A User Evaluation of the 2012 Fire Safety Building Regulations in Sweden and New Zealand

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Abstract
The purpose of this work is to evaluate and analyse the fire safety building regulations in Sweden and New Zealand that underwent significant revision in 2012. The aim of this work is to provide feedback as well as showing if the revised building regulations have achieved some of the major purposes and objectives that were the basis for the revisions. The survey method was chosen as the evaluation tool in order to provide a qualitative analysis from a user perspective. The total number of respondents that participated in the surveys were 155 in Sweden and 89 in New Zealand, out of which the majority were fire safety consultants. The results indicate that the revision of the Swedish fire safety building regulations BBR Chapter 5 was a success and that further development should follow the same path. The results further indicated that the revision of the New Zealand fire safety building regulations NZBC Clause C could not be described as a success, and that a different route may need to be considered for further work and development. Furthermore the surveys pointed to the need for additional guidance for assessment of existing as well as complex buildings in both Sweden and New Zealand.

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Foreword

I would like to extend my appreciation and a big thank you to all of the people who have been kind enough to provide help and support during the course of this work. In particular I would like to thank the following people who have been invaluable during the process of completing this report.

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26 March 2014, Wellington

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Summary

In 2012 the fire safety building regulations in both Sweden, BBR Chapter 5, and New Zealand, NZBC Clause C, were significantly revised. The revision included changes to the mandatory provisions as well as guidance for prescriptive and performance based design. In Sweden Boverket (Swedish National Board of Housing, Building and Planning) introduced the document BBRAD in order to provide general recommendations on performance based fire safety design. In New Zealand the Verification Method C/VM2 was presented by the Ministry for Business, Innovation and Employment as a framework for what can be described as performance based fire safety design.

A number of studies and reviews before the 2012 revisions of the fire safety building regulations had found that they were lacking in clarity and quantifiability. Performance based designs were therefore difficult and complicated to verify against the building regulations which resulted in uncertainty and inconsistent designs. The revisions intended to address these problems while maintaining an acceptable level of safety and promoting innovative designs. The revision of the New Zealand fire safety building regulations had the additional objective of lowering building costs related to the fire safety design process.

The survey method was chosen in order to analyse and evaluate the 2012 fire safety building regulations in Sweden and New Zealand in a qualitative manner from a user perspective. The survey method had previously been utilized with success during the reviews leading up to the revisions. The aim of this work is to show if the revised building regulations have achieved some of the major purposes and objectives that were the basis for the revisions. Additionally, the surveys were to provide general feedback on the fire safety building regulations and the design process in respective country.

Based on a literature study, separate online surveys were distributed to users of the fire safety building regulations, the study population, through a number of relevant channels. The total number of respondents that participated in the surveys were 155 in Sweden and 89 in New Zealand, out of which the majority were fire safety consultants.

The results indicate that the 2012 revision of BBR Chapter 5 in Sweden was to a large degree a success as it achieved many of its primary objectives. Further work and development of the regulations may be necessary, but it should follow the same path as previous changes.

The results from the survey on NZBC Clause C in New Zealand point to the revision not being a success. The survey results indicates that a majority of the main objectives set out before the 2012 revision have not been achieved. The feedback from the respondents on the Verification Method C/VM2 further indicate that it is not a step in the right direction for fire safety design in New Zealand, and therefore a different route may need to be considered for further work and development of the regulations.

Furthermore the survey results indicate that an acceptable level of safety is provided by the fire safety building regulations in both Sweden and New Zealand. The results of both surveys also showed a need for additional guidance for fire safety assessment of existing buildings, as well as fire safety design of very complex buildings.

1 INTRODUCTION 1
1.1 BACKGROUND 1
1.1.1 Swedish building legislation 1
1.1.2 New Zealand building legislation 1
1.1.3 Changing the fire safety building regulations 1
1.2 QUESTION FORMULATION 2
1.3 PURPOSE AND OBJECTIVE 3
1.4 METHOD 3
1.5 SCOPE AND LIMITATIONS 3
1.6 ETHICAL ASPECTS 4
1.7 RELATED RESEARCH 4
1.7.1 Sweden 4
1.7.2 New Zealand 4
2 METHOD 5
2.1 SCIENTIFIC APPROACH 5
2.2 METHODOLOGY 5
2.3 CONDUCTING SURVEYS 6
2.3.1 Designing the questionnaire 7
2.3.2 Designing the questions 8
2.3.3 Implementation methods 9
2.3.4 Analysis of results 10
2.3.5 Ethical aspects 10
3 SWEDISH FIRE SAFETY BUILDING REGULATIONS 11
3.1 HISTORICAL PERSPECTIVE 11
3.2 THE PLANNING AND BUILDING ACT, AND PLANNING AND BUILDING DECREE 11
3.3 BOVERKET'S BUILDING REGULATIONS 13
3.3.1 Prescriptive design method 13
3.3.2 Performance based design method 15
3.4 A REVISION OF BOVERKET'S BUILDING REGULATIONS 16
3.4.1 Government reviews 16
3.4.2 External studies and reviews 17
3.4.3 Developing the Swedish performance based fire safety building regulations 18
4 NEW ZEALAND FIRE SAFETY BUILDING REGULATIONS 19
4.1 HISTORICAL PERSPECTIVE 19
4.2 THE BUILDING ACT 2004 19
4.3 THE NEW ZEALAND BUILDING CODE 20
4.3.1 Prescriptive design method 21
4.3.2 Verification method 22
4.3.3 Alternative solutions 23
4.4 A REVISION OF THE NEW ZEALAND BUILDING CODE 23
4.4.1 Clause C Protection from fire 24
4.5 DEVELOPING THE NEW ZEALAND PERFORMANCE BASED FIRE SAFETY BUILDING REGULATIONS 25
5 THE FINAL SURVEYS 27
5.1 TARGETING THE STUDY POPULATION 27
5.2 LIKERT SCALE QUESTION 28
5.3 PRE-TESTING THE SURVEYS 28
5.4 SCREENING 28
5.5 IMPLEMENTATION 29

5.5.1 Sweden 29
5.5.2 New Zealand 29

6 SURVEY RESULTS 31

6.1 THE SCREENING PROCESS 31
6.2 SWEDEN – SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE 32
6.2.1 Question 1 32
6.2.2 Question 2 33
6.2.3 Question 3 33
6.2.4 Question 4 33
6.2.5 Question 5 34
6.2.6 Question 6 34
6.2.7 Question 7 35
6.2.8 Question 8 36
6.2.9 Question 9 36
6.2.10 Question 10 37
6.2.11 Question 11 37
6.2.12 Question 12 38
6.2.13 Question 13 38
6.2.14 Question 14 39
6.2.15 Question 15 39
6.2.16 Question 16 40
6.2.17 Question 17 40
6.2.18 Question 18 41
6.2.19 Question 19 41
6.2.20 Question 20 42
6.2.21 Question 21 42
6.2.22 Question 22 43
6.2.23 Question 23 43
6.2.24 Question 24 44
6.2.25 Question 25 45
6.2.26 Question 26 49
6.3 NEW ZEALAND – SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE 49
6.3.1 Question 1 50
6.3.2 Question 2 50
6.3.3 Question 3 50
6.3.4 Question 4 51
6.3.5 Question 5 51
6.3.6 Question 6 52
6.3.7 Question 7 53
6.3.8 Question 8 53
6.3.9 Question 9 54
6.3.10 Question 10 54
6.3.11 Question 11 55
6.3.12 Question 12 55
6.3.13 Question 13 56
6.3.14 Question 14 56
6.3.15 Question 15 56
6.3.16 Question 16 57
6.3.17 Question 17 58
6.3.18 Question 18 58
6.3.19 Question 19 59
6.3.20 Question 20 60
6.3.21 Question 21 60
6.3.22 Question 22 61

6.3.23 Question 23 65
7 DISCUSSION 67
7.1 ANALYSIS OF RESULTS FROM THE SWEDISH SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE 67
7.2 ANALYSIS OF RESULTS FROM THE NEW ZEALAND SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE 67
7.3 ANALYSIS OF THE SURVEY RESPONDENT MAJORITY GROUPS 68
7.3.1 Swedish survey on BBR Chapter 5 Safety in case of fire 68
7.3.2 New Zealand survey on NZBC Clause C Protection form fire 69
7.4 COMPARISON AND ANALYSIS OF RESULTS BETWEEN SWEDEN AND NEW ZEALAND 69
7.5 ACCURACY AND TRUSTWORTHINESS OF THE SURVEY RESULTS 70
7.6 CHOICE OF METHOD 71
8 CONCLUSIONS 73
REFERENCES 77
APPENDIX A. SWEDEN – FINAL SURVEY ON BBR CHAPTER 5 81
APPENDIX B. NEW ZEALAND – FINAL SURVEY ON NZBC CLAUSE C 93
APPENDIX C. ADDITIONAL SURVEY RESULTS 103

1 Introduction

The following report is the final result of a report for the course VBRM01 Examensarbete i brandteknik (eng. Report in fire safety engineering) which is part of the Bachelor's degree in Fire Safety Engineering at the Lund University, Sweden. The course is provided by the Department of Fire Safety Engineering and Systems Safety.

1.1 Background

1.1.1 Swedish building legislation

The Planning and Building Act (PBL) (SFS 2010:900) and the Planning and Building Decree (PBF) (SFS 2011:338) together regulate all building work as well as the planning of land, water and construction in Sweden. PBL and PBF contain all fundamental requirements for construction works based on the social objectives to be achieved and state that "The provisions aim to, with respect to individual freedom, promote community development with equal and good living conditions, as well as a sound and sustainable living environment for people in present day and for future generations." (SFS 2010:900).

Boverket (eng. Swedish National Board of Housing, Building and Planning) is the authority for all building and planning in Sweden and are tasked with creating regulations to comply with PBL and PBF. Boverkets Byggregler (BFS 2011:6) (eng. Boverket's Building Regulations), with the Swedish abbreviation BBR used in this report, contain all mandatory provisions for buildings to comply with PBL and PBF. Compliance with BBR can be achieved through either prescriptive or performance based design.

1.1.2 New Zealand building legislation

In New Zealand all building work is governed by the Building Act 2004. Some of the purposes of the Building Act 2004 are to ensure the following.

> "People who use buildings can do so safely and without endangering their health; and buildings have attributes that contribute to appropriately to the health, physical independence, and well-being of the people who use them; and people who use a building can escape from the building if it is on fire; and buildings are designed, constructed and able to be used in ways that promote sustainable development." (The Building Act 2004).

The Ministry of Business, Innovation and Employment (MBIE) is the authority tasked with creating the New Zealand Building Code (NZBC) which contains all mandatory provisions in accordance with the Building Act 2004. Compliance can be achieved through either prescriptive or performance based design. Prescriptive design is referred to as Acceptable Solution, while the Verification Method is for specific fire engineering design which can be described as performance based design. A third means of compliance with the NZBC is the alternative solution.

1.1.3 Changing the fire safety building regulations

In 2012 the fire safety building regulations in both Sweden and New Zealand were overhauled introducing major changes to both structure and content of the regulation documents.

On 1 January 2012 BBR 19 was introduced in Sweden six years after a revision of the document had begun in 2006 (Boverket, 2011a). It was a major overhaul of Section 5 governing fire safety. Although the Swedish fire safety building regulations have been performance based since 1994, it was concluded in a number of studies and reviews that the regulations were not sufficiently quantifiable which in practice made verification difficult and complicated (Boverket, 2011a). The reviews, both by third parties and Boverket themselves,

also found that the regulations were not clear and could be misinterpreted. According to Lundin (2005) this resulted in a wide variation of the fire safety levels for buildings and meant that unambiguous acceptance criteria and clearly defined design methods were necessary.

In New Zealand a new Clause C governing fire safety was introduced on 10 April 2012. This followed the introduction of the Building Act 2004 which had required a comprehensive, statutory review of the NZBC. The review concluded that performance based design was achieving its purpose of generating innovative designs in New Zealand. However, the review also found that the regulations lacked clarity and were not precise resulting in fire safety designs that were unduly conservative and inconsistent. It was believed this lead to costly and lengthy fire safety design reviews by the Authorities Having Jurisdiction (AHJs) who approve all designs (DBH, 2012c).

Studies and reviews of the 2012 fire safety building regulations in Sweden and New Zealand are few and therefore the effects are not well documented. Feedback on the regulations would benefit not only the countries in which they are used, but also other countries where similar regulations are planned or in the process of being developed.

1.2 Question formulation

At the time of writing, the 2012 fire safety building regulations in Sweden and New Zealand have been in effect for over a year. It is clear that the incentives for the revisions are similar in both countries, and adding to this the changes were made around the same time period. It would therefore be beneficial to analyse how the regulations were changed, what they were based on and if there are any significant differences between them.

Some of the major objectives of the revisions to respective regulations were to provide an increased level of quantifiability and a better approach of verifying the safety level of fire safety designs. Therefore it is of particular interest to see if those objectives have been achieved. Surveys among the users was one important evaluation tool used leading up to the revisions.

The following questions have been identified and will be addressed in this report. The first three questions will largely be answered during the literature study phase. Emphasis will be on the last three questions by utilizing the survey method.

- Why were new fire safety building regulations required in Sweden and New Zealand, and what were the some of the purposes and objectives of the revisions?
- What are the Swedish and New Zealand frameworks for performance based fire safety design based on?
- Are there significant differences between the fire safety building regulations and the respective design process in Sweden and New Zealand, and do these have any consequences?
- Given the purpose and objectives set for the revisions of the fire safety building regulations in Sweden and New Zealand, do the users consider that they have been achieved?
- How are the fire safety building regulations perceived within the fire safety industry in Sweden and New Zealand respectively, and what is the feedback?
- Are there any direct problems related to the fire safety building regulations or the design process in Sweden and New Zealand, and how can these potentially be solved?

1.3 Purpose and objective

The purposes of this report is to, in a qualitative manner, analyse and evaluate the 2012 fire safety building regulations in Sweden and New Zealand from a user perspective.

The objective of this report is to show if the 2012 fire safety building regulations in Sweden and New Zealand have achieved some of the purposes and objectives that were the basis for the revisions. Further, the objective is to show how the regulations are perceived by the fire safety industries in respective country. In addition the objective is to elicit feedback from the industry and if possible provide suggestions on how the regulations and the fire safety design process can be improved in each of the countries under study.

1.4 Method

The following three methods will be utilized during the writing of this report.

- Literature studies
- Survey technique
- Compilation and analysis of the results of the surveys

Initially a literature study is conducted to examine why the changes to the regulations were necessary, what the purpose and objectives were, how they were implemented, how they are applied as well as if there any general differences between the regulations in Sweden and New Zealand.

Parallel and in conjunction with the literature study, survey technique will be studied to create a qualitative measuring scale in form of a questionnaire to be used in the surveys. Essentially the surveys will attempt to transform qualitative opinions of the users into quantitative feedback on the regulations. The purpose of the questionnaire is to allow the users evaluate the new regulations in regards to the objectives of the revisions. The results of the surveys will then be compiled and analysed to be able to draw conclusions concerning the overall quality of the regulations. Suggestions will then be given on how to improve the regulations based on the results of the surveys and feedback from the respondents.

1.5 Scope and limitations

The evaluation of the regulations will be solely qualitative and based on the views and opinions of the persons participating in the surveys. The aim is to target persons who are familiar with the regulations and are active within the fire safety industry.

This report is limited to the fire safety building regulations in Sweden and New Zealand. In Sweden the specific versions used for this report is BBR 20 (BFS 2011:6 with changes up until 2013:14), BBRAD 3 (BFS 2011:27 with changes up until BFS 2013:12) and BBRBE 1 (BFS 2013:11). It should be noted that this report is mainly focused on the major changes introduced with BBR 19 in 2012, however the changes for BBR 20 were not as significant for Chapter 5 and mostly included re-wording or clarification of changes that came with BBR 19.

In New Zealand the specific versions used for this report is NZBC Clause C1-C6 Protection from fire dated 10 April 2012, Acceptable Solutions C/AS1 to C/AS7 Errata 1 dated 15 February 2013 and the Verification Method C/VM2 Errata 2 dated 15 February 2013. Updated versions of the New Zealand Acceptable Solutions C/AS1 to C/AS7 and the Verification Method C/VM2 with corresponding commentary were issued by the Ministry of Business, Innovation and Employment on 19 December 2013, shortly before the completion of this report. Additional guidance on assessment of existing buildings was also released by MBIE around this time. Although the changes were relatively significant they have not been considered for this report due to limited time resources.

1.6 Ethical aspects

The results presented in this report are concluded from the surveys taken by persons within the fire safety industries in Sweden and New Zealand. Therefore an important part of the work is related to ethical aspects such as protecting the integrity of the individuals participating in the surveys. A study into these aspects is done in Section 2.3.5.

1.7 Related research

The 2012 fire safety building regulations in Sweden and New Zealand are at the time of writing relatively new and therefore not much research has been published on their impact of fire safety design.

1.7.1 Sweden

Not long after the 2012 regulations were introduced in Sweden, Norén, Bengtsson & Rantatalo (2012) published a study focusing on means of escape in the event of a fire in regards to the new regulations. The study considered changes in fire risk and societal risk acceptance due to the 2012 Swedish regulations. It looked at design fires used prior to the new regulations and compared them to design fires recommended by Boverket for performance based design. The study also analysed real life fire statistics and compared them to the design fires recommended by Boverket. Norén et al. (2012) concluded that the design fires recommended by Boverket are less conservative than previously used design fires and indicated that this could have an impact on societal risk acceptance.

A study by Thuns & Wibelius (2012) compared the prescriptive design method against the performance based scenario analysis method from the 2012 regulations. The study concluded that there were differences in level of safety between the two methods. The scenario analysis used indicated a higher level of safety than that of the prescriptive design method. Further, the study showed that the 2012 regulations most likely had resulted in less uncertainty in regards to compliance with the mandatory provisions. This can be related to the findings of Lundin (2005) which showed that there was a substantial uncertainty for fire safety designs in accordance with older versions of BBR.

1.7.2 New Zealand

No research related to the fire safety regulations in New Zealand could be found dated 2012 or later. However, a study by Lloydd (2008) evaluated a conceptual framework for performance based fire safety design that later became the Verification Method C/VM2. The results of the study indicated that buildings designed with prescriptive design did not comply with the conceptual framework for performance based fire safety design. The study concluded that the framework did not entirely achieve its purposes and therefore needed more work.

2 Method

2.1 Scientific approach

Three scientific methods of approach are suggested by Backman (2008) when conducting report work, the traditional, the qualitative and the literature review method. The traditional method revolves around a neutral perspective where the researcher observes, measures and conducts experiments and then attempts to formulate hypotheses and theories to explain phenomenon in the world around us. The qualitative method is more abstract. It mainly focuses on the written word and takes more of a storytelling approach than scientific. The qualitative method of approach can involve concepts such as opinions, organization, interaction, stress and pain which cannot easily be explained by numbers or data. The purpose of the literature review method is to account for what has previously been researched within a specific field.

This report will utilize parts of all the methods described above. The main focus is to evaluate regulations based on opinions of the users which are qualitative. However a traditional approach is required to develop an evaluation tool in the form of a survey where the regulations can be evaluated and be described in a quantitative way. The literature review method will provide the foundation of this report by building on previous literature in the field of fire safety regulation and design.

2.2 Methodology

Methodology is the basic work method chosen for any research. It provides guidance and principles in order to move from a general purpose to an increased knowledge of the chosen subject to be studied. The appropriate method depends on the objective and character of the research (Höst, Regnell & Runeson, 2006).

Höst et al. (2006) suggest the following methodologies for scientific research.

- ***Survey***. A compilation and description of the current situation for the subject or phenomenon under study.
- ***Case study***. An in depth study of one or more cases without trying to impose influence on the object under study.
- ***Experiment***. A comparative analysis of two or more alternatives attempting to isolate variables and manipulate a select few.
- ***Action research***. A carefully monitored and documented study of an activity with the purpose to solve a problem.

Because the user perspective is the focus of this work the survey methodology will be utilized to describe the current situation regarding fire safety building regulations in Sweden and New Zealand. Survey research can be seen as a first step and depending on the results from this report further studies may be considered.

According to Höst et al. (2006) the literature study is an important part of studies. It provides the foundation of all studies by building on existing research and reduces the risk of missing already learnt lesson. The literature study technique for this study will begin as a broad search. As more information is gathered the search will become more refined to focus on the specific subject at hand, fire safety regulations in Sweden and New Zealand. All material will be evaluated in terms of credibility, both in regards to the author and utilized methods. As the study revolves around regulations issued by Governments and authorities the literature study will focus on those type of sources.

2.3 Conducting surveys

Surveys can typically collect three types of information, descriptive, behavioral and attitudinal. Descriptive information can include the respondent's age, income, education and occupation. Behavioral information can show a respondent's behavior such as information regarding transportation use, recreation and personal behavior. Attitudinal information shows respondent's personal opinions and preferences for various subjects (Rea & Parker, 2005).

Suggested implementation methods for survey research are mail-out, web-based, telephone, in-person interviews. For this report the mail-out and web-based methods are considered.

The mail-out format for collecting survey data involves the distribution of printed questionnaires through the mail to a sample of predestinated potential respondents. The respondents are asked to complete the questionnaire on their own and return it by mail to the researcher. The alternative to the mail-out technique is the web-based surveys whereby individuals usually are contacted by e-mail and asked to participate in a survey that is designed to be completed and submitted via a computer.

Both the mail-out and web-based surveys are associated with a number of advantages and disadvantages, many of which are the same as the two techniques are very similar. Below is a comparison regarding a number of relevant issues for the two techniques.

- ***Time period***. Mail-out surveys require a relatively long time period for distribution and follow-up. Generally a few weeks are required for questionnaires to be returned (Rea & Parker, 2005). In relation to web-based surveys this issue is almost non-existent as both distribution, follow-up and results of the survey are delivered instantly (Martins, 2010).
- ***Administration costs***. Both preparation and administration costs are significantly lower for web-based surveys compared to the mail-out technique. Mail-out surveys require paper, printing and postage which can prove to be expensive (Martins, 2010).
- ***Anonymity and confidentiality***. Respondents of web-based surveys may fear that their responses are intercepted and used for other purposes than that promised of the researcher (Dillman, 2000). Personal or sensitive information supplied by the respondents can however be protected through encryption of data and other methods (Rea & Parker, 2005).
- ***Follow-up***. Web-based surveys are easier and less costly to follow-up in terms of reminder e-mails. If a participation list is used the web-based technique can allow for targeted follow-ups of individuals who have not yet completed the survey (Martins, 2010).
- ***Ease of data entry and analysis***. It is relatively easy for respondents to complete web-based surveys. Burdens of sending, receiving, coding, data capturing and screening data is considerably less than that of mail-out surveys (Martins, 2010).
- ***Response rate***. Research has indicated that response rates from web-based surveys can be both lower and higher than that of other research methods. Older research on web-based techniques tend to show lower response rates compared to mail-out, while more recent research tend to show the opposite or similar response rates (Martins, 2010). This can be associated with people's access to the internet and computer literacy (Rea & Parker, 2005). Further research indicates that with the development of modern technology over the years, the web-based survey has become the preferred method and can therefore provide better response rates compared to other methods (Dyrenforth, Moore, Osatuke, Teclaw & Yanovsky, 2010).

With the above in mind the web-based survey method is considered the best option for this report.

2.3.1 Designing the questionnaire

The process of developing the questionnaire, the set of questions the respondent is to answer, is the core aspect of survey research. Determining the relevant issues that bear on the purpose of the research can in principle be approached in two ways. The first approach is for the survey researcher to construct a team of experts who together plan and implement the survey study. The second is for the researcher to gather information about issues of importance from various sources (Rea & Parker, 2010). The work within this report will primarily follow the second approach with some input from a select number of experts.

Once a draft questionnaire has been formulated the next step is to conduct a pre-test. A pre-test is a small-scale implementation of the draft questionnaire to assess critical factors such as questionnaire clarity, comprehensiveness and acceptability. Assessing the questionnaire clarity checks if respondents understand the questions and if they are sufficiently clear to elicit the desired information from the survey. Questionnaire comprehensiveness shows whether the questions and response choices are sufficiently comprehensive to cover a reasonably complete range of alternatives. Lastly, assessing questionnaire acceptability involves addressing potential problems such as excessive questionnaire length, as well as confidentiality and ethical issues. Web-based surveys should take no more than 15 minutes to complete (Rea & Parker, 2005). The questionnaire for this report will be pre-tested on a handful of individuals who possess extensive knowledge and experience in the field of fire safety design and regulation in respective country. If the pre-test shows that an extensive revision of the questionnaire is required then further pre-tests will be considered.

It is important to inform potential respondents about the purpose of the survey in order to convey its importance and alleviate any concerns they are likely to have. There is a need to convince potential respondents that their participation is useful both to the one conducting the survey and the respondents themselves. Any concerns that respondents might have regarding time, inconvenience and confidentiality should be allayed. The above can be addressed in an introductory statement or a cover letter accompanying the survey. It should note who is conducting the survey, the purpose and objective of the survey, the significance of the survey in relation to the respondents, reasons to why the respondent has been selected, the value of the respondents' participation, and that there are no correct or incorrect answers (Rea & Parker, 2005).

The initial questions contained in a questionnaire are the most important. The primary purpose of introductory questions is to stimulate interest and encourage the respondents to continue the questionnaire without offending, threatening, confusing or boring them. Therefore they should be relatively easy and straight forward to answer (Salant & Dillman, 1994)

Related questions should be put together in order to keep the respondent focused on the subject matter (Salant & Dillman, 1994). At the same time it is important to avoid patterned or reflexive responses made without adequate thought. Some questions within the questionnaire may involve establishing the respondent's qualifications as well as indicating if they are included in the study population (Rea & Parker, 2005).

Questions can be open-ended or closed-ended in regards to the answer. Closed-ended questions have a fixed list of alternative responses and ask the respondent to select one or more options to indicate the best possible answer. In contrast, open-ended questions have no preexisting response categories and permit the respondent to formulate the answer. Closed-ended questions are preferred when it comes to data entry and analysis. They also make it easier for the respondent to complete the survey in a timely manner without considerable thought. Alternatively, closed-ended questions can be complemented with optional open-

ended answers, for example by using a 'Other (please specify)' response category (Salant & Dillman, 1994).

2.3.2 Designing the questions

Once the objective of the questionnaire and the survey as a whole is established it is necessary to translate this into good questions. This method is called operationalizing, which is measurement of phenomenon that is not directly measurable. It can also be described as the process of making a theoretical concept clearly distinguishable to understand in terms of empirical research (Salant & Dillman, 1994). Rea & Parker (2005) and Dillman (2000) suggest the following guidelines when creating survey questions.

- Generally the wording should be simple, straightforward and to the point while still providing enough information in order for the respondent to understand the question and provide an accurate response.
- Ambiguous wording and phrasing of questions should be avoided.
- Questions should not be double-barreled by inadvertently introducing two or more issues with the expectation of a single response.
- Although questions may require some form of explanation or background information, it is necessary to not influence the response by providing manipulative information in any way.
- The questions must be as neutral as possible to obtain accurate results.

Survey data are organized in terms of variables. A variable is a specific characteristic of the studied population such as age, sex or preference of a subject. The measurement scales for these variables can either be nominal, ordinal, interval or ratio scales. Nominal scales allow for data to be placed into categories and counted only with regard to frequency. Examples include gender, nationality, ethnicity and language. Ordinal measurement provides information about the ordering of categories but do not indicate differences among them. Examples of the ordinal scale can be sick versus healthy and false versus true. Interval level measurement labels, orders and uses constant units of measurement to indicate a value of each response category. Examples of interval levels include date and temperature in Celsius. The ratio scale is similar to the interval scale with the addition that it has an absolute zero value. This enables comparison of ratio, for example something can be twice as big as something else. Examples include length, age and temperature in Kelvin as it has an absolute zero value (Rea & Parker, 2005).

The basic primary guideline to follow when formatting response categories is clarity of presentation. It is important to have a comprehensive list of response categories for each closed-ended question. However, it is recommended to not include more than ten response alternatives for each question. This can be balanced through the use of an 'Other (please specify)' response category if required. The categories should also be ordered in an inherent logical order (Rea & Parker, 2005).

According to Höst et al. (2006) the Likert scale is a good method of asking qualitative questions as the respondents can indicate on a scale what their opinions are regarding certain statements. Such an example is a Likert scale. It is an ordinal scale which involves a five-, seven-, or nine-point rating scale where the attitude of the respondent is measured in a range from one extreme to another, for example from 'Completely agree' to 'Completely disagree'. It should include an equal number of positive and negative response categories, and one middle category which is considered neutral (Rea & Parker, 2005). If a 'No opinion' response category is to be included it should be placed last to be differentiated from the neutral middle category (Dillman, 2000).

Höst et al. (2006) describes two types of non-responses for surveys, the external and the internal. The external occurs when an individual who receives the questionnaire does not participate at all for any reason. The internal occurs when the respondent only partially completes the questionnaire.

According to Ahtiainen, Hörngren, Japec, Lindén, Lyberg & Nilsson (1997) a high number of internal non-responses on a particular question can indicate that there is something wrong with the question. It could be that the respondents did not understand the question or that they did not know the answer to it. If the number of internal nonresponses is significant or if data for crucial questions is missing it is also possible to completely disregard the respondent, essentially treating the internal nonresponses as external.

2.3.3 Implementation methods

The selection of population to be studied is important for the success of a survey. It determines how the results can be used and what conclusions can be made. The first step is to specify the population to be studied, which is the fire safety industry in this case. The next step is to select participants, and Höst et al. (2006) describes the following methods.

- ***Total survey***. This involves sending the survey to the entire population. This is only practical when the studied population is small.
- ***Simple random sampling***. Respondents are randomly selected from the population. Each individual has the same probability of being a part of the sample.
- ***Systematic sampling***. This method relies on arranging the study population according to an ordering scheme and then selecting every N^{th} individual from then onwards.
- ***Clustered sampling***. Sampling is often clustered by geography or time periods. This method can be more cost-effective when implementing the survey by distributing the survey in the same geographical area.
- ***Stratified sampling.*** This is similar to the clustered sampling method, the difference being that the population is divided into several smaller populations with distinct categories called ‘strata’ from which the potential respondents are chosen.

For this report the two study populations are persons with knowledge of the fire safety building regulations, the fire safety industry, in Sweden and New Zealand. In Sweden Fire Engineers are classified as safety and quality inspectors and in 2011 there were around 7700 employed safety and quality inspectors out of a total employed population of approximately 4 900 000 persons (Statistics Sweden, 2013). The fire safety industry population in Sweden can therefore be considered relatively small assuming that not all safety and quality inspectors work with fire safety. On the other hand there are most likely other professions that do work with fire safety but are not in the same classification group. In New Zealand the employed population was approximately 2 350 000 in 2011 (Statistics New Zealand, 2013). Although no statistics could be found on Fire Engineers or similar employment it can be assumed that the fire safety industry population of New Zealand is not greater than in Sweden, and therefore also relatively small.

A number of factors are important to consider when implementing the survey. One such factor is that the fire safety industry is a diverse field. The largest group is most likely fire safety consultants, other groups are the Fire Service, AHJs, universities and insurance companies. This makes it difficult to obtain lists of potential respondents. Therefore the surveys will be implemented with the intention of reaching out to as many persons as possible that are likely to be part of the study population. This can be compared to the total survey method described by Höst et al. (2006). Scientific accuracy will most likely not be achieved but the study will provide an indication of how the regulations are perceived by the users.

Another important factor is that although lists of persons with fire engineering background might exist, for example from universities or larger institutions, they may not be made available due to confidentiality reasons. A possible solution is to contact organizations who are active in the fire safety industry and explain the purpose of the survey, and then provide them with the cover letter including a link to the online survey for them to distribute. By doing that the survey can be distributed to the potential respondents without the organizations breaching any confidentiality agreements.

2.3.4 Analysis of results

Measures of central tendency are statistics that provide a summarizing number that characterizes what is typical or average for those data. Three main measures of central tendency are the mode, median and arithmetic mean. Mode is the variable that occurs most frequently. The median is the variable that represents the center of the data. This method is only useful if the data can be arranged in order such as ordinal, interval or ratio scale variables where the categories can be ranked. The arithmetic mean is also referred to as the mathematical center of data, or more commonly as the average rating. It requires data to be measured on the interval or ratio scale as the data needs to be both ranked and measurable. The arithmetic mean can be useful when measuring central tendencies of scaled variables, such as the Likert scale. The data for Likert scales are ordinal but the arithmetic mean can be calculated by treating it like interval data. In a five-point rated Likert scale the numerical values 1 to 5 can be assigned from ‘Highly positive’ to ‘Highly negative’. This allows for the arithmetic mean to be calculated indicating the center of the distribution and what it is weighted towards. This makes the assumption that respondents have an understanding of the meaning of each response category. In reality this is not the case as people will interpret ‘Highly positive’ versus ‘Highly negative’ differently. It also makes the assumption that there is an equal distance between each category of the variable that is measurable in accordance with the numerical values assigned to these categories. Despite these assumptions and manipulations the arithmetic mean is an accepted means of measurement of central tendency for scaled variables as the information it provides is valuable.

The surveys in Sweden and New Zealand will be kept similar so that the results can be compared.

2.3.5 Ethical aspects

Survey research and consideration of ethical issues are strongly connected. Ethical considerations should include protecting both individuals right to privacy as well as results related to the survey (Salant & Dillman, 1994). All information obtained as a part of this report, including respondent contact information and responses to surveys, will be treated with complete confidentiality in accordance with Swedish and New Zealand law. Applicable laws are the Personal Data Act (SFS 1998:204) in Sweden and the Privacy Act 1993 in New Zealand.

It must be made clear to the respondent that the survey is voluntary (Salant & Dillman, 1994). The purpose of the data collection should be agreed to with the respondent (Höst et al., 2006). Survey data from this report will be used for research purposes only and will not be connected to any individual. The surveys will also not include any type of sensitive information. All of these aspects will be made clear to potential respondents.

To protect respondents privacy and confidentiality all survey data will be stored and communicated through secure encrypted servers (SurveyMonkey 1, 2013).All survey data will be handled by the Author only and survey data will not be sold or shared with third parties (SurveyMonkey 2, 2013).

3 Swedish fire safety building regulations

3.1 Historical perspective

References to fire safety in Swedish history can be found as far back as the Middle Ages. Around the year 1350 King Magnus Eriksson established the first Swedish national law which stated that any individual who lit a fire or who carried burning material from one house or farm to another was held responsible until it was extinguished (Holmbäck & Wessen, 1962).

During the 17th century streets and alleys had width requirements to prevent the spread of fire and facilitate firefighting operations. Chimneys and buildings with roofs constructed out of flammable material such as thatch and straw were to be inspected as a preventative measure.

Even though fire safety has a long history in Sweden it did not prevent a number of serious fires during the 18th and 19th century where entire villages and cities were completely or partially burned to the ground. As a response preventative measures included walls made out of incombustible materials between houses if the houses were not separated by a certain distance (Värmlands Brandhistoriska Klubb, 2013b).

The 20th century saw the introduction of the first modern building regulations in Sweden. The first versions of the current Swedish legislation for structures were introduced in 1987, PBL (1987:10) and PBF (1987:383). They were introduced together with NR 1 (BFS 1988:18) which contained both mandatory provisions and general recommendations for buildings, including changes that came about due to new knowledge on fire safety.

In 1994 BBR 1 (BFS 1993:57) was introduced, which was the first version of the building regulations that are used today. It was the first set of Swedish building regulations to be entirely performance based. Design could be verified through calculations and newly discovered methodologies related to fire safety, however prescriptive design methods were still available. According to Boverket (1997) this was to result in progress in technical fire safety solutions, provide flexibility and innovation to the design of buildings, as well as lower costs with a maintained level of safety.

3.2 The Planning and Building Act, and Planning and Building Decree

The Planning and Building Act, the Planning and Building Decree form the minimum acceptable standards expected by the society for all buildings while also enabling buildings to exceed the requirements and provide a higher level of safety (Boverket, 2011b).

Figure 3.1 shows an overview of the Swedish building legislation and means of compliance. PBL and PBF issued by the Parliament and Government are at the top of the pyramid with the highest legal status governing all construction works.

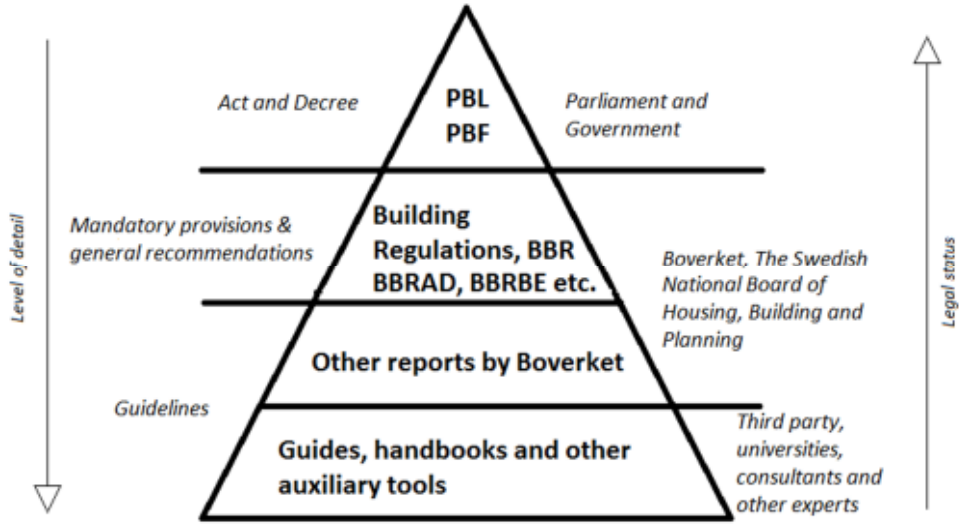

FIGURE 3.1 OVERVIEW OF THE SWEDISH BUILDING LEGISLATION AND MEANS OF COMPLIANCE.

PBL Section 8 4§ state that all construction works shall have the technical properties that are essential in terms of safety in case of fire. To comply with this requirement PBF Section 3 8§ provide the following provisions in regards to the design and construction of structures.

1. The load-bearing capabilities of the structure is likely to persist over a given time period in the event of a fire,
2. The development and spread of fire and smoke within the structure is limited,
3. Spread of fire to neighboring structures is limited,
4. Persons within the structure can escape or be rescued by other means in the event of a fire, and
5. Consideration has been given to the safety of rescue personnel in the event of a fire.

BBR and other documents issued by Boverket are further down in the pyramid and are generally more detailed.

According to the PBL the responsibility for ensuring that the fire safety requirements of BBR are met and have been verified in an appropriate way, rests on the developer. The developer is required to have a quality assurance and risk management system in place to ensure that all design and construction work is compliant with the regulations. It is important to emphasize that AHJs, local housing committees, in Sweden are not approving authorities, and do not provide a seal of compliance for building designs. The role of the AHJ is to interpret the legislation, oversee the competence and knowledge of the developer, and decide what is to be reviewed as well as what documentation that is to be presented. The AHJ does have the authority to intervene when so required, for example when the, by the developer, adopted self-review process is not adequate. The AHJ can then take appropriate precautions such as appointing independent peer-reviewers. Persons within AHJs must therefore have specific knowledge and competence in the field of fire safety (Boverket, 2011b; Boverket, 1997).

There is currently no regulations related to the Fire Service and their role in the building process and therefore their role differ between municipalities. Typically they act as advisers to AHJs supported by municipal law. The Fire Service mandate triggers once the building is completed and is in operation as other legislation require fire safety inspections.

3.3 Boverket's Building Regulations

BBR (BFS 2011:6) contains all mandatory provisions, also known as functional requirements, as well as general recommendations for buildings pursuant to PBL and PBF. It should be noted that BBR regulate buildings only, and not all structures. The legislation defines a building as a non-temporary construction consisting of a roof, or a roof and adjoining walls, that are permanently placed on the ground, completely or partially underground, or completely or partially on water that is constructed in a way to enable persons to reside in it.

The provisions of PBL, PBF and the functional requirements of BBR are mandatory for all buildings, stating what is to be achieved. General recommendations issued by Boverket are not mandatory, instead they are intended to provide guidance on how compliance can be achieved (Boverket, 2011b). General recommendations are clearly marked and worded so that they are not confused with mandatory provisions.

Section 5 of BBR contain all safety in case of fire provisions for buildings required by PBF and PBL except for provisions related to load-bearing capabilities in the event of a fire which are provided in the separate document EKS (BFS 2011:10). The general conditions and objectives related to fire safety for all building designs and is quoted from BBR below.

> "Buildings shall be designed with a fire protection that ensures that fire safety is satisfactory. The design of the fire protection shall be based on the assumption that a fire could occur.
>
> A buildings fire protection shall be designed with adequate robustness to ensure all or large parts of the protection is not knocked out by individual events or stresses." (BFS 2011:6, 5:1)

Several standards are referenced as general recommendations within BBR and other documents issued by Boverket. Most of these standards are EN standards issued by European standardization bodies and can be used for verification of the functional requirements. The Swedish versions of these standards are issued by the Swedish Standards Institute and are referred to as SS-EN standards.

Compliance with BBR can be achieved in two ways. It states that all fire protection elements of buildings shall be designed, developed and verified through either prescriptive or performance based design methods. This is referred to as simplified and analytical design respectively.

3.3.1 Prescriptive design method

Prescriptive design method means following the solutions and methods specified by the general recommendations within BBR Section 5.

BBR include provisions related to classifying spaces in buildings into occupancy classes. The classification depends on the extent to which people are knowledgeable about the building and its evacuation procedures, if they can evacuate mainly on their own, if they are expected to be awake and if there is an increased risk of a fire occurring and spreading rapidly. Table 3.1 show a general description of the occupancy classes specified in BBR.

TABLE 3.1 GENERAL DESCRIPTION OF OCCUPANCY CLASSES WITHIN BBR (BFS 2011:6).

Occupancy class	Description	Examples
1	Includes spaces where residents are likely to have a good local knowledge and have the ability to evacuate without assistance and are likely to be awake.	Industrial buildings, warehouses and offices.
2	Includes spaces of assembly and other premises where residents are likely to have good local knowledge and have the ability to evacuate without assistance and are likely to be awake. Is divided into sub-classes depending on occupant loads and if alcohol is served in the premise.	Schools, shops, health centers, conference centers, auditoriums, cinemas, lecture halls, restaurants, , sports halls, retail facilities, theatres, concerts halls, larger pubs and nightclubs.
3	Includes dwellings where residents are likely to have good local knowledge and have the ability to evacuate without assistance and cannot be assumed to be awake.	Multi-dwelling blocks, single family houses, sheltered housing, nursing homes and day care centers for families.
4	Includes spaces where residents are not likely to have good local knowledge, but have the ability to make themselves safe and cannot be assumed to be awake.	Hotels, hostels, bed and breakfasts and other types of temporary accommodation.
5	Includes spaces where occupants have limited or no ability to evacuate without assistance. Is divided into sub-classes depending on the type of care or treatment within the space, or if persons are kept detained.	Pre-schools, mental institutions, hospitals and prisons.
6	Includes spaces with increased probability of the occurrence of fire or where fire can grow and spread rapidly. It is to be noted that the regulations for the handling of flammable and explosive goods are not included in BBR.	Spaces where highly flammable goods are produced and processed, mills, paper factories, production buildings for agricultural and facilities for professional woodworking.

In addition to the occupancy classes, there are also building classes which are based on the building's need for protection. In assessing the need for fire protection the designer is required to take into account a probable fire development, potential consequences of a fire and the complexity of the building. A brief description of general recommendations regarding building classes is provided in Table 3.2.

TABLE 3.2. GENERAL DESCRIPTION OF BUILDING CLASSES WITHIN BBR (BFS 2011:6).

Building class	Description	General recommendations
Br0	Buildings with a very high need for protection.	Buildings with more than 16 storeys, certain sub-classes of occupancy class 5 such as hospitals and prisons, and certain sub-classes of occupancy class 2 with a high occupant load.
Br1	Buildings with a high need for protection.	Buildings with two storeys in occupancy class 4 and to some extent occupancy class 5. In addition certain spaces within occupancy class 2 where the assembly space is on the second storey.
Br2	Buildings with a moderate need for protection.	Two storey buildings with certain spaces of occupancy class 2 on the ground floor, and with areas exceeding a certain limit that is not divided into firecells.
Br3	Buildings with a low need for protection	Other buildings not specified in the general recommendations.

Buildings classified as Br1, Br2 and Br3 can all be designed using the prescriptive design method described in BBR. The performance based design method is required for buildings classified as Br0.

3.3.2 Performance based design method

Performance based design is when a building design meets one or more of the mandatory provisions of BBR other than through the prescriptive design method. Verification of compliance can done either through qualitative assessment, scenario analysis, quantitative risk analysis or equivalent methods.

In order to provide guidance for performance based design, Boverket issued a document with general recommendations on performance based fire safety design called BBRAD (BFS 2011:27) as a part of the 2012 revision. This guidance document is structured into the following six sections.

BBRAD Section 1 - Introduction. This section provides the scope of the document and its purpose. An overall perspective of the building's fire safety is recommended when using the document as a verification method for performance based design.

BBRAD Section 2 - The design process. This section describes the recommended design process. It should include a description of the analysis, identification of the verification need, how verification will be shown and what is considered acceptable levels of safety. The verification should also include a risk identification to highlight relevant scenarios impacting the fire safety of the building.

A qualitative assessment should only be applied if the deviations from prescriptive design are limited, or the impact on fire safety is well known and the design satisfies the provisions with a large safety margin. Suggested methods that can be used are logical reasoning, statistics, known and tested solutions, simple calculations and specific tests.

A scenario analysis should be based on the assumption that the fire safety of a building is subject to one or more scenarios. The scenarios should be identified and chosen to represent the worst probable scenarios, and all results should be shown to be acceptable. A sensitivity analysis should also be included to identify variables with great impact on the fire safety.

Verification through quantitative risk analysis should have a probabilistic approach towards input variables. Distribution of probabilities should reflect the entire economical life span of the building and any probable events that could occur. The design method should include both a sensitivity and uncertainty analysis.

This section also provides recommendations regarding the design of Br0 buildings and special considerations that should be applied.

BBRAD Section 3 - Means of escape in the event of fire. This section provide recommendations on analysis for means of escape and related fire modelling. The analysis should consider different scenarios to accommodate for human behavior and persons that may be hindered.

*BBRAD Section 4 - Protection against fire and smoke spread within a building***.** This section outlines the recommendations for assessing fire and smoke spread within a building. This includes fire separations, preventing fire and smoke spread within the ventilation system and pressurization of spaces.

BBRAD Section 5 - Protection against fire spread between buildings. This section provide the recommendations for assessing external fire spread between buildings and provide suggested heat radiation for different occupancies and the limits to be met.

BBRAD Section 6 - Documentation and verification. This section provide recommendations on the documentation and verification that should be provided for each project. It outlines what should be included and should state that it has been reviewed and passed the control process adopted by the developer.

3.4 A revision of Boverket's Building Regulations

3.4.1 Government reviews

In 1994 when the first version of BBR was introduced it was considered a major overhaul of the regulations. The design approach went from being almost completely prescriptive to performance based. According to Boverket (1997) this was to result in technical progress of fire safety solutions, provide flexibility and innovation to the design of buildings, as well as lower costs with a maintained level of safety.

In 1995 the Swedish Government, on initiative from Boverket, called for a review of the changes that had been introduced a year earlier. The purpose of the review, conducted by Boverket (1997) was to study the consequences brought on by the 1994 performance based regulations. An important question that needed answering was if the level of safety had changed.

A number of methods were adopted for the review. Two case studies were done, one school and one assembly hall, by comparing the prescriptive and performance based designs in regards to relative level of safety and costs. The prescriptive designs were based on the older regulations, while the performance based designs were based on BBR. The work was completed by the Department of Fire Safety Engineering and Systems Safety at Lund University. In addition, a telephone survey was conducted in which a total of 353 users of the regulations participated. The majority of the participants were consultants, building entrepreneurs, AHJs, and persons within the fire service. The survey included 30 questions that originated from cases and yearly seminars on fire safety that Boverket were involved in.

Boverket's (1997) review concluded that the performance based regulations allowed for flexible design solutions as well as lower construction costs. The case studies could not clearly show that the level of safety had changed. They did however show that the performance based regulations had not been complied with in a satisfactory way and that the available fire engineering knowledge had not been utilized to its full extent. This had resulted in an increased uncertainty the design complied with the mandatory provisions of BBR. At the same time the defined documentation and verification requirements resulted in a higher quality and therefore a better level of safety. The survey results indicated that the competence and knowledge of persons dealing with fire safety design generally was not adequate. Almost half of the participants considered, or were hesitant to the question, that persons involved in the building process did not understand the performance based regulations. A third could not tell if sensitivity analyses of designs were acceptable. The survey also showed that 80% were of the opinion that the documentation of buildings fire safety designs had improved with the 1994 regulations.

Based on the review Boverket (1997) suggested several improvements. The most significant one was to continue the work and development on the performance based regulations as well as a method to provide guidance for risk based fire safety design. Crucial to designing compliant buildings was to make sure involved parties increased their competence and that fire safety engineering was to be included in an early stage of the design process. An increased control of compliance was deemed necessary to ensure fire protection was designed and constructed according to the regulations with a satisfactory level of safety.

Following the review Boverket (1997) proposed a number of changes, these are summarized below.

- Guidance documents on performance based design should be developed to include:
    - Input, including uncertainty factors, for design fires, smoke spread and means of escape,
    - Calculation methods, including limitations,
    - Input, including statistics on reliability, for technical fire safety solutions such as automatic fire sprinklers, automatic fire alarm system, door closers and fire dampers, and
    - Methods for verification and documentation of a building's fire safety such as the results of sensitivity analyses.
- The quality of control of designs and their implementation should be improved through:
    - Certification of persons responsible for independent reviews of the designs according to PBL,
    - Improve AHJs ability to perform inspections during the building phase, and
    - Improve the self-control systems utilized by developers.
- Risk analysis should be more widely used by:
    - Authorities, to define safety levels; and
    - Designers, for relative comparisons of safety levels.

3.4.2 External studies and reviews

A number of external studies on the fire safety regulations in BBR has been done since 1994 leading up to the major revision of 2012.

Lundin (2005) found that the lack of measurable goals regarding the total safety of a building combined with ambiguous regulations meant that quantifying the level of risk was difficult in a form suitable for design purposes. This resulted in a high levels of uncertainty in regards to compliance with the regulations. The conclusions were that if performance based design was to be used properly, unambiguous acceptance criteria and procedures for verification of compliance with the regulations needed to be defined. Lundin also suggested adopting the review system used in Japan where a national committee conducts investigations of large performance based designs.

Jönsson, Hansson, Frantzich, Grahn & Johansson (2006) were commissioned by Boverket to do a pre-study of the planned revision of BBR. It found that no study could clearly show that the level of fire safety had in any way deteriorated since the introduction of performance based regulations with BBR. Perhaps the most important finding was that the provisions of BBR did not provide enough guidance in order to verify compliance with the regulations. The regulations were unclear due to the mix of verifiable and non-verifiable provisions. In essence, the proposed changes provided in the review by Boverket (1997) had not been adopted. It was therefore suggested that a separate performance based design guidance document should be developed. Other suggestions included a new classification system based on the type occupancy within the building, as well as considering certification of Fire Engineers.

A number of other related studies (Jönsson & Lundin, 1998; Lundin, 2000; Lundin, 2001; Nystedt, 2008) had also showed the necessity for guidelines to performance based fire safety design.

3.5 Developing the Swedish performance based fire safety building regulations

According to an impact assessment by Boverket (2011a) the revision of BBR largely followed the suggestions and recommendations of the pre-study by Jönsson et al. (2006).

According to Bjelland, Cronsioe, Strömgren & Tonegran (2012) the objective of the 2012 regulations was to achieve fire safety requirements with well-defined levels of performance and clear purposes. The structure of the performance based regulations were largely based on earlier work within the Nordic countries, Nordic Committee on Building Regulations (1976), and the more recent work by the Inter-jurisdictional Regulatory Collaboration Committee (2010), which included input from Canada, Japan, New Zealand and Scotland. The purpose of BBRAD was to provide a framework for performance based design and specific guidance on acceptable level of safety for certain design situations.

Scenario analysis was chosen as the method to be included in BBRAD as this is the most common method for performance based fire safety design and has a long tradition in the industry (Boverket, 2011a). The recommendations on scenarios and design fires are primarily based on standards such as NFPA 5000 and BS 7974:2001 (Bjelland et al., 2012).The chosen verification methods and accompanying input values were mainly based on European standards, previous publications by Boverket and other internationally recognized sources, for example Karlsson & Quintiere (2000), Nystedt (2011), Tewarson (2008) and Purser (2008). A conservative mindset was adapted when choosing specific variables to be included. It was also recognized that the variables provided would not represent all worst probable scenarios but would provide a minimum level of safety regardless of who designed the building (Boverket, 2011a).

General recommendations on quantitative risk analysis are included in BBRAD, although according to Bjelland et al. (2012) probabilistic criteria were not included as they were deemed not to be feasible neither for the entire building nor on a sub-system level. The ambition was to strive towards probabilistic criteria when these may be set properly.

Part of the revision of BBR revolved around regulations applicable for alterations or extensions to existing buildings. Therefore guidance was provided on alterations to buildings and what sort of assessment that is required. According to Bjelland et al. (2012) this was to further clarify the level of safety required in altered buildings as it is in most cases not possible to meet all the general recommendations fully.

4 New Zealand fire safety building regulations

4.1 Historical perspective

The 1666 Great Fire of London led to the introduction of the Rebuilding Act 1667 in England. It involved requirements on the types and construction of buildings. Fire safety was included to some extent, for example walls were required to be constructed between buildings in order to limit the spread of fire. A later version of this legislation was still in effect when the early British settlers set out to colonize New Zealand, thus influencing the early buildings.

The first legislation in New Zealand related to fire safety within buildings was the Raupo Houses Ordinance. It was introduced in 1842 and predominantly revolved around levies for buildings that had roofs made out of straw, thatch or similar materials.

Legislation in other areas that came about during the 18th Century dictated that all buildings in certain areas were required to have external walls of incombustible materials such as brick or stone. Roofs were required to be constructed out of slates, tiles, metal or other material that was considered to be fire proof (Isaacs, 2011).

Up until 1932 the buildings in New Zealand were relatively unregulated. That year the New Zealand Standards Institution was founded and, largely through their efforts, the first Building Code Committee constituted in 1934. Their objective was to produce a building code applicable to New Zealand. These new codes contained regulations involving fire resistant construction and means of escape. For example it had lists of fire resistant ratings of certain materials (An Encyclopedia of New Zealand, 1966).

It was not until the introduction of the Building Act 1991 that national building codes were implemented. The Act was a major overhaul of the legislative framework for building controls and became mandatory in 1993. Before that time the building regulations had been prescriptive. In a way it therefore revolutionized modern fire safety design in New Zealand as it allowed performance based designs through first principles. This allowed more freedom in design and innovative solutions were easier to accomplish (Buchanan, Deam, Fragiacomo, Gibson & Morris, 2006).

4.2 The Building Act 2004

All building work in New Zealand is governed by the Building Act 2004 which an evolved version of its 1991 predecessor. It came about due to a number of systematic problems that failed to prevent issues such as weather tightness of buildings.

Figure 4.1 shows an overview of the New Zealand building legislation and means of compliance. The Building Act 2004 which is issued by the Parliament and Government is at the top of the pyramid with the highest legal status.

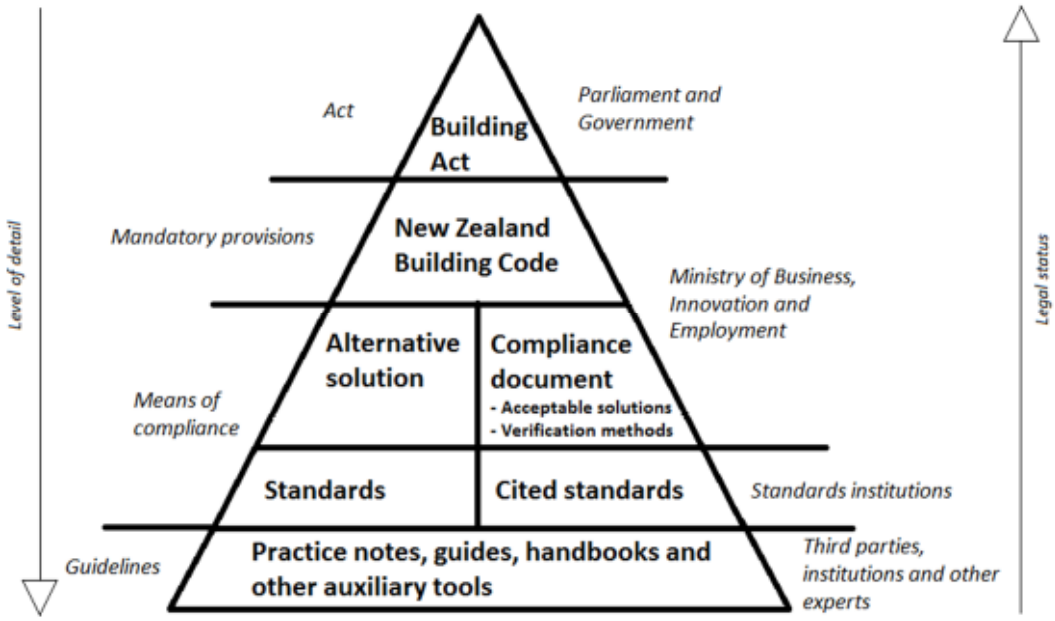

FIGURE 4.1. OVERVIEW OF THE NEW ZEALAND BUILDING LEGISLATION AND MEANS OF COMPLIANCE.

Further down in the pyramid is the New Zealand Building Code as well as different means of compliance. These documents are all issued MBIE, and provide a higher level of detail than the Building Act.

The Building Act 2004 aimed to address a number of issues of its 1991 counterpart and therefore became more stringent. One major change included establishing the Department of Building and Housing (DBH) with a more strengthened role than the previous regulatory body. Noteworthy is that in 2012 the DBH were incorporated into the Ministry for Business, Innovation and Employment. The Building Act 2004 also required a review of the NZBC and the development of better compliance documents to support the code. Further improvements included increasing the knowledge within AHJs by requiring accreditation and performance audits (DBH, 2010a).

In 2009 the Government announced review of the Building Act 2004 to determine how it could be updated to minimize the cost of compliance without compromising the quality of buildings. The review found that the system was out of balance with an undue reliance on the AHJs to protect consumers from defective building work. This imposed higher than necessary costs due to slow processing of building consents, excessive requests by AHJs for documentation and plans, and a reluctance by AHJs to approve new or innovative building designs, products or processes. One proposed solution was a more streamlined process for complex commercial building work with more reliance on the skills and experience of qualified professionals. This proposal would give the AHJ more of an overseeing role, similar to the Swedish system described Section 3.3 (DBH, 2010a).

The Building Act 2004 also required a revision of the involvement of the New Zealand Fire Service (NZFS) in the design process for buildings. The reason for this was due to perceived conflicts between the Fire Service Act and the Building Act 1991 (Merry & Spearpoint, 2008).

4.3 The New Zealand Building Code

The Building Act 2004 states that all building work must comply with the New Zealand Building Code, both of which are mandatory for all buildings. The role of building codes are to establish minimum acceptable standards for new buildings and building work, while still

enabling buildings to go above and beyond the requirements. The NZBC must balance quality, cost, affordability and accessibility. It is important to remember that regulations do not eliminate risk. They are simply a means to provide basic protection for the people who use buildings (DBH, 2007a).

The provisions within the NZBC follow the three level structure detailed below.

1. ***Objective***. The social objective the building must achieve.
2. ***Functional requirement***. What the building must do to satisfy the social objective.
3. ***Performance criteria***. Qualitative or quantitative performance and acceptance criteria which the building must meet in order to comply with the functional requirement. No quantitative specific criteria were included in the NZBC before the 2012 revision.

Clause C of the NZBC contains all safety in case of fire provisions for buildings. Its objective is to "Safeguard people from unacceptable risk of injury or illness caused by fire, protect other property from damage caused by fire, and facilitate firefighting and rescue operations." (DBH, 2012a)

Compliance with Clause C can be achieved through either prescriptive or performance based design. Prescriptive design is referred to as Acceptable Solution which are Government approved compliance documents. If designs follow these documents they also comply with the NZBC. Performance based design can be referred to as both Verification Method and Alternative Solution. Verification Methods are also compliance documents, but is more similar to performance based design. Any designs outside the scope of the compliance documents are called Alternative Solutions and are entirely performance based (DBH, 2007a).

4.3.1 Prescriptive design method

Prescriptive design according to Clause C of the NZBC consists of seven Acceptable Solution documents intended to be used building professionals who do not necessarily have specific fire engineering qualifications (MBIE, 2012a). Each of the Acceptable Solution documents C/AS1 to C/AS7 is related to a specific type of risk group which in turn describe a certain type of activity, a brief summary of these are provided in Table 4.1.

TABLE 4.1. BRIEF DESCRIPTIONS OF THE ACCEPTABLE SOLUTION DOCUMENTS FOR NZBC CLAUSE C (MBIE, 2013C).

Acceptable Solution	Risk Group	Description	Examples
C/AS1	SH	Detached houses and buildings subdivided into multiple dwellings.	Houses, townhouses and small multi-unit dwellings.
C/AS2	SM	All multiple unit accommodation buildings not included in risk group SH.	Apartments, hotels, motels, backpackers and education accommodation.
C/AS3	SI	All buildings or spaces where care is provided, occupants are incapacitated by any means, are unable to evacuate unaided for any other reason, or would be delayed in their evacuation.	Institutions, hospitals, residential care, rest homes, medical day treatment and detention facilities (excluding prisons).
C/AS4	CA	Buildings or places where people congregate or visit, including any place where people are given treatment but are not incapacitated in any way.	Crowds, halls, recreation centers, libraries, cinemas, shops, schools, dentists and restaurants.
C/AS5	WB	Places where people work, such as offices, factories and manufacturing plants, laboratories and workshops.	Offices, laboratories, workshops, manufacturing and factories.
C/AS6	WS	Buildings where large quantities of commodities are stored or where the risk is higher than in other risk groups.	Warehouses, cool stores, trading and bulk retail.
C/AS7	VP	Any place where vehicles are parked or stored.	Vehicle parking, within a building or a separate building.

A risk group can apply to either a building or a firecell and defining characteristics revolve around the awareness and abilities of the occupants as well as the fire hazards presented by the building contents. Within each document, buildings and parts of buildings are categorized further depending on the number of occupants within a firecell and the vertical distance occupants would have to cover to escape the building.

Prescriptive design is only allowed for buildings without complex features. For all other buildings performance based design is required, either through Verification Method or Alternative Solution.

4.3.2 Verification method

The Verification Method for Clause C is called C/VM2 and can be described as a framework for performance based design method based on well-established practice standards. It is intended to provide the fire safety industry in New Zealand with a robust methodology for compliance verification of buildings with complex features. It is to be noted that C/VM2 states that there are some minor exceptions to this such as tunnels. The intended users of the framework are professionals with specific fire engineering expertise who are proficient in the use of fire engineering modelling methods. Note that the C/VM2 should not be confused with the C/VM1 document, which is for compliance of solid fuel appliances.

Although the C/VM2 can be used for any type of building it is stated in some official MBIE documents, including Acceptable Solution documents, that it “must” or “shall” be used for some type of buildings and firecells (MBIE, 2012b; MBIE, 2013c).

The C/VM2 document utilizes the scenario analysis method and is structured into the following four sections.

C/VM2 Section 1 - Introduction and scope. This section defines the design method, how the framework is to be applied and provides illustrative flow charts for each scenario. The C/VM2 also states that performance based fire safety design is to be trialed according to the requirements ascertained via the internationally established Fire Engineering Brief process. According to the Australian Building Codes Board (2005) the FEB is a process that defines the scope of work for the fire safety analysis of the project. Its purpose is to set down the basis on which the fire safety analysis will be undertaken and should in principle outline the objectives, proposed trial designs, analysis methods and acceptance criteria before the analysis commences.

C/VM2 Section 2 - Rules and variables for the design scenarios. This section provides requirements and variables for fire modelling and design fires. It sets the provisions for modelling fires with zone and CFD modelling tools.

C/VM2 Section 3 - Movement of people. This section covers calculating and modelling egress of the building occupants and their exposure to the effects of the fire. The main objective of this section is to end up with a comparison of total egress time to the time when tenability criteria are exceeded.

C/VM2 Section 4 - Design scenarios. This section provides descriptions of each scenario that must be considered in order to comply with NZBC Clause C. It provides the objective each scenario is related to in the code, what must be satisfied to achieve compliance as well as the desired outcome of the analysis. Noteworthy is that no scenario require a sensitivity analysis of the design. Instead a robustness check scenario applies to certain active fire safety systems.

4.3.3 Alternative solutions

An alternative solution is a building design of all or part of a building that validates compliance with the NZBC but is not done according to any of the Government approved compliance documents. According to MBIE (2013a) the performance based NZBC allows for innovation and uniqueness. This gives designers freedom of design as long as the design can be proven to comply with the mandatory provisions.

4.4 A revision of the New Zealand Building Code

The revision of the NZBC was to ensure that it met the requirements, purpose and principles of the Building Act 2004, was stated in sufficient detail to provide clear guidance on the performance requirements, and that it supported innovative designs while also meeting quality standards. According to DBH (2007a) the improved clarity was to result in better and more efficient decision making by designers and AHJs. It was also the ambition that the product of these changes would reduce the risks and the costs of developing innovative building designs.

The review by the DBH (2007a) found that the NZBC needed to be performance based and set clear performance standards supported by compliance documents and guidance material. This meant that previously used expressions such as ‘adequate’ and ‘reasonable’ were not sufficient as such wording did not enable clear verification of compliance in a quantifiable way.

The methods applied for developing a performance based code needed to be evidence based and risk informed. Therefore the revision took account of the likelihood of undesirable events occurring and the consequences, using factual data wherever possible. Where such data and

evidence were lacking or unreliable, the uncertainty was treated in a precautionary way (DBH, 2007a).

Although the revision aimed to improve the performance based function of the NZBC there were debates regarding how precise the provisions needed to be. There was worry that quantified requirements would result in a too cautious and restrictive code. Therefore the intention was to ensure that the code was relatively constant by only specifying and clarifying performance, and not prescription. In turn the supporting compliance documents were to be dynamic and in practice be able to be amended as new knowledge was revealed and new technology developed (DBH, 2007a; DBH, 2007b). A dynamic and adaptive code was also acknowledged as a necessity by Buchanan (1994) following the introduction of the first performance based code for fire safety in New Zealand.

The development of a new NZBC structure involved the review of foreign building codes. In particular the MBIE looked closely at European Union directives and how building codes were being developed in Europe (DBH, 2007b).

4.4.1 Clause C Protection from fire

The review by DBH (2007a) concluded that the level of fire safety provided by the NZBC and the at the time existing compliance documents was acceptable but that they were lacking in clarity. It was found that the NZBC did not set adequate performance standards for buildings to ensure means of escape for the building occupants. The requirements were not quantifiable which resulted in fire safety design solutions generally being prescriptive. Any deviations from the compliance documents were regarded as an Alternative Design which were not well-supported due to the lack of specific performance requirements to verify against. The end result was inconsistent fire safety designs, stifled innovation, limited design options, and misinterpretations of the mandatory provisions as well as costly and time consuming disputes on compliance. In particular, multi-level residential buildings and the provisions for means of escape were the subject for several determinations by the DBH. (DBH, 2007a; DBH, 2007b; DBH, 2010b). Although the number of fire safety related determinations averaged 5 per year from 2007 to 2012 they were, due to their complexity, one of the more time and cost consuming matters for MBIE (MBIE, 2012c).

The problem with verification of fire safety designs with the NZBC was acknowledged as early as 1994 by Buchanan (1994). He stated that performance requirements that can be quantified are superior to descriptive requirements with the reasoning that a holistic performance based code requires a probabilistic performance statement for the whole building, including fire safety. Buchanan further highlighted the need for guidance on fire safety design by reasoning that the difficulty in modelling complex phenomena and the possibility of human error are factors that need to be considered for a performance based code.

To address these issues DBH (2010b) proposed the following key changes to Clause C and the corresponding compliance documents.

- A re-written NZBC Clause C using better defined, specific and quantified performance and acceptance criteria requirements.
- A new Verification Method that would set out a clear framework for specific designs to comply with the NZBC, thereby removing the existing scope for interpretation and dispute.
- A revised prescriptive design method containing essential elements for fire safety design of non-complex buildings.

These proposed changes were expected to lead to greater consistency and certainty of fire safety design, reduced compliance costs for the building industry, as well as a more efficient and flexible design process (DBH, 2010b). At the same time the proposed changes did not aim to alter the existing minimum level of fire safety required and therefore no extra costs to the building sector were expected to arise from the proposals, in either design or construction (DBH, 2010b).

The prescriptive design method was to be re-structured to make information for each building easier to find and use. This addressed findings that even non-complex designs needed to be undertaken by professional Fire Engineers and thereby adding unnecessary costs and delays to the building process (DBH, 2010b). The idea was to change and simplify the prescriptive design method to enable non-complex fire designs to be undertaken by building professionals other than fire engineers (MBIE, 2012a).

The new Verification Method C/VM2 was to act as a framework for performance based fire safety design in order to comply with Clause C. It was to specify fire design scenarios and performance requirements to be taken into account for fire safety designs. The intention was for the framework to be analogous with the existing design process for structural engineering in New Zealand, which require buildings to be designed for certain events and physical conditions (Beever, Fleischman, Miller, Saunders, Thorby & Wade, 2010).

Despite the major changes that were proposed review also stated that the Alternative Solution design option was to be retained (DBH, 2010b).

4.5 Developing the New Zealand performance based fire safety building regulations

The solution to the NZBC being unclear and not possible to verify in a quantifiable way, was to include a number of performance and acceptance criteria. Different criteria were developed to apply to occupant life safety, requirements to firefighting operations and damage to other property.

The scenario analysis method for fire safety that was adopted for C/VM2 was in line with other framework documents around the world. The scenarios included in the framework were developed from NFPA 5000, with adjustments to suit the New Zealand building legislation (DBH, 2012c). It was also recognized that a good fire safety design needed to be demonstrably robust. This meant considering both uncertainty and sensitivity of the model. This was done through a number of methods such as choosing conservative input values and tenability criteria, as well as including a robustness check scenario (Beever et al, 2007; DBH, 2012c).

Parties involved in the development of the 2012 fire safety regulations were the DBH, the building industry, fire safety consultants, the New Zealand Fire Service and AHJs around the country (DBH, 2010b). The approach taken by the DBH (2012c) when developing the performance and acceptance criteria for the NZBC as well as the new C/VM2 framework was to firstly look at existing compliance documents and standards within New Zealand and Australia. Another source of information included BRANZ, an independent and impartial research, testing, consulting and information company providing resources for the building industry in New Zealand. The NFPA, ISO and British Standards as well as a number of other internationally recognized sources were also used during the development phase of the code and framework.

To accommodate for the life safety of occupants the framework adopted the methods of ISO 13571 which is a guideline document for estimating the time available for escape using fire

data. Some relaxations to these criteria were included to promote the use of sprinklers in buildings and to provide closer alignment with the requirements of the prescriptive design method (DBH, 2012a).

5 The final surveys

The literature study in Section 3 and Section 4, together with the chosen survey research method and theory outlined in Section 2.3, resulted in the final surveys that were sent out to potential respondents in Sweden and New Zealand. The final Swedish and New Zealand surveys can be seen in Appendix A and Appendix B respectively.

Important aspects of the final surveys and how they were implemented, are described in this section.

5.1 Targeting the study population

The first three questions in the surveys, shown below, were filtering questions as was described in Section 2.3.1.

Question 1. Please describe your employment with one of the following options. If several apply, select the one that best describe your employment.

- Consultant (fire)
- Consultant (other)
- Fire Service
- Building Consent Authority (*New Zealand*) / Housing committee (*Swedish*)
- Ministry of Business, Innovation and Employment (*New Zealand*) / Boverket (*Swedish*)
- Student (fire)
- Student (risk management)
- Other; please specify.

Question 2. In your job or studies do you in any way apply NZBC Clause C Protection from fire (*New Zealand*) / BBR 19 Section Safety in case of fire (*Swedish*), for example by design, review or regulation?

- Yes
- No.

Question 3. How many years of experience do you have in the fire safety industry?

- Please specify.

These questions had two main objectives. The first was to provide easy answered questions to create an interest in the survey and thereby inducing the respondent into continuing with the survey. The second objective was to indicate if the respondent was part of the study population, with the knowledge and experience required to be able to answer the questionnaire. Based on these three questions, as well as the answer pattern for the rest of the questions, an assessment was made whether the respondent was to be included in the survey or not. A respondent was excluded from the survey if the respondent answered ‘No’ to question number two above unless the remainder of the answers showed that the respondent had previous experience with the regulations. All the surveys from respondents who described their employment as ‘Student’ were assessed based on their experience in the fire safety industry and if they answered ‘Uncertain’ to most questions. Completed surveys where the respondent indicated that they had two or less years of experience in the fire safety industry were assessed in the same way. Furthermore, respondents who answered ‘Uncertain’ or similar to a substantial amount of the questions regardless of the answers to the first three questions were also excluded from the survey. Following the pre-tests of the surveys, as

discussed in Section 5.3, the objective of targeting the study population with these filtering questions became essential for the success of the survey.

5.2 Likert scale question

Both the Swedish and New Zealand surveys included a five-point rating scale measuring the attitude of the respondents in regards to a number of statements, from positively 'Strongly agree' to negatively 'Strongly disagree', with 'Undecided' as the middle neutral category. A 'No opinion' category was also included. All statements were related to the changes brought by the 2012 fire safety building regulations in respective country. The purpose was to indicate if the regulations had achieved some of the purposes and objectives that were the basis for the revisions which are described in Section 3.4 and 4.4 respectively.

5.3 Pre-testing the surveys

Pre-testing of the surveys was done in two stages. During stage one the first drafts of the questionnaires, including the cover letters, were sent to two persons with significant knowledge and experience with fire safety design and the regulations. This draft consisted of a text document and was not made available online. They commented on both the content of the questions and how they were formulated. The main critique following this stage was that the questions were too general and needed to be more specific.

The changes to the questionnaire following the first stage were significant and therefore a second pre-test stage was deemed necessary. The second draft included a full test of the chosen online survey tool. Approximately ten people participated in this pre-test stage by commenting on the wording and phrasing of the questions as well as answers categories. These testers were both from Sweden and New Zealand. Following the second pre-test stage some smaller changes were made to the surveys. The most significant changes were to the distribution method and configuration of the online survey tool. It became apparent from the tests, and through discussions with some of the organizations that were to distribute the surveys, that the preferred implementation method of controlling who the surveys were sent to would not be practicable due to confidentiality issues. Therefore the online surveys were required to be open for everyone with no tracking possible. For this reason some of the pre-test online surveys were configured to allow only one partially or fully completed survey per computer in order to stop one person from submitting multiple surveys. The pre-tests further revealed that this in turn prevented persons who were connected to the same computer network from accessing the online survey. Multiple responses from one computer were therefore enabled following the second and final pre-test stage.

5.4 Screening

Configuring the online surveys to be open and allowing multiple responses from the same computer had a number of consequences. Firstly, the filtering questions described in Section 5.1 became even more important in order to target the study population. Secondly, to ensure that the results of the surveys were not distorted by persons submitting multiple surveys, a number of additional screening methods were required to be applied. This involved analysing the full set of individual responses for each respondents together with their submission times and the attached IP addresses. Factors to look at were duplicate IP addresses, more than one survey completed within 30 seconds of each other, and the exact same responses (SurveyMonkey 3, 2013). The exact same responses especially applied to open-ended response alternatives.

Other applied screening methods included assessing the time the respondent took to complete the survey. Research has shown that the average total survey completion time for a respondent can relate to the number of questions included (SurveyMonkey 4, 2011). It

showed that 16 to 25 questions resulted in an average total survey completion time between 7 to 9 minutes. For 26 to 30 questions the results were 9 to 10 minutes. The Swedish survey had 26 questions whereas the New Zealand survey had 23. With this in consideration the individual surveys that were fully or partially completed in less than 5 minutes were assessed in the same way as described in Section 5.1.

5.5 Implementation

5.5.1 Sweden

The following distribution channels were utilized when sending out the Swedish version of the survey.

- Via the alumni e-mailing list at the Department of Fire Safety Engineering and Systems Safety of Lund University, Sweden. It sends e-mails to more than 800 former students with degrees in BSc Fire Safety Engineering and MSc Risk Management.
- Via e-mailing lists to the 2013 students in BSc Fire Safety Engineering and MSc Risk Management at Lund University, Sweden.
- To members of SFPE-BIV, the Swedish chapter of Society for Fire Protection Engineers.
- Through the www.LinkedIn.com discussion group 'Brandingenjör Sverige' (eng. Fire Engineering Sweden).
- Through the forum and newsletter at www.Utkiken.net, a website promoting information sharing among the Swedish Fire Service.

Apart from the above channels the survey was also spread independently via persons who participated through the above channels.

5.5.2 New Zealand

The following distribution channels were utilized when sending out the New Zealand version of the survey.

- To members of the New Zealand Fire Service.
- Via the newsletter to members of The Institution of Professional Engineers New Zealand (IPENZ).
- To members of the New Zealand branch of the Society of Fire Protection Engineers.
- To persons within the Ministry of Business, Innovation and Employment who are involved with NZBC Clause C Protection from fire.
- Via internal e-mail lists to all Fire Engineers within Holmes Fire LP in New Zealand and Australia.
- To the 2013 MSc Fire Safety Engineering students at the University of Canterbury.
- Via the Institution for Fire Engineers (IFE) New Zealand Branch to its members.
- Via the Building Officials Institute of New Zealand to its members.

The survey was also spread independently by persons who participated through the above channels.

6 Survey results

6.1 The screening process

The screening of the results followed the process detailed below. The order of the process is due to factors related to how the data was presented by the online survey tool.

Stage 1. Respondents were filtered by total survey completion time as described in Section 5.4 and assessed in regards to completion of the survey as well as answering 'Uncertain' to most questions.

Stage 2. Responses were filtered by completion, and assessed in regards to the amount of internal non-responses described in Section 2.3.3 as well as answering 'Uncertain' to most questions.

Stage 3. Responses were filtered by the responses 'Student (fire)' and 'Student (risk management)' to Question 1 described in Section 5.1 and assessed in regards to the answers to Question 2 and 3 as well as answering 'Uncertain' to most questions.

Stage 4. Responses were filtered by the response 'No' to Question 2 described in Section 5.1 and assessed in regards to the answers to Question 1 and 3 as well as answering 'Uncertain' to most questions.

Stage 5. Responses were filtered by the answer to Question 3 described in Section 5.1. The fire safety building regulations under study were introduced in 2012 and therefore persons with two years of experience or less may not have had the knowledge required to complete the survey. The respondents were assessed in regards to the answers to Question 1 and 2 as well as answering 'Uncertain' to most questions.

Stage 6. The remainder of respondents were checked for duplicate IP addresses, submission time and duplicate answers as described in Section 5.4.

Table 6.1 shows the number of respondents included in the surveys after each completed stage of the screening process, with the final number shown in the Stage 6 column.

TABLE 6.1 NUMBER OF RESPONDENTS INCLUDED IN EACH OF THE SURVEYS AFTER EACH STAGE OF THE SCREENING PROCESS.

	Total respondents	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Sweden	190	168	165	162	155	155	155
New Zealand	99	93	92	90	89	89	89

6.2 Sweden – Survey on BBR Chapter 5 Safety in case of fire

This section present and discuss the principal results of the Swedish survey on BBR Chapter 5.

Additional results from the survey can be found in Appendix C, including answers to the optional response categories 'Clarify your answer (optional)', as well as results filtered by the two largest employment groups that participated in the survey.

Most of the open-ended answers in Appendix C are shown as they were written by the respondents, meaning that they have not been translated or formatted. Some of the responses have been censored or left out in order protect the confidentiality of the respondent.

6.2.1 Question 1

TABLE 6.2 QUESTION 1 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Please describe your current employment with one of the following options. If several apply, select the one that best describe your employment.		
Answer Options	**Response Percent**	**Response Count**
Consultant (fire)	62.6%	97
Consultant (other)	0.6%	1
Fire Service	26.5%	41
Building Consent Authority	0.0%	0
Boverket	0.6%	1
Student (fire)	0.0%	0
Student (risk management)	0.6%	1
Other (please specify)	9.0%	14
	answered question	**155**
	skipped question	**0**

Table 6.2 show that 155 respondents were included in the Swedish survey on BBR Chapter 5 Safety in case of fire. The two most common types of employment were with the Fire Service or as a fire safety consultant, which combined to nearly two-thirds of the respondents. Respondents who chose 'Other (please specify)' included researchers, lecturers as well as persons in risk management and the building sector.

The two largest contributors to the survey, fire safety consultants and the Fire Service, can be described as being at opposite ends of the building process, designer versus reviewer. Therefore they may have different interests and motives influencing their responses. The survey results for each of these groups are presented in Appendix C and the difference between these two groups and the respective results are discussed in Section 7.3.1.

Since the fire safety consultants are the majority of the respondents, 63 percent, they will have the most impact on the survey results. This means that the results may be biased in favor of the fire safety consultants, which is discussed in Section 7.5.

6.2.2 Question 2

TABLE 6.3 QUESTION 2 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

In your job or studies do you in any way apply BBR 19 Chapter 5 Safety in case of fire, or later versions, for example by design?		
Answer Options	**Response Percent**	**Response Count**
Yes	97.4%	151
No	2.6%	4
Clarify answer (optional)		36
	answered question	**155**
	skipped question	**0**

Table 6.3 show that almost all respondents actively apply BBR Chapter 5 Safety in case of fire in their work or studies. The remainder indicated that they had previous experience with BBR.

6.2.3 Question 3

The respondents had an average experience of almost ten years in the fire safety industry. As can be seen in Table C.2 of Appendix C the individual responses ranged from 0 to 45 years, with 89 percent of the respondents having two or more years of experience. Some respondents with less than two years of experience were included as their answers indicated that they had the required experience and knowledge related to the regulations to be included in the study population, as explained in Section 6.1.

6.2.4 Question 4

TABLE 6.4 QUESTION 4 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do the persons involved in the building process for fire safety of buildings generally understand the functional requirements of BBR Chapter 5 Safety in case of fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	37.4%	58
No	41.9%	65
Undecided	20.6%	32
Clarify answer (optional)		58
	answered question	**155**
	skipped question	**0**

Table 6.4 shows that a substantial percentage of the respondents, almost 42 percent, indicated that persons involved in the building process do not understand the functional requirements of BBR Chapter 5. The results also show that the response spread is substantial.

These results coincide with the results from review by Boverket (1997) indicating that a large portion of the persons involved in the building process for fire safety of buildings generally do not understand the functional requirements. A lack of knowledge, or application of the knowledge available, within the fire safety industry in Sweden as a whole was also indicated by Lundin (2005). The responses to the category ‘Clarify answer (optional)’ indicated that the understanding of the functional requirements vary. Some persons outside the fire safety industry have basic knowledge of the functional requirements, but detailed understanding is mainly limited to persons with fire engineering qualifications.

6.2.5 Question 5

TABLE 6.5 QUESTION 5 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	**Response Percent**	**Response Count**
Yes	8.4%	13
No	81.3%	126
Undecided	10.3%	16
Clarify answer (optional)		48
	answered question	155
	skipped question	0

Table 6.5 show that most, 81 percent, of the respondents do not believe that all persons involved in the building process related to fire safety in Sweden possess the competence and knowledge required.

These results further highlight the indication of Question 4 that there is a lack of knowledge within the fire safety industry in Sweden. A certain extent of knowledge is required within all disciplines of the fire safety industry. Fire Engineers and others with specific qualification in the field are expected to be the experts. Others are expected to have the knowledge required to fulfill their part in the building process. Some responses to the category 'Clarify answer (optional)' indicated that this is why the role of the fire safety consultant is vital.

6.2.6 Question 6

TABLE 6.6 QUESTION 6 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

How have the overall costs related to fire safety of building projects changed since the introduction of BBR 19?		
Answer Options	**Response Percent**	**Response Count**
Increased significantly	20.0%	31
Increased a little	32.9%	51
No change	8.4%	13
Decreased a little	0.0%	0
Decreased significantly	0.0%	0
Do not know	38.7%	60
	answered question	155
	skipped question	0

Table 6.6 show that more than half of the respondents believe that the overall costs related to building fire safety have increased since the introduction of BBR 19 in 2012. The remainder indicated either no change to the costs or did not know. None of the respondents indicated that the costs had decreased.

Boverket's (1997) review found that performance based regulations could lower costs of building projects. Although no such specific objectives of lowering costs of building projects were identified as a part of the 2012 revision, it can be assumed that it did not aim to increase the costs. Although this survey indicate that the costs have increased, it has not identified the reasons for this. It could be that more time spent on verification of the building regulations, as they are now more quantifiable, has increased the time that is needed for a fire safety consultant to complete the design. The end result may be more or less the same as before

2012, but qualitative arguments cannot be utilized as much. Change also brings an inevitable learning process. The indicated increase in costs may go down as the industry gets more familiar with the new regulations. Lundin (2005) wrote that the short-term benefits of the 1994 introduction of BBR were likely to be insignificant which may also apply for the 2012 revision.

It can be assumed that very few of the respondents have full insight into the costs related to fire safety as a majority are consultants and not developers themselves. Notwithstanding this the above indications are considered credible as the respondents likely know the time required for projects after the 2012 revision. Time equals costs and such it is expected the respondents have a good idea of the relative cost changes.

6.2.7 Question 7

TABLE 6.7 QUESTION 7 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Can questions of interpretation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents, be resolved through discussions with the local Housing Committees? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	**Response Percent**	**Response Count**
Frequently	18.3%	28
Occasionally	32.0%	49
Rarely	17.0%	26
Very rarely	17.0%	26
Undecided	15.7%	24
Clarify answer (optional)		38
	answered question	**153**
	skipped question	**2**

Table 6.7 show a substantial response spread, but that a large portion of the respondents indicate that questions of interpretation on BBR Chapter 5 can occasionally be resolved through discussions with the local AHJ.

The response spread is likely to reflect a varying specific fire safety knowledge among AHJs in Sweden. A varying degree of help provided by AHJs was indicated in some responses to the category ‘Clarify answer (optional)’. This may be dependent on the region and the staff base, with larger AHJs in more populated regions. In general it can be expected that a larger staff base brings more specific knowledge and thereby better assistance on questions regarding the building regulations. These results can be interpreted as a need for more specific fire safety knowledge within local AHJs.

An alternative solution is to have a central AHJ with all the required specific knowledge. They could then either take over the project entirely, or provide assistance to the local AHJ.

6.2.8 Question 8

TABLE 6.8 QUESTION 8 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Does Boverket provide satisfactory help with explanation of purpose for provisions and general recommendation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents?		
Answer Options	**Response Percent**	**Response Count**
Yes	32.0%	49
No	45.8%	70
Undecided	22.2%	34
Clarify answer (optional)		52
	answered question	**153**
	skipped question	**2**

Table 6.8 show that almost half of the respondents, 46 percent, indicate that Boverket does not provide satisfactory help with explanation of purpose for provisions and general recommendations within BBR Chapter 5 and corresponding documents.

The above results likely derive from the fact that Boverket does not have mandate to interpret the building regulations. However, the response category 'Clarify answer (optional)' indicate that the quality of the responses from Boverket vary, but tend to be general and non-specific. As Boverket is the Authority responsible for the building regulations it is vital that they are consistent in their work and keep to their mandate and instead refer to the local AHJs. If they are not it will generate confusion and inconsistency within the industry.

6.2.9 Question 9

TABLE 6.9 QUESTION 9 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Should there be a certification requirement for qualified fire engineering designers?		
Answer Options	**Response Percent**	**Response Count**
Yes	43.8%	67
No, there should be no certification at all	6.5%	10
No, but voluntary certification is good (e.g. SAK 3)	35.3%	54
Undecided	14.4%	22
Clarify answer (optional)		41
	answered question	**153**
	skipped question	**2**

Table 6.9 show that most of the respondents are of the opinion that certification of Fire Engineers in Sweden is a good idea, with a slightly higher response rate indicating that it should be a requirement rather than an optional choice.

Certification of Fire Engineers is intended as a proof of knowledge and experience, and is one means of increasing the expertise knowledge within the fire safety industry. In the response category 'Clarify answer (optional)' some of the respondents indicate that certification should only be required for more complex projects. Some respondents believe that certification being a requirement can be beneficial but that the costs are likely to outweigh the benefits.

It is believed that a certification requirement is not as important as to what the actual certification proves. It is important that certification proves that the fire engineer is highly qualified and thereby appropriate for more complex projects. A BSc in Fire Engineering or similar can be seen as a sort of certification, which some respondents indicated is enough for many projects.

6.2.10 Question 10

TABLE 6.10 QUESTION 10 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the new occupancy classes introduced with BBR 19 Chapter 5 Safety in case of fire, better compared to previous versions of BBR?		
Answer Options	**Response Percent**	**Response Count**
Yes	77.6%	118
No	8.6%	13
Undecided	13.8%	21
Clarify answer (optional)		41
	answered question	**152**
	skipped question	**3**

Table 6.10 indicate that most respondents, 78 percent, find the new occupancy classes introduced with BBR 19 Chapter 5 to be better than those of previous versions of BBR.

The responses to the category 'Clarify answer (optional)' indicated that the occupancy classes are an improvement to BBR Chapter 5 and that the concept is good, but not always easy to apply. The intention of the occupancy classification system was likely not to be applicable the entire range of occupancies and buildings. Instead the system provides sufficient guidance and therefore achieves its purpose.

A problem with this question, as reported by some of the respondents, is that it implies that there was a different occupancy classification system in older versions of BBR. This was not the case as the system is new and has been included only since BBR 19. Despite this confusion it seems most respondents understood the intention of the question which was to compare methods of providing similar information when designing to previous versions of BBR.

6.2.11 Question 11

TABLE 6.11 QUESTION 11 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the prescriptive design method for fire safety of buildings outlined in BBR 19 and later versions?		
Answer Options	**Response Percent**	**Response Count**
Yes	44.7%	68
No	44.7%	68
Undecided	10.5%	16
Clarify answer (optional)		53
	answered question	**152**
	skipped question	**3**

Table 6.11 show that the respondents are divided fifty-fifty, excluding the undecided, on the necessity of fire engineering qualifications for prescriptive fire safety design utilizing BBR 19 or later versions.

If the provisions are clear and precise enough, no specific fire engineering qualifications should be necessary to follow the general recommendations for prescriptive design. The results may therefore indicate that the general recommendations for prescriptive design are not as clear as they can be. The costs could potentially be lowered if purely prescriptive projects could be designed by building professionals without fire engineering qualifications. It may also be that the responses show a reluctance of sharing the fire engineering market with

other professionals. Prescriptive fire safety design is likely to provide a large part of the income for fire safety consultants which can influence the results negatively.

According to responses in the category 'Clarify answer (optional)' the necessity for fire engineering qualifications vary based on complexity of projects. Many projects have elements of performance based design and fire engineering qualifications are likely to be necessary to recognize these.

6.2.12 Question 12

TABLE 6.12 QUESTION 12 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is adequate guidance provided for alterations to existing buildings in BBR 19 Chapter 5 Safety in case of fire and later versions, including BBRAD?		
Answer Options	Response Percent	Response Count
Yes	25.7%	39
No	51.3%	78
Undecided	23.0%	35
Clarify answer (optional)		39
	answered question	152
	skipped question	3

Table 6.12 show that more than half of the respondents, 51 percent, do not find the guidance for alterations to existing buildings within BBR Chapter 5 and BBRAD to be adequate.

These results indicate that additional guidance for assessment of existing buildings would be beneficial. In the response category 'Clarify answer (optional)' the respondents recognized that alterations to existing buildings can be difficult. The opinions regarding the adequacy of the existing guidance vary, but most respondents agree that it has room for interpretation. On the contrary the respondents also acknowledge the fact that too strict regulation or guidance may not be the solution. A few respondents also critiqued the guidance for alterations to existing complex buildings classified as Br0 buildings.

6.2.13 Question 13

TABLE 6.13 QUESTION 13 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	Response Percent	Response Count
Yes	35.1%	52
No	47.3%	70
Undecided	17.6%	26
Clarify answer (optional)		37
	answered question	148
	skipped question	7

Table 6.13 show that a large part of the respondents, 47 percent, are of the opinion that Fire Engineers are generally not brought into the design process in an early enough stage.

The responses to the category 'Clarify answer (optional)' indicated that it varies depending on geographic location and contractor. Smaller contractors are less likely to hire a Fire Engineer in an early stage of the project. The solution is for Fire Engineers to educate their clients that if hired in an early stage both costs and time resources can be reduced.

6.2.14 Question 14

TABLE 6.14 QUESTION 14 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

The role of the Fire Service in the building process is not statutory in the Planning and Building Act, and does therefore differ between municipalities. They are mostly given the role as advisers to the local Housing Committee. To what level should the Fire Service be involved in the building process?		
Answer Options	**Response Percent**	**Response Count**
More than the current situation	35.8%	53
Their current level of involvement is sufficient	39.9%	59
Less than the current situation	18.2%	27
Undecided	6.1%	9
Clarify answer (optional)		63
	answered question	**148**
	skipped question	**7**

Table 6.14 show there is a substantial response spread regarding the involvement of the Fire Service in the building process, however only 18 percent of the respondents believe that the Fire Service should be included to a lesser degree than they currently are.

A large part of the respondents indicating a higher level of involvement are from the Fire Service, as indicated in Table C.32 and Table C.33 of Appendix C. Despite this the above results can indicate that the role provided by the Fire Service is generally well accepted and adequate.

If the specific fire safety knowledge within AHJs is limited then the Fire Service is the natural choice as advisors. The expectations are that the Fire Service are experts for all things related to fire. However, fire safety design and building regulations are likely not one of the main areas of expertise within the Fire Service. It is therefore vital that the knowledge is available if they are to act as advisors in building related matters. Similar to AHJs, the knowledge will depend on the region and the staff base. A lack of experience and knowledge within the Fire Service in some regions was indicated by some responses to the category 'Clarify answer (optional)'.

6.2.15 Question 15

TABLE 6.15 QUESTION 15 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the general recommendations in BBRAD a step in the right direction for performance based fire safety design in Sweden?		
Answer Options	**Response Percent**	**Response Count**
Yes	79.1%	117
No	4.1%	6
Undecided	16.9%	25
Clarify answer (optional)		24
	answered question	**148**
	skipped question	**7**

Table 6.15 show that a majority of the respondents, 79 percent, believe that BBRAD is a step in the right direction for performance based fire safety design in Sweden.

These results provide a clear indication that BBRAD, which was a substantial part of the changes introduced with the 2012 regulations, has been a success. Although further

development may be required, as noted in other parts of this report, these results indicate that the revision to some degree was a success and that development should follow the same route.

6.2.16 Question 16

TABLE 6.16 QUESTION 16 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

A large part of BBRAD described scenario analysis. How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method outlined in BBRAD?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety	25.5%	37
Acceptable level of safety	42.8%	62
Lower than acceptable level of safety	6.9%	10
Undecided	24.8%	36
Clarify answer (optional)		37
	answered question	**145**
	skipped question	**10**

Table 6.16 show that 68 percent of the respondents are of the opinion that the scenario analysis method of BBRAD provide an acceptable or higher level of fire safety for buildings. Only 7 percent believe that the level of safety is lower than acceptable.

The above results indicate that one of the objectives of the 2012 revision to provide guidance for an acceptable level of safety has been achieved. Notably is that more than a quarter of the respondents believe that the scenario analysis in BBRAD even provide a higher than acceptable level in some cases. This can indicate that parts of the guidance for scenario analysis is too conservative. It can also be that many respondents identify the prescriptive design as an acceptable level of safety. Because performance based design provide a higher level of safety, as intended, the respondents may interpret the scenario analysis as too conservative.

6.2.17 Question 17

TABLE 6.17 QUESTION 17 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Previous research has shown a wide variation of the fire safety levels for building designed in accordance with BBR 18 or earlier versions. Do you consider that the introduction of BBR 19 has resulted in a more consistent level of fire safety for different buildings with the performance based design method?		
Answer Options	**Response Percent**	**Response Count**
Yes	49.7%	72
No	20.0%	29
Undecided	30.3%	44
Clarify answer (optional)		42
	answered question	**145**
	skipped question	**10**

Table 6.17 show that half of the respondents think that BBR 19 has resulted in a more consistent level of fire safety for building, while almost third of the respondents are undecided to the same question.

These results indicate that the objectives of increasing consistency and reducing uncertainty, as reported by Lundin (2005), have been addressed to some degree. Considering that guidance for performance based fire safety design was not as comprehensive it can be assumed that

consistency has improved. The substantial amount of undecided respondents indicate that some respondents do not know. Therefore more time and research is likely required before a more definite answer can be given to this question.

6.2.18 Question 18

TABLE 6.18 QUESTION 18 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

The scenario analysis method in BBRAD includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios	22.1%	32
Credible scenarios, but not worst case	37.9%	55
Less severe scenarios	2.1%	3
Do not know	29.0%	42
Other (please specify)	9.0%	13
	answered question	**145**
	skipped question	**10**

Table 6.18 show that the largest portion of the respondents, 38 percent, believe the specific variables and values included in the scenario analysis outlined in BBRAD describe credible scenarios, but not worst case scenarios.

The results of this question can be compared to those of Question 16, both of which indicate that an acceptable level of safety is provided with the introduction of BBRAD and the scenario analysis method it focuses on. One can argue what ‘acceptable’ is, if it should be the credible or the worst credible scenario. In present day it is generally not acceptable for one event to claim the lives of many. That is likely the reason why commercial buildings generally are designed according to worst credible scenarios. It also comes down to the level of risk each person is inclined to accept. A person can be assumed to accept a higher level of risk in their own home as they themselves have made the choice to live there. While at work or other more public buildings one expect to be safe as there is less choice involved when it comes to safety.

6.2.19 Question 19

TABLE 6.19 QUESTION 19 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance in BBRAD for design of Br0 classified buildings comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	12.4%	18
No	42.1%	61
Undecided	45.5%	66
Clarify answer (optional)		28
	answered question	**145**
	skipped question	**10**

Table 6.19 show that 42 percent of the respondents believe that the guidance for Br0 classified buildings within BBRAD is not sufficient. Almost half of the respondents, 46 percent, were either uncertain or did not know.

These results show that more development of BBRAD may be required, especially for very complex buildings where the existing guidance is minimal. The respondents noted that a guidance document for design of Br0 classified buildings is provided by the Swedish chapter

of the Society for Fire Protection Engineers. This shows that full guidance by Boverket is always not necessary as long as a certain level of quality can be achieved by third parties. It is therefore imperative that these third party guidance documents are thoroughly reviewed by the fire safety industry.

The reason why a large portion of the respondents answered that they did either not know or were undecided is most likely due to the fact that projects for very complex buildings is rare and that not enough time has passed for many such projects to be designed with the 2012 fire safety building regulations.

6.2.20 Question 20

TABLE 6.20 QUESTION 20 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you believe that an alternative fire safety design outside the scope of the general recommendations of BBRAD is possible to get through the review process?		
Answer Options	**Response Percent**	**Response Count**
Yes	56.6%	82
No	7.6%	11
Undecided	35.9%	52
Clarify answer (optional)		44
	answered question	**145**
	skipped question	**10**

Table 6.20 show that the majority of the respondents, 57 percent, believe an alternative design outside the scope of the general recommendations of BBRAD could get through the review process.

This question may have been confusing to some of the Swedish respondents as the review system does not involve a seal of approval from the local AHJ, as it does in New Zealand. In spite of this, the results indicate that the general recommendations within BBRAD are not seen as mandatory, meaning that the regulations are fully performance based and not limited by the guidance provided by Boverket.

The substantial amount of respondents being undecided is likely due to confusion over the question, as mentioned above. It is also expected that projects that do not largely follow the general recommendations of BBRAD are rare and therefore unknown to most respondents.

6.2.21 Question 21

TABLE 6.21 QUESTION 21 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Can persons involved in the building process, who should be able to review a sensitivity analysis, generally assess its adequacy?		
Answer Options	**Response Percent**	**Response Count**
Yes	18.6%	27
No	49.0%	71
Undecided	32.4%	47
Clarify answer (optional)		32
	answered question	**145**
	skipped question	**10**

Table 6.21 show that almost half of the respondents are of the opinion that persons, who should be able to assess a sensitivity analysis, generally do not possess the knowledge to do so.

A similar question regarding sensitivity analyses was asked in the review by Boverket (1997) where each respondent was to say if they could themselves assess a sensitivity analysis. What the results of both this survey and that of Boverket (1997) indicates, is that the expertise knowledge within the fire safety industry could be better. It is deemed important that someone other than the actual designer can assess the sensitivity analysis for it to be meaningful. Whether this is someone from the Fire Service or an independent peer-reviewer is less important, as long as they have the knowledge and experience to do so. Most consultancy firms are likely to internally review all designs, but this system should not always be trusted.

Some respondents indicated that they did not fully understand the question. This may explain the substantial amount of respondents who chose the response category 'Undecided'. Another explanation is that some respondents may not be familiar enough with sensitivity analyses in order to assess the potential benefit.

6.2.22 Question 22

TABLE 6.22 QUESTION 22 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for quantitative risk analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	22.1%	32
No	27.6%	40
Undecided	50.3%	73
Clarify answer (optional)		16
	answered question	**145**
	skipped question	**10**

Table 6.22 show that half of the respondents did not know or were uncertain if the guidance for quantitative risk analysis outlined in BBRAD is sufficient.

This method is expected to be utilized the most complex of projects, mainly Br0 classified buildings. For this reason the results indicate that, similar to Question 19, more guidance for design of complex buildings is necessary. During the development of BBR 19 Bjelland et al. (2012) acknowledged that the intention was to provide guidance on quantitative risk analysis when the tools are readily available.

Similarly to Question 19, the large amounts of 'Undecided' responses are likely due to projects utilizing quantitative risk analysis being rare. Therefore most of the respondents are unlikely to have come in contact with these type of projects and the method of assessment.

6.2.23 Question 23

TABLE 6.23 QUESTION 23 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for scenario analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	44.1%	64
No	17.9%	26
Undecided	37.9%	55
Clarify answer (optional)		11
	answered question	**145**
	skipped question	**10**

Table 6.23 show that a large part of the respondents, 44 percent, believed that the guidance in BBRAD for scenario analysis is comprehensive to a sufficient level, while 38 percent were either uncertain or did not know.

These results do not provide a strong indication that the scenario analysis method BBRAD largely focuses on is comprehensive enough. Interpreting these results is difficult, but they may indicate that further development of the method is necessary. However, together with the results of Question 15 these results show that the scenario analysis method as a concept is well received within the fire safety industry and that it should remain the focus in BBRAD.

The substantial amount of respondents being undecided can be due to a lack of experience with the scenario analysis method.

6.2.24 Question 24

TABLE 6.24 QUESTION 24 WITH RESULTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for qualitative assessment in BBRAD comprehensive enough?		
Answer Options	Response Percent	Response Count
Yes	36.6%	53
No	24.8%	36
Undecided	38.6%	56
Clarify answer (optional)		10
answered question		145
skipped question		10

Table 6.24 show that the response spread was substantial regarding guidance for qualitative assessments in BBRAD, with a substantial portion of the respondents being undecided.

These results are likely to reflect that the guidance on qualitative assessment is minimal, making it hard to provide a definite answer. The objective of increasing the quantifiability of the regulations may conflict with extensive guidance on qualitative assessment. For this reason substantial development of the guidance on qualitative assessment is not likely to be needed.

6.2.25 Question 25

Figure 6.1 show a summary of statement S1 to S11 with the average ratings calculated from the survey results concerning BBR Chapter 5.

FIGURE 6.1 QUESTION 25 AND THE SHORTENED STATEMENTS WITH CORRESPONDING AVERAGE RATING RESULTS IN A BAR CHART FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Figure 6.2 show the response spread for statements S1 to S11 concerning BBR Chapter 5.

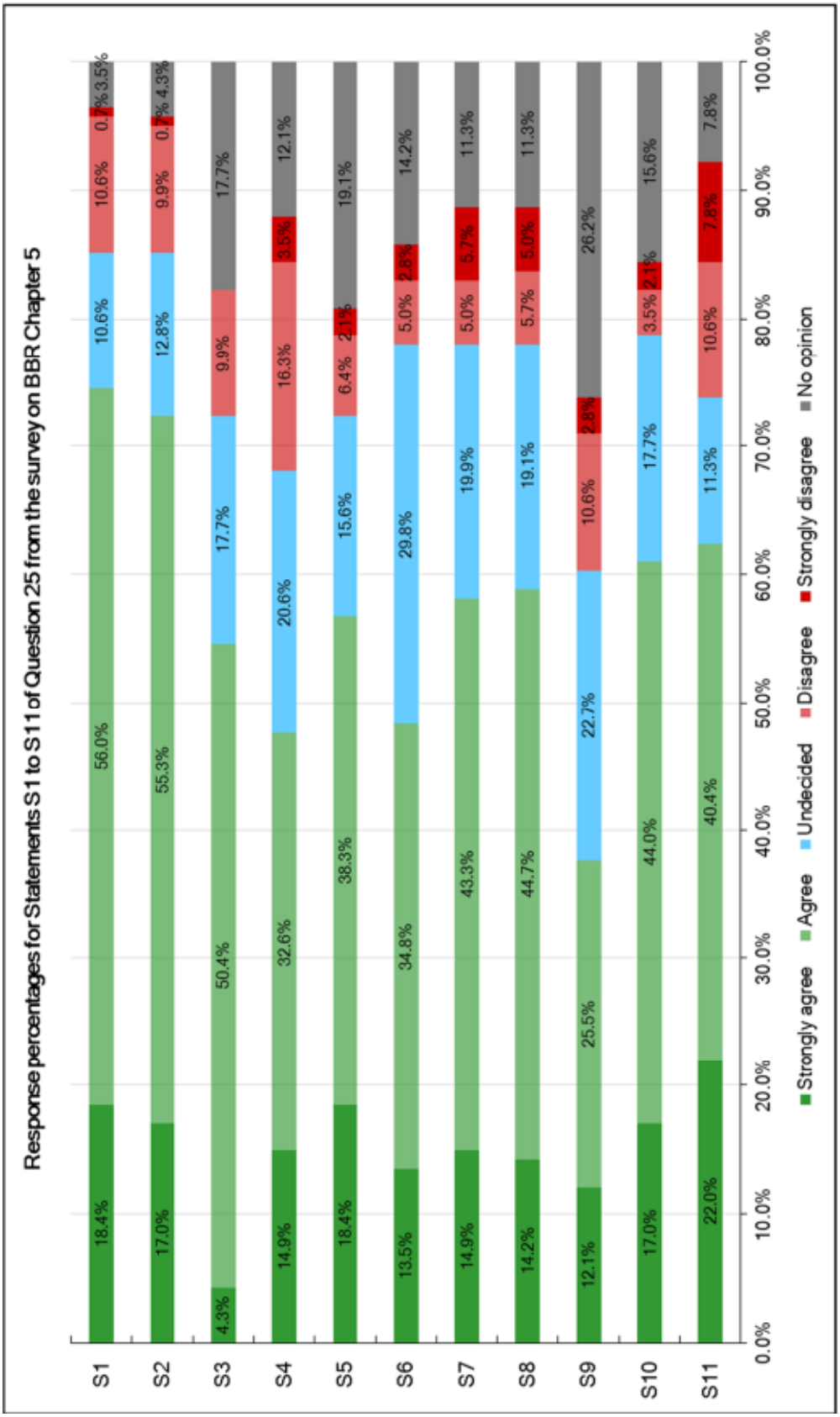

FIGURE 6.2 RESPONSE PERCENTAGES TO STATEMENTS S1 TO S11 OF QUESTION 25 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

The spread among the response categories for each statement are shown in Figure 6.2 as well as color coded depending on the nature of the category. Positive response categories are colored green, negative colored red and undecided colored blue. The left side of origin indicate positive opinions and the right side indicate negative opinions. The undecided response category was split between the negative and positive sides in order to provide ease of comparison. The respondents who indicated that they did not have an opinion have not been included in the figure, these percentages can be seen in Table C.65. For this reason the number of responses included above is not the same for each statement.

S1. The mandatory requirements of BBR Chapter 5 Safety in case of fire are clear. The average rating of 2.16 close to the 'Agree' category together with the response percentages indicate a clear positive weighting of opinions regarding this statement. The results clearly indicate that the objective of creating clear and unambiguous mandatory requirements has been achieved with the 2012 revision.

S2. The general recommendations for the prescriptive design method of BBR Chapter 5 Safety in case of fire are clear. The average rating of 2.19 close to the 'Agree' category together with the response percentages indicate a clear positive weighting of opinions regarding this statement. This indicates that the 2012 revision has achieved the objective of creating clear general recommendations for prescriptive design.

S3. The general recommendations for the performance based design method in BBRAD are clear. The average rating of 2.41 with a tendency towards the 'Agree' category together with the response percentages indicate a positive weighting of opinions regarding this statement. Despite a substantial amount of respondents being undecided, the results indicate that the general recommendations in BBRAD are clear. Additional development of BBRAD may however be needed to achieve the clarity seen in BBR. As BBRAD is a new document it can be assumed that there is a learning process involved and that it becomes clearer with time. This learning process applies not only to users of the regulations but also Boverket. The document is up to version three which shows that changes are still actively being made.

Compared to statements S1 and S2 a substantial number of respondents chose not to give an opinion on this statement. This may be due to a lack of experience with performance based design. The response spread is very similar to S1 and S2 with the exception that there are less 'Strongly agree' opinions which has an effect on the average rating.

S4. The mandatory requirements of BBR Chapter 5 Safety in case of fire allow for creative building designs. The average rating of 2.56 with a tendency towards the 'Undecided' category together with the response percentages indicate a generally positive weighting of opinions regarding this statement but with a large response spread. Out of all the statements this had the most negatively opinionated respondents. There is a substantial difference between Statement S4 and S5 where 20 percent of the respondents indicate negative opinions for statement S4 and only 9 percent for S5. This can be an indication that there is a perceived difficulty of verifying compliance with the mandatory requirements due to the qualitative wording. This highlights the importance for additional guidance that interprets qualitative requirements in a quantitative way.

S5. The general recommendations in BBRAD allow for creative building designs. The average rating of 2.20 close to the 'Agree' category and the response percentages indicate different results to some degree. Compared to S4 the overall opinion is positive regarding BBRAD allowing for creating building designs. It can however be hard to compare two different type of provisions, but it does provide an indication that performance based guidance is required in order to assess more creative building designs.

S6. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification that the functional requirements are complied with during the building process. The average rating of 2.40 with a tendency towards the 'Agree' category together with the response percentages indicate a positive weighting of opinions regarding this statement. Only a small percentage of the respondents are negatively opinionated towards the statement that BBR Chapter 5 has improved the verification process since the 2012 revision. Notably though is that almost a third of the respondents were undecided to this statement, which can indicate that they did not have enough experience to compare with older versions of BBR Chapter 5. The functional, or mandatory, requirements may also be difficult to verify against directly, which is why quantitative performance criteria are necessary.

S7. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has generally resulted in an increased level of fire safety for buildings. The average rating of 2.36 with a tendency towards the 'Agree' category together with the response percentages indicate a positive weighting of opinions regarding this statement. The general opinion for the statement that BBR Chapter 5 has resulted in an increased level of fire safety in buildings since the 2012 revision. These results coincide with the results of Question 16 and Question 18 and the discussion on prescriptive versus performance based design and the level of safety provided.

S8. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in more consistent interpretations of the mandatory requirements. The average rating of 2.35 with a tendency towards the 'Agree' category together with the response percentages indicate a positive weighting of opinions regarding this statement. The results indicate that interpretations of the mandatory requirements are more consistent compared to older versions of BBR Chapter 5. This can be related to the results from Statement 1 that the provisions are clear as well as the results from Question 17 that fire safety designs are more consistent.

S9. The specific performance criteria, such as visibility, that are included in BBRAD has resulted in a better indication if the building is safe or not in the event of a fire. The average rating of 2.55 with a tendency towards the 'Undecided' category together with the response percentages indicate a generally positive weighting of opinions regarding this statement but with a large response spread. Table C.65 of Appendix C show that a substantial amount of the respondents were undecided or chose the 'No opinion' category related to the specific performance criteria in BBRAD. This may indicate that the respondents had trouble understanding the statement. These criteria were used before the 2012 revision and did not change much with BBR 19. The question related more to the acceptability of these values as well as comparison of the results to the same statement in the New Zealand survey on NZBC Clause C, which is likely the cause for confusion among the Swedish respondents.

S10. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification process for a buildings safety in the event of a fire. The average rating of 2.17 close to the 'Agree' category together with the response percentages indicate a clear positive weighting of opinions regarding this statement. These results show that the verification process has improved since the 2012 revision, contrary to the results of statement S6. The difference is that S6 was related to the functional requirements which are purely qualitative. The results do however show that the increased quantification of BBR Chapter 5 has improved the verification process.

S11. The prescriptive design method according to the general recommendations in BBR Chapter 5 Safety in case of fire is uncomplicated to apply for non-complex buildings. The average rating of 2.37 with a tendency towards the 'Agree' category together with the

response percentages indicate a positive weighting of opinions regarding this statement. These results show generally positive opinions regarding the simplicity of using the prescriptive design method.

It should however be noted that a substantial percentage of the respondents were negative towards this statement. The clear results of statement S2 should indicate that the prescriptive design method is easy to use. It may be that other aspects of the prescriptive design method are influencing the responses. For example Question 12 indicate that additional guidance is required for assessment of existing buildings. Without such guidance it can be difficult to apply prescriptive design as one is likely to encounter a number of issues with the building. As it is not reasonably to simple upgrade all buildings to full compliance some guidance is required to indicate to what level upgrades should be done for such projects.

Some of the respondents may also be influenced by other motives, similar to the discussion on Question 11. If prescriptive designs were done mainly by building professionals without Fire Engineering qualifications this would mean less work for fire safety consultants. As fire safety consultants are the majority of respondents the results can therefore reflect their reluctance to share the market.

6.2.26 Question 26

Most of the open-ended responses to the optional Question 26 of the Swedish survey are included in Table C.68 of Appendix C as they were written by the respondents. Below is a summary of some common answers to this question.

- The mandatory requirements, also known as functional requirements, are too restrictive. Some should instead be general recommendations rather than requirements.
- Third party reviews should be required for performance based fire safety designs.
- EKS, containing Swedish application of European construction standards, is unclear.
- The development process for BBR 19 was hurried, which lead to problems of interpretation of the final product.

6.3 New Zealand – Survey on NZBC Clause C Protection from fire

This section present and discuss the principal results of the New Zealand survey on NZBC Clause C.

Additional results from the survey can be found in Appendix C, including answers to the optional response category ‘Clarify your answer (optional)’ for each question, as well as results filtered by the two largest employment groups that participated in the survey.

Most of the open-ended answers in Appendix C are shown as they were written by the respondents, meaning that they have not been translated or formatted. Some of the responses have been censored or left out in order protect the confidentiality of the respondent.

6.3.1 Question 1

TABLE 6.25 QUESTION 1 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Please describe your current employment with one of the following options. If several apply, select the one that best describe your employment.		
Answer Options	**Response Percent**	**Response Count**
Consultant (fire)	61.8%	55
Consultant (other)	5.6%	5
Fire Service	3.4%	3
Building Consent Authority	23.6%	21
Ministry of Business, Innovation and Employment	2.2%	2
Student (fire)	1.1%	1
Student (risk management)	0.0%	0
Other (please specify)	2.2%	2
	answered question	**89**
	skipped question	**0**

Table 6.25 show that 89 respondents were included in the New Zealand survey on NZBC Clause C Protection from fire. The two most common types of employment were with an AHJ or as a fire safety consultant, which combined to 85 percent of the respondents. The respondents who chose the category 'Other (please specify)' were manufacturers of fire protection products.

The two largest groups that participated in the survey, fire safety consultants and AHJs, are generally at either end of the review and approval process. It can therefore be assumed that they are influenced by different factors and do not have the same qualifications. The survey results for each of these groups are presented in Appendix C and the difference between these two groups and the respective results are analysed and discussed in Section 7.3.1.

Since the fire safety consultants are the largest majority of the respondents, 62 percent, they will have the most impact on the survey results. The potential consequences of this is discussed in Section 7.5

6.3.2 Question 2

TABLE 6.26 QUESTION 2 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

In your job or studies do you in any way apply NZBC Clause C Protection from Fire, for example by design, review or regulation?		
Answer Options	**Response Percent**	**Response Count**
Yes	100.0%	89
No	0.0%	0
Clarify answer (optional)		32
	answered question	**89**
	skipped question	**0**

Table 6.26 show that all respondents actively applied NZBC Clause C Protection from fire in their work or studies. This indicates that all respondents were part of the study population.

6.3.3 Question 3

The respondents had an average experience of approximately 13 years in the fire safety industry. As can be seen in Table C.70 of Appendix C the individual responses ranged from zero to 40 years, with 93 percent of the respondents having two or more years of experience.

Some respondents with less than two years of experience were included as their answers indicated that they had the knowledge required to be included in the study population.

6.3.4 Question 4

TABLE 6.27 QUESTION 4 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do the persons involved in the building process for fire safety generally understand the functional requirements of NZBC Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	49.4%	44
No	34.8%	31
Undecided	15.7%	14
Clarify answer (optional)		29
	answered question	**89**
	skipped question	**0**

Table 6.27 show that almost half of the respondents indicated that persons involved in the building process understand the functional requirements of NZBC Clause C.

These results indicate that building professionals generally have some understanding of the functional requirements in Clause C, but that it can be improved. The level of understanding most likely vary depending on profession and involvement with fire safety, which was also reported by some of the respondents in the response category 'Clarify answer (optional)'.

6.3.5 Question 5

TABLE 6.28 QUESTION 5 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	**Response Percent**	**Response Count**
Yes	10.1%	9
No	83.1%	74
Undecided	6.7%	6
Clarify answer (optional)		34
	answered question	**89**
	skipped question	**0**

Table 6.28 show that most of the respondents, 83 percent, do not believe that all persons involved in the building process related to fire safety in New Zealand possess the competence and knowledge required.

These results provide an indication that there is a lack of knowledge within the fire safety industry in New Zealand. Together with the results of Question 4 it can be interpreted that even though there is basic knowledge, the expertise is not as good as it could be. There is definitely room for improvement. The results of Question 4 can indicate that the lack of knowledge applies more to the science behind fire safety rather than the actual building regulations. Some respondents indicated in the category 'Clarify answer (optional)' that the knowledge within AHJs in particular is lacking.

6.3.6 Question 6

TABLE 6.29 QUESTION 6 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How have the overall costs related to fire safety of building projects changed since the 2012 revision of Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Increased significantly	61.8%	55
Increased a little	21.3%	19
No change	4.5%	4
Decreased a little	1.1%	1
Decreased significantly	0.0%	0
Do not know	11.2%	10
	answered question	**89**
	skipped question	**0**

Table 6.29 show that a large majority of the respondents, 83 percent, think that the overall costs related to building fire safety have increased since the introduction of NZBC Clause C in 2012.

One primary objective for the 2012 revision of the fire safety regulations in New Zealand was to lower the costs of building projects. The above results clearly indicate that this objective has not been achieved when it comes to fire safety. The reasons for these significant increases in costs can be many. One possible explanation is that before 2012 most design projects, especially of existing buildings, were rather qualitative for deviations from the prescriptive design methods. The increased need for quantification and verification has likely increased the time and thereby the costs of projects without providing a much different end result. A learning process is also to be expected for new regulations, and the costs may decrease over time as the industry familiarizes itself with the changes.

It can be assumed that very few of the respondents have full insight into the costs related to fire safety as a majority are consultants and not developers themselves. Notwithstanding this the above indications are considered credible as the respondents likely know the time required for projects after the 2012 revision. Time equals costs and such it is expected the respondents have a good idea of the relative cost changes.

No matter what has caused the increase in costs this issue may be significant and should therefore be investigated more thoroughly by MBIE.

6.3.7 Question 7

TABLE 6.30 QUESTION 7 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Can questions of interpretation of NZBC Clause C Protection from Fire, including the C/AS1 to C/AS7 and C/VM2 documents, be resolved through discussions with the Building Consent Authorities? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	**Response Percent**	**Response Count**
Frequently	21.3%	19
Occasionally	46.1%	41
Rarely	15.7%	14
Very rarely	14.6%	13
Undecided	2.2%	2
Clarify answer (optional)		34
	answered question	**89**
	skipped question	**0**

Table 6.30 show that a large part of the respondents, 46 percent, were of the opinion that questions of interpretation on NZBC Clause C and the compliance documents can occasionally be resolved through discussions with the local AHJ.

These results are rather positive by indicating that discussions with the local AHJs can clarify issues of interpretation when it comes to the building regulations. It is likely that AHJs with a larger staff base have more specific knowledge and can therefore provide better support. The responses to the category 'Clarify answer (optional)' indicated that it can sometimes be hard to work with the AHJs due to overly conservative mindsets. Some respondents also indicated that issues for performance based projects normally can be settled via discussion with the peer reviewer.

6.3.8 Question 8

TABLE 6.31 QUESTION 8 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Does the Ministry of Business, Innovation and Employment provide satisfactory help with interpretation and clarification of NZBC Clause C Protection from Fire including the C/AS1 to C/AS7 and C/VM2 documents?		
Answer Options	**Response Percent**	**Response Count**
Yes	24.7%	22
No	44.9%	40
Undecided	30.3%	27
Clarify answer (optional)		36
	answered question	**89**
	skipped question	**0**

Table 6.31 show that almost half of the respondents, 45 percent, indicate that the Ministry for Business, Innovation and Employment do not provide satisfactory help with interpretation and clarification of NZBC Clause C and the compliance documents.

These results are likely due to the fact that MBIE do not have the mandate to interpret the building regulations. Despite this, the responses to the category 'Clarify answer (optional)' indicate that the advice can vary and that some persons get assistance through email which is then not shared with the rest of the fire safety industry. This is a problem that shows a need for better communication between MBIE and the industry. If MBIE do not have mandate then all interpretations should be referred to the local AHJ.

6.3.9 Question 9

TABLE 6.32 QUESTION 9 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Should there be a certification requirement for Fire Engineers doing performance based designs?		
Answer Options	**Response Percent**	**Response Count**
Yes	69.7%	62
No, there should be no certification at all	5.6%	5
No, but voluntary certification is good (e.g. CPEng)	16.9%	15
Undecided	7.9%	7
Clarify answer (optional)		30
	answered question	**89**
	skipped question	**0**

Table 6.32 show that most of the respondents, 70 percent, think that certification for Fire Engineers should be required in New Zealand.

The results show that most respondents believe certification of Fire Engineers is beneficial for the fire safety industry. Since most of the respondents believe it should be a requirement it may indicate that Fire Engineers need to increase their knowledge and competence. This was further highlighted by some respondents saying that the CPEng certification that exists in New Zealand does not always prove that the person has the knowledge required for performance based designs. Certification is only beneficial if it actually require a high level of knowledge. This report has not included an analysis of existing certification, but if it does not provide a genuine mark of knowledge then it defeats the purpose of certification. A BSc in Fire Engineering or similar can be seen as a sort of certification, although it does not prove that the person has appropriate experience.

6.3.10 Question 10

TABLE 6.33 QUESTION 10 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the new risk group classification system in the Acceptable Solutions C/AS1 to C/AS7 better compared to the previous acceptable solution used before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	27.0%	24
No	34.8%	31
Undecided	38.2%	34
Clarify answer (optional)		32
	answered question	**89**
	skipped question	**0**

Table 6.33 show that there is a substantial response spread among all the categories regarding the new risk groups in the Acceptable Solutions being better than the equivalent classifications from previous versions.

The substantial response spread make it difficult to draw any conclusions regarding the new risk group classification system introduced with the 2012 Acceptable Solutions, however the responses are clearly not positive. It may be that the responses are not positive due to the new structure of the prescriptive documents where a single document has now been replaced with seven separate documents. One building rarely contain only a single occupancy and it can therefore be overly complicated and tedious to use several different documents for a single building.

Some respondents reported that different classification systems are used within the building regulations. This will only cause confusion and these classification systems should therefore be reviewed by MBIE to ensure consistency.

6.3.11 Question 11

TABLE 6.34 QUESTION 11 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the Acceptable Solutions C/AS1 to C/AS7?		
Answer Options	**Response Percent**	**Response Count**
Yes	20.2%	18
No	74.2%	66
Undecided	5.6%	5
Clarify answer (optional)		31
	answered question	**89**
	skipped question	**0**

Table 6.34 show that a majority of the respondents, 74 percent, consider that fire engineering qualifications are not necessary to apply the Acceptable Solutions C/AS1 to C/AS7.

One of the objectives of the revision of the building regulations was to enable persons without specific fire safety qualifications to do prescriptive designs in accordance with the Acceptable Solutions. The results give a clear indication that this has been achieved. The respondents did suggest that some experience and knowledge of the building process is required which goes in line with the aims of the revision.

A question that this survey does not provide answer to is how common it is with persons doing prescriptive designs without fire engineering qualifications. If this was more common it could help with reducing costs of building projects.

6.3.12 Question 12

TABLE 6.35 QUESTION 12 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is adequate guidance provided for alterations and extensions to existing buildings in the Acceptable Solutions C/AS1 to C/AS7 and the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Yes	19.1%	17
No	67.4%	60
Undecided	13.5%	12
Clarify answer (optional)		34
	answered question	**89**
	skipped question	**0**

Table 6.35 show that a substantial amount of the respondents, 67 percent, do not find the guidance for alterations to existing buildings within NZBC Clause C and the compliance documents to be adequate.

The results clearly show that better guidance for assessment of existing buildings is necessary. Guidance for assessment of existing buildings was released shortly before the completion of this report, as described in Section 1.5, and further research may be required to show if the additional guidance is sufficient.

6.3.13 Question 13

TABLE 6.36 QUESTION 13 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	Response Percent	Response Count
Yes	29.2%	26
No	53.9%	48
Undecided	16.9%	15
answered question		89
skipped question		0

Table 6.36 show that the majority of the respondents, 54 percent, are of the opinion that Fire Engineers are generally not brought into the design process early enough.

The consequences of Fire Engineers not being brought in at an early stage of a project be higher costs and lengthier design stage. This can be solved by Fire Engineers educating their clients of the benefits of bringing them in at an early stage of the project.

6.3.14 Question 14

TABLE 6.37 QUESTION 14 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Building Consent Authorities must seek advice from the Fire Service for some types of buildings in regards to means of escape and firefighting operations. To what level should the Fire Service be involved in the building process?		
Answer Options	Response Percent	Response Count
More than the current situation	14.6%	13
Their current level of involvement is sufficient	42.7%	38
Less than the current situation	30.3%	27
Undecided	12.4%	11
Clarify answer (optional)		35
answered question		89
skipped question		0

Table 6.37 show that a large portion of the respondents, 43 percent, believe that the current level of involvement by the Fire Service in the building process is sufficient. 30 percent believe that they should be involved to a lesser degree than the current situation.

These results clearly show that most the respondents do not want an increased level of involvement by the Fire Service. For projects where peer reviewers are not involved, an extra instance required to review the design is likely to increase the costs with little benefit. However, if they are to be involved it is essential that they have the knowledge and competence to adequately assess against the building regulations.

Most of the responses to the category ‘Clarify answer (optional)’ indicate that the involvement of the Fire Service is beneficial but that it should be limited to the areas related to firefighting operations. Some respondents indicated that the Fire Service can be influenced by other motives and sometimes go beyond the requirements in the building regulations.

6.3.15 Question 15

TABLE 6.38 QUESTION 15 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the introduction of Verification Method C/VM2 a step in the right direction for performance based fire safety design in New Zealand?		
Answer Options	**Response Percent**	**Response Count**
Yes	47.2%	42
No	24.7%	22
Undecided	28.1%	25
Clarify answer (optional)		42
	answered question	**89**
	skipped question	**0**

Table 6.38 show that a large part of the respondents, 47 percent, believe that the C/VM2 document is a step in the right direction for performance based fire safety design in New Zealand.

The above results indicate that the C/VM2 has not been well received by a large part of the general fire safety industry. The 2012 revision largely revolved around creating a framework for performance based design and these results therefore indicate that the revision was neither a failure nor a success. It can be that it is too early to tell or that the industry is still adapting to this new design process, which was indicated by some of the respondents. The fact that the C/VM2, and other documents, have been amended multiple times since 2012 indicate that there were problems that needed addressing. If these new changes are for better or worse is difficult to tell. However, the results of this survey indicate that further development may be required. Such development may even need to explore a different route of development.

Some respondents indicate that the verification method C/VM2 is not guidance for genuine performance based design because it is too restrictive. Even though the C/VM2 can be described as a framework for performance based design, this is not stated in the actual document.

6.3.16 Question 16

TABLE 6.39 QUESTION 16 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method described in the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety	17.4%	15
Acceptable level of safety	43.0%	37
Lower than acceptable level of safety	7.0%	6
Undecided	32.6%	28
Clarify answer (optional)		28
	answered question	**86**
	skipped question	**3**

Table 6.39 show that 60 percent of the respondents are of the opinion that the scenario analysis method of C/VM2 provide an acceptable or higher level of fire safety for buildings.

The 2012 revision did not set out to change the level of safety provided by the regulations or compliance documents as it had been established to already be acceptable. Therefore these results indicate that this has not changed and that the C/VM2 provide a minimum level of safety that is acceptable, thereby achieving an objective of the revision.

The results of this survey indicate that there are issues with the Verification Method C/VM2. An interpretation of the results regarding level of safety is that the problems are related to other factors and not too conservative or overly onerous requirements.

6.3.17 Question 17

TABLE 6.40 QUESTION 17 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Has the introduction of the Verification Method C/VM2 resulted in a more consistent level of fire safety for different buildings when compared to performance based designs undertaken before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	32.6%	28
No	24.4%	21
Undecided	43.0%	37
Clarify answer (optional)		30
	answered question	**86**
	skipped question	**3**

Table 6.40 show that that the response spread is substantial regarding the consistency of fire safety for buildings designed with the C/VM2 framework compared to performance based designs before 2012. A substantial part of the respondents, 43 percent, are either undecided or do not know.

One of the main objectives of the 2012 revision was to reduce the inconsistency of performance based designs which was causing uncertainty with regards to compliance. The results of the survey indicate that this objective has not been achieved. It may be that it is too early to tell and that further research may be required, a suggested approach is the one utilized by Lundin (2005). It can also be that these results reflect other issues with the C/VM2 rather than the consistency of design. Considering that there was minimal guidance before 2012 it is not likely that a framework will decrease consistency of design.

6.3.18 Question 18

TABLE 6.41 QUESTION 18 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

The scenario analysis method in the Verification Method C/VM2 includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios	29.1%	25
Credible scenarios, but not worst case	24.4%	21
Less severe scenarios	3.5%	3
Do not know	23.3%	20
Other (please specify)	19.8%	17
	answered question	**86**
	skipped question	**3**

Table 6.41 show substantial response spread on what type of scenarios the input variables in C/VM2 describe. The largest portion of the respondents, 29 percent, indicate that the variables describe credible worst case scenarios.

The results of this question can be related to those of Question 16, both of which indicate that an acceptable level of safety is provided with the introduction of C/VM2 and the scenario analysis method it focuses on. One can argue what ‘acceptable’ is, and similarities can

therefore be drawn with the discussion in Section 6.2.18. The respondents who chose the response category 'Other (please specify)' indicated that it varies depending on scenario, the type of project and building.

6.3.19 Question 19

TABLE 6.42 QUESTION 19 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the guidance for design of complex buildings provided in the Verification Method C/VM2 comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	24.4%	21
No	36.0%	31
Undecided	39.5%	34
Clarify answer (optional)		30
	answered question	**86**
	skipped question	**3**

Table 6.42 show a substantial response spread regarding the comprehensiveness of guidance for design of complex buildings in the C/VM2.

The C/VM2 does not provide specific requirements or recommendations for certain type of buildings, and therefore the guidance for complex buildings can be seen as non-existent. Despite this the framework is intended to be used for everything from small buildings outside the scope of the Acceptable Solutions to sport Stadiums and high rise buildings. The results above may reflect this large spread of complexity. Some respondents reported that very complex buildings are hard to assess with the framework. MBIE may want to consider providing additional guidance for design of very complex buildings. Simple overall guidance for various buildings could clear any confusion related to C/VM2 designs. An additional source for guidance is the Commentary document for C/VM2. However, to avoid confusion and ambiguous methods everything necessary for design should be included in the same document.

The reason why a large portion of the respondents answered 'Undecided' is most likely because they have not had much experience in designing very complex buildings after the 2012 revision.

6.3.20 Question 20

TABLE 6.43 QUESTION 20 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do you believe that an alternative fire safety design outside the scope of Acceptable Solutions and the Verification Method is possible to get approved by Building Consent Authorities?		
Answer Options	**Response Percent**	**Response Count**
Yes	58.1%	50
No	19.8%	17
Undecided	22.1%	19
Clarify answer (optional)		35
	answered question	**86**
	skipped question	**3**

Table 6.43 show that more than half of the respondents, 58 percent, believe that alternative fire safety designs are possible to get approved by AHJs.

These results indicate that designs outside the acceptable solutions and the verification method are still viable and being accepted in New Zealand given that they can be proven to comply with the NZBC. The indicates that the statements that the C/VM2 “must” or “shall” be used for everything but prescriptive design that is included in some official MBIE documents, as described in Section 4.3, is not hindering designers from using Alternative Solutions. Despite these results it is troublesome that this wording is used by MBIE as it suggests it is the only solution outside of prescriptive design. Any statements with such wording in the official compliance documents should be rewritten to reflect that other means of compliance are available.

6.3.21 Question 21

TABLE 6.44 QUESTION 21 WITH RESULTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Should sensitivity analyses of input variables be more included in performance based fire safety designs in New Zealand than it currently is?		
Answer Options	**Response Percent**	**Response Count**
Yes	41.9%	36
No	16.3%	14
Undecided	41.9%	36
Clarify answer (optional)		26
	answered question	**86**
	skipped question	**3**

Table 6.44 show that 42 percent of the respondents believe sensitivity analyses should be more included in performance based fire safety designs in New Zealand.

As the survey has provided clear indication that the C/VM2 document provide an acceptable or higher level of safety it can be interpreted that the above results are more general or related to Alternative Design. When the C/VM2 was developed one of the objectives was to incorporate a conservative mindset with the methods and variables utilized. Therefore sensitivity analyses may not be needed when complying with this method.

A possible explanation to the substantial number of undecided responses is a lack of knowledge among the respondents regarding sensitivity analyses, what they can be used for and the potential benefit they can bring in terms of safety.

6.3.22 Question 22

Figure 6.3 show a summary of statement S1 to S11 with the average ratings calculated from the survey results concerning NZBC Clause C.

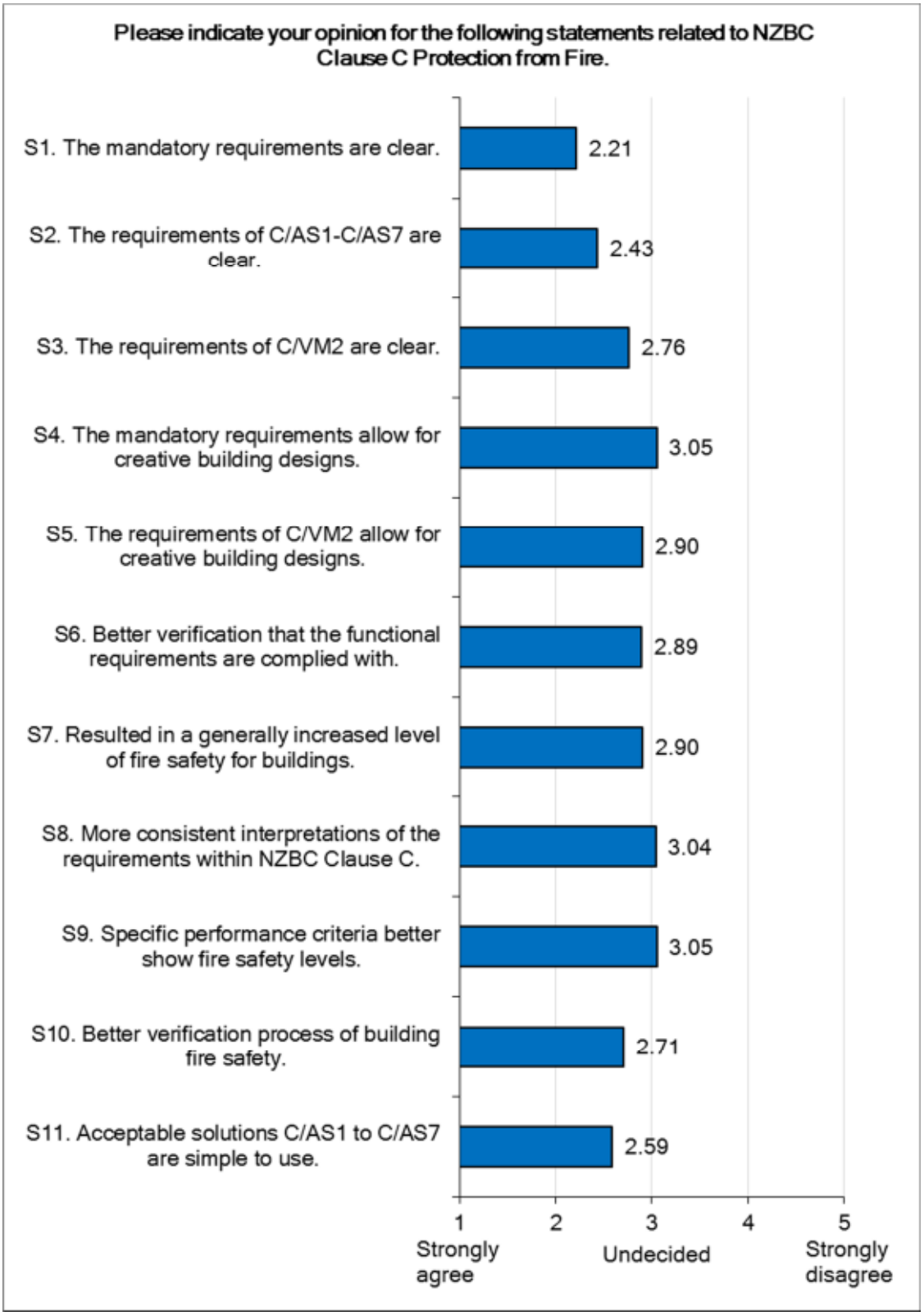

FIGURE 6.3 QUESTION 22 AND THE SHORTENED STATEMENTS WITH CORRESPONDING AVERAGE RATING RESULTS IN A BAR CHART FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Figure 6.4 show the response spread for all categories, excluding 'No opinion', for statements S1 to S11 concerning NZBC Clause C.

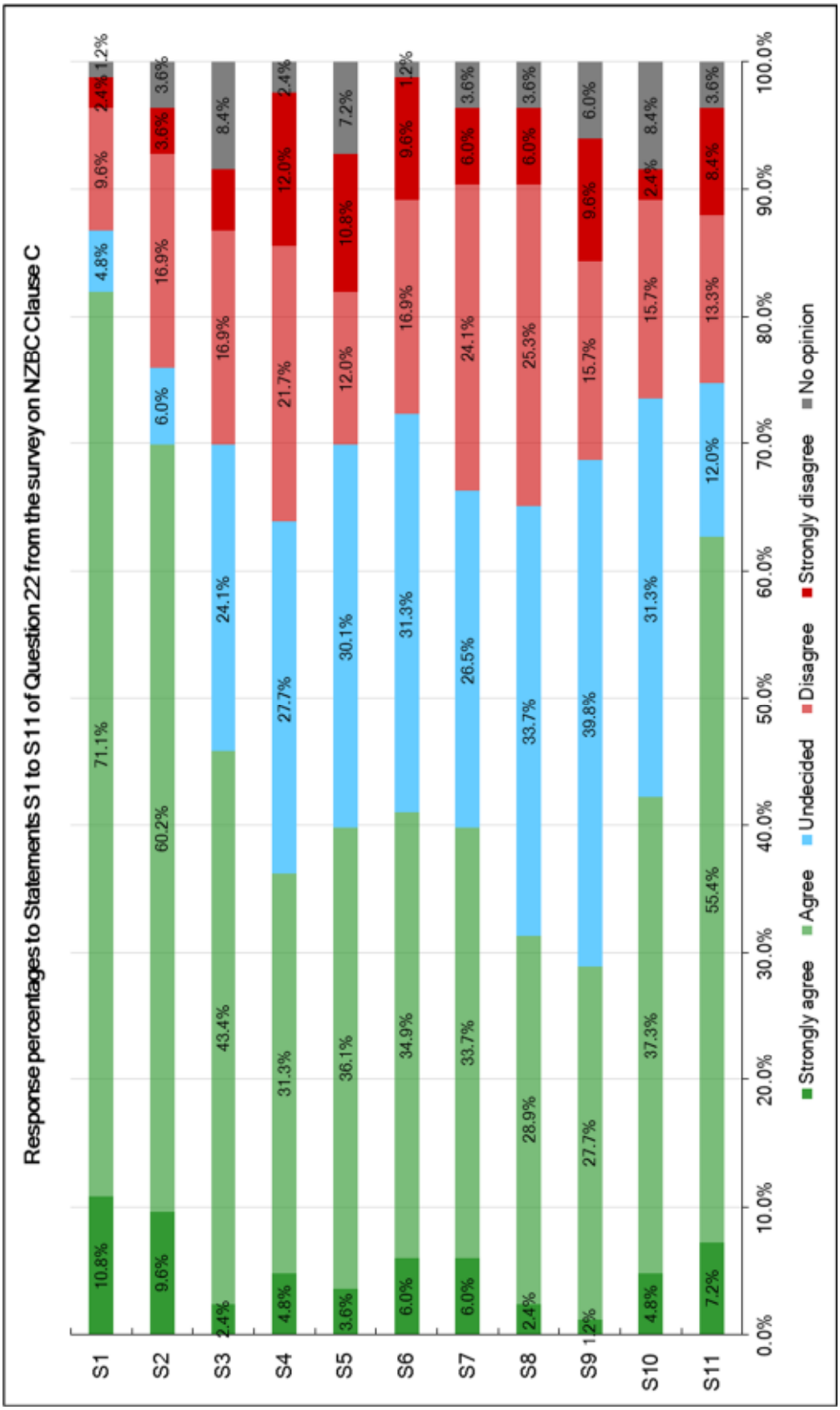

FIGURE 6.4 RESPONSE PERCENTAGES TO STATEMENTS S1 TO S11 OF QUESTION 22 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

The spread among the response categories for each statement are shown in Figure 6.4 as well as color coded depending on the nature of the category. Positive response categories are colored green, negative colored red and undecided colored blue. The left side of origin indicate positive opinions and the right side indicate negative opinions. The undecided response category is split between the negative and positive sides in order to provide ease of comparison. The respondents who indicated that they did not have an opinion have not been included in the figure, these percentages can be seen in Table C.123. For this reason the number of responses included above is not the same for each statement.

S1. The requirements of NZBC Clause C Protection from Fire are clear. The average rating of 2.21 close to the 'Agree' category together with the response percentages indicate a clear positive weighting of opinions regarding this statement. These results show that the objective of creating clear provisions within NZBC Clause C has been achieved with the 2012 revision.

S2. The requirements of the Acceptable Solutions C/AS1 to C/AS7 are clear. The average rating of 2.43 with a tendency towards the 'Agree' category together with the response percentages indicate a positive weighting of opinions regarding this statement. Although the opinions are generally positive regarding the clarity of the Acceptable Solutions C/AS1 to C/AS7 it should be noted that a substantial percentage of the respondents were negatively opinionated. This may indicate that there is room for improvement and that some provisions can be ambiguous. It can also indicate a general dislike towards the Acceptable Solutions as they underwent significant change with the 2012 revision.

S3. The requirements of the Verification Method C/VM2 are clear. The average rating of 2.76 with a tendency towards the 'Undecided' category together with the response percentages indicate a generally positive weighting of opinions regarding this statement but with a large response spread. The substantial amount of respondents being undecided or negatively opinionated regarding the clarity of the Verification Method C/VM2 may indicate that there are issues with the document that need resolving. It is vital that a guidance document is unambiguous if it is to bring consistency in design and interpretation. The responses can also be influenced by a general dislike towards the Verification Method C/VM2 among some respondents and that they therefore do not directly reflect the clarity. Some respondents may not have had much experience with C/VM2 designs and could therefore not provide a direct answer.

S4. The requirements of NZBC Clause C Protection from Fire allow for creative building designs. The average rating of 3.05 indicate a slightly negative weighting of opinions regarding this statement. Notably is that a larger majority of the respondents are positive than negative towards the statement regarding NZBC Clause C allowing for creative design. The reason for these different results is due to the high number of 'Strongly disagree' opinions which are assumed to weigh more than 'Agree'. Overall the results still indicate that creative building designs can be difficult to assess against NZBC Clause C. A possible explanation for these results is the inclusion of specific performance criteria in the NZBC. This can be seen as a step backwards from performance base design as it essentially makes the NZBC stricter and less adaptable.

S5. The requirements of the Verification Method C/VM2 allow for creative building designs. The average rating of 2.90 with a tendency towards the 'Undecided' category together with the response percentages indicate a slightly positive weighting of opinions regarding this statement but with a large response spread. Compared to statement S4 the results indicate that the Verification Method C/VM2 more adequately allow for creative building designs than the actual mandatory requirements. This can be due to perceived

difficulty of assessing designs directly according to the mandatory provisions which are largely qualitative in nature and wording. Despite this there was a substantial amount of respondents who are undecided or negatively opinionated which may indicate that complex buildings can be difficult to design in regards to fire safety when applying the C/VM2. These results can therefore be related to the results of Question 19, that additional guidance is needed for more complex and creative building designs.

S6. The 2012 revision of NZBC Clause C Protection from Fire has resulted in better control that the functional requirements are complied with during the design process of a building. The average rating of 2.89 with a tendency towards the 'Undecided' category together with the response percentages indicate a slightly positive weighting of opinions regarding this statement but with a large response spread. The relatively substantial percentages of respondents who were undecided or negatively opinionated can indicate that it is hard to verify compliance direct to the functional requirements. Similarly to the discussion for statement S4, the results can indicate that this is difficult due to the qualitative nature of the functional requirements. This is one reason why additional guidance for performance based design is required to provide the quantitative part that goes in line with the functional requirements.

S7. The 2012 revision of NZBC Clause C Protection from Fire has increased the level of fire safety for buildings. The average rating of 2.90 with a tendency towards the 'Undecided' category together with the response percentages indicate a slightly positive weighting of opinions regarding this statement but with a large response spread. The intention of the 2012 revisions was not to increase the level of fire safety within buildings, which these results indicate has largely been achieved. Together with the results and discussion on Question 16 and Question 18 this indicates that an acceptable level of safety is provided by the regulations. With a substantial revision there are likely to be elements changed that unintentionally increase the level of safety which is likely to be reflected in the results. An example of such a change is that the 2012 prescriptive design solutions generally specify smoke detection systems instead of heat detection systems.

S8. The 2012 revision has resulted in more consistent interpretations of the requirements within NZBC Clause C Protection from Fire. The average rating of 3.04 indicate a slightly negative weighting of opinions towards this statement. Together with the substantial response spread indicate that the consistency of interpretations is not as good as it could be. To some degree this elevate the results from statement S2 and S3 that the regulations are not sufficiently clear. The objective of guidance is to make interpretations easier and improving the consistency among designers. It seems this has not been achieved to a high enough level with the 2012 revision of NZBC Clause C.

S9. The specific performance criteria, such as visibility, that are now included in NZBC Clause C Protection from Fire has resulted in a better indication if the building is safe or not in the event of a fire. The average rating of 3.05 indicate a slightly negative weighting of opinions towards this statement. The response spread is significant with more positive than negative respondents towards the statement on specific performance criteria being included in NZBC Clause C and improving verification. The average rating is influenced by the strong opinions more, causing it to be negative. These results may show that the inclusion of performance criteria within the NZBC makes it too prescriptive. Performance criteria are necessary for performance based design. However, it can be better to have these specified in documents that are not as legally binding and therefore easier to amend should research show that different criteria are more suitable.

S10. The 2012 revision of NZBC Clause C Protection from Fire has resulted in a better verification process for a buildings safety in the event of a fire. The average rating of 2.71 with a tendency towards the 'Undecided' category together with the response percentages indicate a generally positive weighting of opinions regarding this statement but with a large response spread. These results coincide with the results of Question 17. Consistency of design is almost certain to improve as there were no comparable guidance for design outside of the prescriptive methods before 2012. Therefore these results likely reflect that the respondents have other issues with the changes, such as the C/VM2. It is possible that verification can be sometimes be difficult as statement S3 showed that total clarity within C/VM2 has not been achieved.

S11. The new Acceptable Solutions C/AS1 to C/AS7 are straightforward to apply for non-complex building designs. The average rating of 2.59 with a tendency towards the 'Undecided' category together with the response percentages indicate a generally positive weighting of opinions regarding this statement. The response spread provide a better indication than the average rating as a substantial percentage of the respondents are positively opinionated towards this statement regarding the simplicity and applicability of the prescriptive design methods. These results coincide with those of Question 11 that building professionals without Fire Engineering qualifications can adequately apply the Acceptable Solutions C/AS1 to C/AS7.

6.3.23 Question 23

Most of the open-ended responses to the optional Question 23 of the New Zealand survey are included in Table C.126 of Appendix C as they were written by the respondents, meaning that they have not been translated or formatted. Some of the responses may have been censored or left out to protect the confidentiality of the respondent.

Below are a summary of common answers to Question 23 of the New Zealand survey.

- Communication between MBIE and the industry needs to improve. Advice on interpretation and other code related issues should be available to the entire industry and not only the individual asking the question.
- Alterations to existing buildings should not always require a C/VM2 solution if it does not fully comply with the Acceptable Solutions. The costs of C/VM2 solutions often outweigh the benefits.
- More worked examples should be included in the compliance documents.
- The C/VM2 often provide higher level of safety than the Acceptable Solutions, this was not the intent of the revision.

7 Discussion

7.1 Results from the Swedish survey on BBR Chapter 5 Safety in case of fire

When interpreting the overall results from the survey on BBR Chapter 5 they convey a sense of acceptance and approval towards the changes that were introduced with the 2012 revision of the fire safety building regulations in Sweden. The primary objectives of achieving a clear and quantifiable set of regulations with improved consistency appears to have been achieved. Many of the factors that Lundin (2005) found to result in uncertainty were managed and the general recommendations, primarily those in BBRAD, provide a minimum and acceptable level of safety largely independent of who the designer is. The 2012 revision can for these reasons be considered a success.

In spite of the above there are areas where the Swedish building regulations can be developed further and that the design process can be improved. The results indicate that there is a general lack, or application, of knowledge within the Swedish fire safety industry. This includes the basic knowledge expected by building professionals and fire safety contractors as well as the specific expert knowledge among Fire Engineers. In particular it is vital that persons who are involved in the review process of fire safety designs are highly knowledgeable and competent. This predominantly applies to AHJs, the Fire Service and peer reviewers. Certification of Fire Engineers is one way to increase expertise knowledge. Furthermore, an increased knowledge within AHJs would be beneficial for the entire industry as this is where interpretations on the regulations need to be resolved. As for the Fire Service it is equally important that they too have the knowledge and experience required to act as advisors to AHJs when so asked.

Boverket should consider developing the guidance for assessment of existing buildings as this can be difficult due to buildings not being fully compliant with the prescriptive provisions. There is also a lack of guidance for Br0 classified buildings. Such guidance should include both assessment of existing and new buildings. It is possible that the guidance for Br0 buildings that is provided by third parties is sufficient, further research on this matter is likely required.

7.2 Results from the New Zealand survey on NZBC Clause C Protection from fire

The survey results provide a strong indication that the 2012 revision of the NZBC Clause C and the corresponding compliance documents was not the improvement it meant to be.

The objective of achieving clarity in regards to the regulations was only partially achieved. Even though issues of interpretation are able to be resolved with AHJs the results show that the compliance documents are not as clear as they should be.

There seems to be a lack of knowledge within the entire fire safety industry in New Zealand. As the AHJ has an approving function it is vital that they have the knowledge and competency to adequately assess fire safety designs, in particular prescriptive designs of existing buildings that are not fully compliant. Peer reviewers are involved in C/VM2 projects and thereby provide specific expertise. It is however important that peer reviewers are chosen based on their competence for the project. For example, not all peer reviewers can adequately assess all types of fire modelling. Certification of more Fire Engineers can also partly address the lack of knowledge within the industry, but only if the certification is a true mark of competency. It is possible that more designers are doing performance based designs with the introduction of C/VM2 even though they are not fully competent in the area of fire modelling.

The increase in costs related to fire safety for building projects is an issue MBIE should investigate. The reasons for these increases have not been fully established, but it should not be acceptable that the costs go up significantly without much end result. Building professionals should be able to adequately apply the prescriptive solutions, but considering the high costs this is likely not happening around New Zealand.

Furthermore there appears to be a communication problem between MBIE and the fire safety industry. Even though MBIE do not have mandate to interpret the regulations they occasionally provide such advice to consultants. This leads to confusion within the industry and should therefore be addressed. Interpretations should be left to AHJs. Reason, logic and discussion should be able to settle all such interpretations and if ambiguities are repeatedly found then they should be reported to MBIE so that they can be properly addressed and amended.

The Verification Method C/VM2 does to a large extent not distinguish between simple and very complex buildings. Some respondents even indicated that it is more oriented towards buildings with little complex features. MBIE should therefore consider including additional guidance for design of very complex buildings.

The inclusion of specific performance criteria in the NZBC Clause C may have improved quantification and verification of fire safety designs, but made it more prescriptive at the same time. As research advances it is not unlikely that new more suitable specific performance criteria are found. If the building regulations are to be dynamic and adaptable it is necessary that such changes can be made relatively quick. Changing the NZBC is more complicated than simply amending a set of compliance documents.

7.3 Survey respondent majority groups and their influence on the results

The respondents of the Swedish and the New Zealand survey mainly consisted of two groups respectively. The majority of the respondents for both surveys were fire safety consultants which are assumed to mainly consist of Fire Engineers. In Sweden the second group was the Fire Service, which are assumed to consist mostly of persons with Fire Engineering qualifications. In New Zealand the second group was persons working for an AHJ which is referred to as a Building Consent Authority.

All of the results discussed in this section can be found in Appendix C.

7.3.1 Swedish survey on BBR Chapter 5 Safety in case of fire

The results from the Swedish survey on BBR Chapter 5 generally indicate a better acceptance and approval of the fire safety building regulations amongst the Fire Service than fire safety consultants. This is likely due to the different roles the two groups have in the building process. The Fire Service has more of a reviewing role and more regulation makes this process easier to manage. The introduction of BBRAD can be described as increased regulation in the area of performance based design making benchmarking of designs less complicated. Question 7 on the need for certification of Fire Engineers is one example where the Fire Service would like to see more regulations, in this case by making certification a requirement. Fire safety consultants were more inclined to leave it as an optional choice likely because they do not want to see an increased level of regulation among themselves and their occupation.

The results further indicate that the fire safety consultants are more knowledgeable on the building regulations and the building process. Respondents within the Fire Service were undecided or did not know the answer to some of the questions where fire safety consultants

could provide more definite answers. This strengthens the indications that there is a lack of knowledge within the fire safety industry, in this case the Fire Service.

Question 14 show a clear difference where the Fire Service wants to be more involved in the building process, while the fire safety consultants believe their level of involvement is sufficient. This can be due to a by fire safety consultants perceived lack of knowledge within the Fire Service, as was indicated in some of the optional open-ended response categories. Rather than looking at the Fire Service as an instance working for the same goal, fire safe buildings, they are sometimes regarded as a counterpart trying to hinder the project. An increased involvement by the Fire Service goes in line with the above discussion on their likely want of stricter regulation. At the same time it is important that they do not overstep their boundaries by trying to go beyond the building regulations.

7.3.2 New Zealand survey on NZBC Clause C Protection form fire

The results from the New Zealand survey on NZBC Clause C generally show the same results for both persons within AHJs and fire safety consultants. There is some indication that fire safety consultants are more knowledgeable on the building regulations due to a high number of undecided responses from persons within AHJs. It is also quite clear that fire safety consultants are more familiar with the science behind the regulations, for example the C/VM2. The reliance on competent Fire Engineers may be something AHJs expect and seek, which is indicated by their responses to Question 9 that certification of Fire Engineers should be required.

The results for Question 8 are interesting because the respondents within AHJs seem to be more negative towards the help MBIE provide when it comes to the building regulations. It can be that AHJs responses are influenced by building regulations not related to fire safety or that they simply do not turn to MBIE very often for assistance.

7.4 Comparison of results between the Swedish and New Zealand surveys

The results of the surveys provide a clear indication that the 2012 revision in respective country was overall more successful in Sweden than New Zealand. The underlying reasons for this are probably many and not entirely dependent on the differences in the actual building regulations.

One major difference is the role of the AHJs. In Sweden the design process is much more dependent on the developer and the consultants who do the designs. Even though there may be a lack of specific knowledge within AHJs regarding fire safety that may not be a critical factor as they do not have an approving role. The lack of knowledge within the fire industry, as indicated by both surveys, becomes more distinguishable when persons without Fire Engineering qualifications have the final say on approval of designs. In New Zealand this even applies to performance based designs when a peer reviewer is involved, although disagreements are not as common in those cases. A suggested route is to either ensure all AHJs have specific competency in the area of fire safety, or that that the review system is changed into something more similar to the one used in Sweden.

The inclusion of specific performance criteria within the NZBC Clause C is a major difference between the Swedish and New Zealand building regulations. The results of the New Zealand survey did not show that this difference had much of a positive effect in regards to quantification and verifiability. A suggestion is to include such specific performance criteria within a separate document, for example the C/VM2, and keep the NZBC performance based.

Both surveys indicated that the costs related to fire safety has gone up since the 2012 revisions. Even though there may be underlying reasons that are specific for each country, this can also indicate that major change will always bring an increase in costs. Further time and research may be required to show whether it is temporary or permanent.

The different results in the surveys regarding the involvement of the Fire Service in the building process is most likely due to the high number of respondents form the Fire Service in Sweden. In New Zealand very few respondents were from the Fire Service. The remaining respondents may want to keep the Fire Service from intruding on their territory and responsibilities and therefore this issue was more negatively viewed by the New Zealand respondents.

7.5 Accuracy and trustworthiness of the survey results

The final implementation method of the surveys made it impossible to track who they were sent to. This also made follow-up to increase the response rates almost impossible, as well as actually calculating the final response rate. The total number of responses to the Swedish and New Zealand surveys were 190 and 99 respectively, before the screening process. This can be compared to the review in Sweden by Boverket (1997) where 353 respondents participated in a telephone survey conducted by a professional survey company. Furthermore, the alumni e-mailing list kept by the Department of Fire Safety Engineering and Systems Safety at Lund University used to distribute the Swedish survey contained approximately 800 separate addresses. As Lund University was the only university in Sweden with a BSc Fire Engineering course up until 2006 it is assumed that the total number of active Fire Engineers in Sweden is roughly 800. Therefore the Swedish survey is likely providing a good indication of how the fire safety industry view the building regulations and the building process. Considering that the population of Sweden is roughly twice that of New Zealand the results of the survey on NZBC Clause C is also assumed to have roughly the same relevance. In the ideal case where the results had been verified to be statistically accurate and a good representation of the fire safety industry it would have required additional data such as population size and comparable data which could not be retrieved.

When it comes to surveys asking for opinions the results should generally reflect the views of the entire study population. It can be that the persons most inclined to participate in the survey are those who have strong opinions. For the survey to produce representable results both those who are satisfied and those who are dissatisfied, with the issue in question, need to participate. Most questions included optional open-ended response categories where respondents could express any opinions they had that could not be described by the required response alternatives. Most of the persons who provided open-ended answers either further explained their responses or gave their opinions on things they thought was wrong with the building regulations or feature in question. None of the questions resulted in a large part of the respondents using the open-ended answers. Furthermore, the results to most questions did not show an extremely strong favor for one of the answers and therefore the opinions amongst the respondents is believed to be fairly balanced.

Another important consideration is the majority groups that participated in the surveys. Both the Swedish and the New Zealand survey had fire safety consultants as the single largest respondent groups. The results are therefore likely to primarily reflect the opinions of the persons who do the actual fire safety designs. It can be expected that fire safety consultants perceive themselves as highly valuable in the building process and that they have the best knowledge on fire safety which may influence their answers. Question 4 and Question 5 are examples where a substantial number of respondents indicate that there is a lack of knowledge within the fire safety industry. From a fire safety consultant point of view almost

all other parties are less knowledgeable, which in turn may influence their answer. For this reason, even though there may be a lack of knowledge within the industry, the results can be somewhat exaggerated. An optimal study population would have consistent of equal number of designers, reviewers and other parties involved. However, the fire safety consultants are the main users of the building regulations and therefore possess the greatest knowledge and experience on the regulations. In order to receive useful feedback it is therefore imperative that they are included. Without the high number of fire safety consultants the total number of respondents would have been much lower which in turn would have resulted in less credibility of the results.

All of the survey questions included a response category indicating that the respondent were unsure or did not know. Some questions had substantial percentages of respondents choosing this category. The reason for this can be that the phrasing of the question was ambiguous and that some respondents therefore did not understand the intention of the question. This was clearly shown by the results for Statement S9 of Question 25 from the Swedish survey on BBR Chapter 5. The most likely reason however, is that the respondents simply did not have the knowledge or experience to provide a direct answer.

7.6 Choice of method

The survey method was chosen because of the overall picture it would give on the building regulations. By utilizing surveys, this report has resulted in indications from a large part of the fire safety industry which could not have been shown by any other method considering the limited resources available. A qualitative evaluation such as this can be just as valuable as a quantitative as it provides a much larger perspective. The fire safety industry sit on large amounts of experience and knowledge and is therefore an invaluable resource for feedback. Based on this report further research can be undertaken to delve deeper and find the root causes of issues that need resolving.

8 Conclusions

The below bullet points provide a summary of the conclusions from this report.

- The 2012 revision of the Swedish fire safety building regulations is considered to have been a success as many of the identified primary objectives are indicated to have been achieved.
- The 2012 revision of the New Zealand fire safety building regulations is not considered to have been a success as most of the identified primary objectives were not indicated to have been met. Further work and development is likely required.
- There is a general lack of knowledge within the fire safety industries in Sweden and New Zealand. There are some indications that the specific knowledge on building fire safety can be better among AHJs and the Fire Service in respective country.
- Additional guidance is needed in both Sweden and New Zealand for fire safety assessment of existing buildings, as well as fire safety design of very complex buildings.

In the introduction of this report a number of questions were formulated that led up to the purpose and objectives of this research. Brief answers to these questions are provided below and provide more detailed conclusions.

Why were new fire safety building regulations required in Sweden and New Zealand, and what were the some of the purposes and objectives of the revisions?

In both Sweden and New Zealand performance based fire safety designs of buildings have been around for more than two decades. For performance based regulations to function they require to be clear and quantifiable, as well as verifiable against specific acceptance criteria. Reviews and studies leading up to the revisions of the regulations found that they were not achieving this to a sufficient level. This resulted in a high level of uncertainty both in regards to compliance with the regulations as well as the level of safety provided within buildings.

To solve these problems each of the countries set out to revise the regulations so that they were clear and quantifiable. This included developing guidelines for performance based fire safety design with unambiguous acceptance criteria and suggested methods of verification with the building regulations. These guidelines were to reduce the uncertainty by providing a minimum and acceptable level of safety.

In New Zealand additional objectives were to lower the costs of building projects and to promote innovative building designs.

What are the Swedish and New Zealand frameworks for performance based fire safety design based on?

Both the Swedish and the New Zealand performance based frameworks took inspiration from other similar work around the world. The structure of the Swedish framework was largely based on earlier work by the Nordic Committee on Building Regulations (1976), as well as more recent work by the Inter-jurisdictional Regulatory Collaboration Committee (2010). In New Zealand the framework was heavily based on the already existing structural engineering design process which utilizes the scenario analysis method. Specific content within both sets of regulations were based on recognized works and standards.

Are there significant differences between the fire safety building regulations and the respective design process in Sweden and New Zealand, and do these have any consequences?

From an over-looking perspective the Swedish and the New Zealand fire safety building regulations as well as frameworks for performance based fire safety design are similar in

actual content. One significant difference is that specific acceptance criteria have been included in the New Zealand Building Code itself, whereas in Sweden these criteria are only general recommendations. The surveys showed that the respondents in New Zealand were slightly negative towards this. Possible consequences are slow changes to the NZBC should research reveal that other criteria are more valid.

Perhaps the most significant difference between fire safety design in Sweden and New Zealand is the review and approval system used during the design process. In Sweden the sole responsibility of ensuring compliance with the regulations lies on the developer. The responsibility of the AHJ is to oversee the developer and make certain that the necessary quality systems are in place and working as intended. In New Zealand the AHJ has an approving role where they inspect and sign off each building design. Third party peer reviewers are involved in projects outside the scope of the prescriptive design methods, however the final approval still rests with the AHJ. The consequence is that the final approval lies with persons who do not have Fire Engineering qualifications.

Given the purpose and objectives set for the revisions of the fire safety building regulations in Sweden and New Zealand, do the users consider that they have been achieved?

The overall results of the Swedish Survey on BBR Chapter 5 suggest that the 2012 revision was to a large degree a success as it achieved many of the primary objectives. More development is needed in some areas but it should follow the same route as previous changes

The New Zealand survey on NZBC Clause C cannot be described as a success. The results indicate that most of the main objectives were not fully achieved. More work and development is likely necessary. If small or major change is needed is difficult to say but inspiration can be from the Swedish building regulations and building process.

The objective of providing an acceptable or higher level of safety in the event of a fire was indicated to have been achieved with both the Swedish and New Zealand fire safety building regulations. Furthermore, both surveys indicated that the costs related to fire safety of building projects has increased.

How are the fire safety building regulations perceived within the fire safety industry in Sweden and New Zealand respectively, and what is the feedback?

The 2012 revisions in both countries largely revolved around guidance for performance based design. BBRAD is clearly seen a step in right direction for fire safety design in Sweden. In New Zealand the Verification Method C/VM2 was not as well received by the fire safety industry and further changes may be required.

Are there any direct problems related to the fire safety building regulations or the design process in Sweden and New Zealand, and how can these potentially be solved?

Both the Swedish and New Zealand surveys indicate that additional guidance is required for assessment of existing as well as very complex buildings. Additional guidance for assessment of existing buildings was published in New Zealand by MBIE in December 2013 and was therefore not included in this report. Guidance for design of very complex buildings is available by third parties in Sweden such as the Society for Fire Protection Engineers but has not been included in this report.

The survey results related to the design process indicate that there is a general lack of knowledge within the fire safety industry both in Sweden and New Zealand. There was some indication that this applied in particular to AHJs and the Fire Service. Certification of Fire

Engineers was preferred in both surveys, which can be a partial solution towards increasing the expertise knowledge within the industry.

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Appendix A. Sweden – Final survey on BBR Chapter 5

Enkätundersökning om BBR Avsnitt 5 Brandskydd

Om du har dirigerats till den här enkätundersökningen utan att få introduktionsmeddelandet med bakgrundsinformation samt syfte och mål med den här undersökningen, var god och kontakta mig på christofer.wickmark@holmesfire.com

1. Var vänlig och beskriv din typ av sysselsättning med ett av följande alternativ. Om flera gäller, välj den som närmast beskriver din sysselsättning.

- Konsult (brand)
- Konsult (annan)
- Räddningstjänst
- Byggnadsnämnd
- Boverket
- Student (brand)
- Student (riskhantering)
- Annan (var god specificera)

2. Tillämpar du BBR 19 Avsnitt 5 Brandskydd, eller senare versioner, på något sätt i ditt arbete eller dina studier, till exempel projektering, rådgivning, tillsyn eller granskning?

- Ja
- Nej

Utveckla ditt svar (valfritt)

3. Hur många års erfarenhet har du inom brandskyddsbranschen? Ange endast heltal, om ingen erfarenhet ange 0.

Antal år:

Enkätundersökning om BBR Avsnitt 5 Brandskydd

4. Förstår de personer som är involverade i byggprocessen för byggnaders brandskydd generellt de funktionskrav som finns i föreskrifterna i BBR 19 Avsnitt 5 Brandskydd och senare versioner?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

5. Anser du att i princip samtliga personer som är involverade i byggprocessen för byggnaders brandskydd har de kunskaper och kvalifikationer som krävs?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

6. Hur har de totala kostnaderna relaterade till byggnaders brandskydd förändrats sedan BBR 19 introducerades?

- Stor ökning
- Liten ökning
- Oförändrade
- Liten minskning
- Stor minskning
- Osäker

Enkätundersökning om BBR Avsnitt 5 Brandskydd

7. Kan tolkningsfrågor av BBR Avsnitt 5 Brandskydd, inklusive BBRAD och andra dokument, lösas genom diskussion med byggnadsnämnder? Med tolkningsfrågor avses frågor om hur föreskrifter och allmänna råd ska tydas och appliceras.

- Oftast
- Ibland
- Sällan
- Mycket sällan
- Osäker

Utveckla ditt svar (valfritt)

8. Går det att på ett tillfredställande sätt få hjälp av Boverket med förklaring av syfte för föreskrifter och allmänna råd till BBR Avsnitt 5 Brandskydd, inklusive BBRAD och andra dokument?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

9. Borde det finnas ett krav på certifiering av kvalificerade brandskyddsprojektörer?

- Ja.
- Nej, ingen certifiering bör finnas.
- Nej, men frivillig certifiering är bra (ex. SAK 3)
- Osäker

Utveckla ditt svar (valfritt)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

10. Är de nya verksamhetsklasserna som introducerades med BBR 19 Avsnitt 5 Brandskydd bättre jämfört med tidigare versioner av BBR?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

11. Anser du att kvalifikationer som brandingenjör eller liknande är nödvändiga för att tillämpa den förenklad dimensioneringsmetodik för byggnaders brandskydd som anges i BBR 19 och senare versioner?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

12. Är den vägledning som finns i BBR 19 Avsnitt 5 Brandskydd och senare versioner, inklusive BBRAD, för ändringar av befintliga byggnader tillräckligt utförlig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

13. Anlitas brandskyddsprojektörer oftast tillräckligt tidigt i byggprocessen?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

14. Räddningstjänstens roll i byggprocessen är inte lagstadgad i Plan- och Bygglagen och skiljer därför från kommun till kommun. Oftast får de rollen som rådgivare till byggnadsnämnden. Till vilken grad bör räddningstjänsten vara involverade i byggprocessen?

- Mer än nu.
- Tillräckligt som det är.
- Mindre än nu.
- Osäker.

Utveckla ditt svar (valfritt)

15. Är de allmänna råden i BBRAD ett steg i rätt riktning för analytisk dimensionering av byggnaders brandskydd i Sverige?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

16. Större delen av BBRAD behandlar scenarioanalys. Hur skulle du generellt beskriva säkerhetsnivån för en byggnad som är projekterad enligt de allmänna råden för scenarioanalys i BBRAD?

- Högre än acceptabel säkerhetsnivå.
- Acceptabel säkerhetsnivå.
- Lägre än acceptabel säkerhetsnivå.
- Osäker.

Utveckla ditt svar (valfritt)

17. Tidigare studier har visat på stor variation av säkerhetsnivån för byggnaders brandskydd projekterade enligt BBR 18 eller tidigare versioner. Anser du att BBR 19 och senare versioner har resulterat i en mer likvärdig säkerhetsnivå för olika byggnader projekterade med analytisk dimensionering?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

18. Den metod för scenarioanalys som beskrivs i BBRAD inkluderar specifika variabler och värden. Vilken typ av scenarier anser du att majoriteten av dessa värden representerar? Om inget av alternativen beskriver din åsikt, var god använd 'Annan' och specificera.

- Värsta troliga scenarier.
- Troliga scenarier, men inte värsta troliga.
- Mindre allvarliga scenarier.
- Osäker.
- Annan (var god specificera)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

19. Är den vägledning som finns i BBRAD för dimensionering av Br0-byggnader tillräckligt utförlig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

20. Bedömer du att analytisk dimensionering av en byggnads brandskydd som inte följer de allmänna råden i BBRAD är möjlig att få genom i granskningsprocessen?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

21. Kan personer involverade i byggprocessen, som bör kunna granska känslighetsanalyser, generellt bedöma om en sådan är tillräcklig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

22. Är den vägledning som finns i BBRAD för *kvantitativ riskanalys* tillräckligt utförlig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

23. Är den vägledning som finns i BBRAD för *scenarioanalys* tillräckligt utförlig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

24. Är den vägledning som finns i BBRAD för *kvalitativ bedömning* tillräckligt utförlig?

- Ja
- Nej
- Osäker

Utveckla ditt svar (valfritt)

Enkätundersökning om BBR Avsnitt 5 Brandskydd

25. Var vänlig och beskriv din åsikt angående följande påståenden relaterade till BBR 19 Avsnitt 5 Brandskydd och senare versioner.

	Instämmer helt	Instämmer delvis	Tveksam	Tar delvis avstånd	Tar avstånd helt	Ingen åsikt
De obligatoriska kraven (föreskrifterna) i BBR Avsnitt 5 Brandskydd är tydliga.						
De allmänna råden för *förenklad* dimensionering i BBR Avsnitt 5 Brandskydd är tydliga.						
De allmänna råden för *analytisk* dimensionering i BBRAD är tydliga.						
De obligatoriska kraven (föreskrifterna) i BBR Avsnitt 5 Brandskydd tillåter kreativ design av byggnader.						
De allmänna råden i BBRAD tillåter kreativ design av byggnader.						
Jämfört med tidigare versioner så har BBR 19 Avsnitt 5 Brandskydd resulterat i bättre kontroll av att funktionskraven uppfylls under byggprocessen.						
Jämfört med tidigare versioner så har BBR 19 Avsnitt 5 Brandskydd generellt sett ökat säkerheten vad gäller byggnaders brandskydd.						
Jämfört med tidigare versioner så har BBR 19 Avsnitt 5 Brandskydd resulterat i mer lika tolkningar av de obligatoriska kraven (föreskrifterna).						
Kriterierna, exempelvis siktbarhet, som anges i BBRAD har resulterat i en tydligare indikation om en byggnad är säker eller ej vid brand.						
Jämfört med tidigare versioner så har BBR 19 Avsnitt 5 Brandskydd resulterat i en bättre process för verifiering av byggnadens säkerhet vid						

Enkätundersökning om BBR Avsnitt 5 Brandskydd

brand.

Förenklad dimensionering enligt de allmänna råden i BBR Avsnitt 5 Brandskydd är okomplicerad att göra för ej komplexa byggnader.	○	○	○	○	○	○

Enkätundersökning om BBR Avsnitt 5 Brandskydd

26. ***Valfritt*****. Beskriv gärna problem med BBR 19 Avsnitt 5 Brandskydd och senare versioner, detta inkluderar BBRAD, BBRBE och EKS. Om möjligt beskriv gärna tänkbara lösningar till dessa problem. Lösningar kan vara allt från mindre ändringar i föreskrifterna eller allmänna råd till ett mer helhetsperspektiv som exempelvis en nationell byggnadsnämnd, krav på tredjeparts granskning, snabbare domstolsavgörande, certifiering av granskare och/eller kvalificerade brandskyddsprojektörer med mera.**

Appendix B. New Zealand – Final survey on NZBC Clause C

Survey on the New Zealand Building Code Clause C - Protection from

If you have been directed to this survey without receiving the introductory e-mail with background information as well as the purpose and objective of this survey then please contact me on christofer.wickmark@holmesfire.com

1. Please describe your current employment with one of the following options. If several apply, select the one that best describe your employment.

- Consultant (fire)
- Consultant (other)
- Fire Service
- Building Consent Authority
- Ministry of Business, Innovation and Employment
- Student (fire)
- Student (risk management)
- Other (please specify)

2. In your job or studies do you in any way apply NZBC Clause C Protection from Fire, for example by design, review or regulation?

- Yes
- No

Clarify answer (optional)

3. How many years of experience do you have in the fire safety industry? Specify a whole number, if no experience specify 0.

Years:

Survey on the New Zealand Building Code Clause C - Protection from

4. Do the persons involved in the building process for fire safety generally understand the functional requirements of NZBC Clause C Protection from Fire?

- Yes
- No
- Undecided

Clarify answer (optional)

5. In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?

- Yes
- No
- Undecided

Clarify answer (optional)

6. How have the overall costs related to fire safety of building projects changed since the 2012 revision of Clause C Protection from Fire?

- Increased significantly.
- Increased a little.
- No change.
- Decreased a little.
- Decreased significantly.
- Do not know.

Survey on the New Zealand Building Code Clause C - Protection from

7. Can questions of interpretation of NZBC Clause C Protection from Fire, including the C/AS1 to C/AS7 and C/VM2 documents, be resolved through discussions with the Building Consent Authorities? Questions of interpretation relate to both clarification and application of the provisions.

- Frequently
- Occasionally
- Rarely
- Very rarely
- Undecided

Clarify answer (optional)

8. Does the Ministry of Business, Innovation and Employment provide satisfactory help with interpretation and clarification of NZBC Clause C Protection from Fire including the C/AS1 to C/AS7 and C/VM2 documents?

- Yes
- No
- Undecided

Clarify answer (optional)

9. Should there be a certification requirement for fire engineers doing performance-based designs?

- Yes.
- No, there should be no certification at all.
- No, but voluntary certification is good (e.g. CPEng).
- Undecided

Clarify answer (optional)

Survey on the New Zealand Building Code Clause C - Protection from

10. Is the new risk group classification system in the Acceptable Solutions C/AS1 to C/AS7 better compared to the previous acceptable solution used before 2012?

- Yes
- No
- Undecided

Comment

11. Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the Acceptable Solutions C/AS1 to C/AS7?

- Yes
- No
- Undecided

Clarify answer (optional)

12. Is adequate guidance provided for alterations and extensions to existing buildings in the Acceptable Solutions C/AS1 to C/AS7 and the Verification Method C/VM2?

- Yes
- No
- Undecided

Clarify answer (optional)

Survey on the New Zealand Building Code Clause C - Protection from

13. Are fire engineers generally brought into the design process early enough?

- Yes
- No
- Undecided

14. Building Consent Authorities must seek advice from the Fire Service for some types of buildings in regards to means of escape and firefighting operations. To what level should the Fire Service be involved in the building process?

- More than the current situation.
- Their current level of involvement is sufficient.
- Less than the current situation.
- Undecided.

Clarify answer (optional)

15. Is the introduction of Verification Method C/VM2 a step in the right direction for performance-based fire safety design in New Zealand?

- Yes
- No
- Undecided

Clarify answer (optional)

Survey on the New Zealand Building Code Clause C - Protection from

16. How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method described in the Verification Method C/VM2?

- Higher than acceptable level of safety.
- Acceptable level of safety.
- Lower than acceptable level of safety.
- Undecided.

Clarify answer (optional)

17. Has the introduction of the Verification Method C/VM2 resulted in a more consistent level of fire safety for different buildings when compared to performance-based designs undertaken before 2012?

- Yes
- No
- Undecided

Clarify answer (optional)

18. The scenario analysis method in the Verification Method C/VM2 includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.

- Credible worst case scenarios.
- Credible scenarios, but not worst case.
- Less severe scenarios.
- Do not know.
- Other (please specify)

Survey on the New Zealand Building Code Clause C - Protection from

19. Is the guidance for design of complex buildings provided in the Verification Method C/VM2 comprehensive enough?

- Yes
- No
- Undecided

Clarify answer (optional)

20. Do you believe that an alternative fire safety design outside the scope of Acceptable Solutions and the Verification Method is possible to get approved by Building Consent Authorities?

- Yes
- No
- Undecided

Clarify answer (optional)

21. Should sensitivity analyses of input variables be more included in performance-based fire safety designs in New Zealand than it currently is?

- Yes
- No
- Undecided

Clarify answer (optional)

Survey on the New Zealand Building Code Clause C - Protection from

22. Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No opinion
The requirements of *NZBC Clause C Protection from Fire* are clear.						
The requirements of the *Acceptable Solutions C/AS1 to C/AS7* are clear.						
The requirements of the *Verification Method C/VM2* are clear.						
The requirements of NZBC Clause C Protection from Fire allow for creative building designs.						
The requirements of the Verification Method C/VM2 allow for creative building designs.						
The 2012 revision of NZBC Clause C Protection from Fire has resulted in better control that the functional requirements are complied with during the design process of a building.						
The 2012 revision of NZBC Clause C Protection from Fire has increased the level of fire safety for buildings.						
The 2012 revision has resulted in more consistent interpretations of the requirements within NZBC Clause C Protection from Fire.						
The specific performance criteria, such as visibility, that are now included in NZBC Clause C Protection from Fire has resulted in a better indication if the building is safe or not in the event of a fire.						
The 2012 revision of NZBC Clause C Protection from Fire has resulted in a better verification process for a buildings safety in the event of a fire.						
The new Acceptable						

Survey on the New Zealand Building Code Clause C - Protection from

Solutions C/AS1 to C/AS7
are straightforward to apply
for non-complex building
designs.

Survey on the New Zealand Building Code Clause C - Protection from

23. *Optional.* **Please describe issues with NZBC Clause C Protection from Fire as well as the C/AS1 to C/AS7 and C/VM2 documents. If possible describe solutions to these issues. Solutions can include anything from small changes within the compliance documents to a more holistic perspective with a national Building Consent Authority, requirement of third party reviews, faster determinations, certification of fire engineer designers and more.**

Appendix C. Additional survey results

Sweden – Survey on BBR Chapter 5 Safety in case of fire

Question 1

TABLE C.1 TYPES OF EMPLOYMENT DESCRIBED FOR THE CATEGORY 'OTHER (PLEASE SPECIFY)' OF QUESTION 1 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Annan (var god specificera)
forskare
Statlig myndighet
Universitetslektor
Entreprenör Bygg
Institut
Forskning
Industri
utbildning
Lärare/konsult
försäkring
Byggmaterialindustri
Underwriter/Riskingenjör Försäkringsbolag
Riskingenjör Försäkringsbolag
Producent

Question 2

The open-ended answers to the optional category 'Clarify answer (optional)' to question 2 from the survey on BBR Chapter 5 Safety in case of fire have not been included in this report in order to protect the confidentiality of the respondents.

Question 3

TABLE C.2 ANONYMIZED RESULTS TO QUESTION 3 REGARDING YEARS OF EXPERIENCE IN THE FIRE SAFETY INDUSTRY FOR EACH RESPONDENT FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Number	Years	Number	Years	Number	Years	Number	Years
1	0	44	3	87	9	130	20
2	0	45	3	88	9	131	20
3	0	46	3	89	10	132	20
4	0	47	3	90	10	133	20
5	1	48	3	91	10	134	20
6	1	49	4	92	10	135	20
7	1	50	4	93	10	136	20
8	1	51	4	94	10	137	22
9	1	52	4	95	10	138	22
10	1	53	5	96	10	139	22
11	1	54	5	97	10	140	22
12	1	55	5	98	11	141	22
13	1	56	5	99	11	142	22
14	1	57	5	100	11	143	23
15	1	58	5	101	11	144	23
16	1	59	5	102	12	145	23
17	1	60	5	103	12	146	24
18	2	61	5	104	12	147	25
19	2	62	5	105	12	148	25
20	2	63	6	106	12	149	28
21	2	64	6	107	12	150	30
22	2	65	6	108	13	151	30
23	2	66	6	109	13	152	30
24	2	67	6	110	13	153	32
25	2	68	6	111	13	154	36
26	2	69	6	112	14	155	45
27	2	70	6	113	14		
28	2	71	6	114	14		
29	2	72	7	115	14		
30	3	73	7	116	15		
31	3	74	7	117	15		
32	3	75	7	118	15		
33	3	76	7	119	15		
34	3	77	7	120	15		
35	3	78	7	121	15		
36	3	79	8	122	16		
37	3	80	8	123	16		
38	3	81	8	124	16		
39	3	82	8	125	16		
40	3	83	8	126	17		
41	3	84	9	127	18		
42	3	85	9	128	19		
43	3	86	9	129	19		

Question 4

TABLE C.3 QUESTION 4 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do the persons involved in the building process for fire safety of buildings generally understand the functional requirements of BBR Chapter 5 Safety in case of fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	51.2%	21
No	29.3%	12
Undecided	19.5%	8
Clarify answer (optional)		11
	answered question	**41**
	skipped question	**0**

TABLE C.4 QUESTION 4 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do the persons involved in the building process for fire safety of buildings generally understand the functional requirements of BBR Chapter 5 Safety in case of fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	36.1%	35
No	43.3%	42
Undecided	20.6%	20
Clarify answer (optional)		42
	answered question	**97**
	skipped question	**0**

TABLE C.5 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 4 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Det stora flertalet men de som saknar full inblick tillhör en majoritet andra konsultdiscipliner samt byggherrar, medan myndighetspersoner och projektledare är bättre insatta.
krävs normalt en brandkonsult/brandsakkunnig som omsätter funktionskraven till mer konkret text och anger kraven för aktuell byggnadstyp som projekteras.
Allt för många förstår inte att de är minmikrav samt förstår inte kontrollsystemet.
Skulle vilja säga 70-30 till nejs 'fördel'. Vissa kan det väldigt bra, andra kan det inte alls.
Det varierar mycket från person till person. Många brandkonsulter är duktiga. Vissa har dålig koll på BBR.
Det är svårt för oss brandkonsulter att förstå allt, då är det heller inte lätt att förklara för sina kunder.
Både ja och nej (jag tolkar det som att du menar byggherrar eller liknande). Jag tror att de flesta skulle få en viss uppfattning om kraven om de läste dem. Däremot är det många som inte lägger tid på att fundera utan lämnar ansvaret helt åt konsulten/rådgivaren (vilket ju är dennes roll). Min uppfattning är att de som inte arbetar aktivt med brandskyddsfrågor kan ha svårigheter att urskilja vad som faktiskt är det viktiga med föreskrifterna (typ vilka praktiska implikationer de får). Vissa förväntar sig mycket högre nivå än vad allmänna råden anger, andra mycket lägre.
Vissa saknar förståelse för hur en lösning som ska uppfylla ett funktionskrav bör valideras, ofta väljs lösningar på måfå.
Vissa saker solklara, andra oklara vilken funktion man egenligen är ute efter.
Väldigt blandad kunskapsnivå
Blir dock bättre.
Räddningstjänsten har tyvärr skapat egna skyddaspekter.
Stor spridning

En del nyheter jämfört med tidigare versioner har ännu inte sjunkit in.
Stora otydligheten för proj av Bostäder
Flera föreskrifter är svåra att tilka utan bakgrundsinfo.
Inte i så stor utsträckning hos handläggare på kommunerna och även hos oss i räddningstjänsten finns brister i kunskaperna
BBR är lägsta brandskydd i byggprocessen, men det förstår inte byggherren. Oftast inga kunskaper om vad brandskydd är.
Gängs praxis och förenklad ja, men pratar vid den stora nyheten med nya BBR 19 är jag inte lika säker.
De allra flesta känner inte till skillnaden mellan funktionskrav (functionalbased) och verifierbara funktionskrav (performancebased)
Jag tror inte beställare och projektledare är fullt medvetna om funktionskraven men de anliter ju oss konsulter just därför så det blir lite på vad man menar.
Mycket stor variation
Väldigt olika spridning och en individfråga snarare än en genrealiseringsfråga
Vissa gör, men majoriteten betraktar det som ett nödvändigt ont och vill ha minimalt.
Vi brandkonsulter är med på banan men övriga discipliner såsom Arkitekt konstruktör, entreprenör och byggherre beställare förstår inte de stora skillnaderna mot bbr18 och tidigare versioner.
Vid förtydligande och förklaringar kan oftast de flesta förstå bakgrund och tanke med kraven och lösningar
Detta varierar väldigt mycket på olika orter och utifrån vilka personer i byggprocessen det handlar om. Vissa är väldigt kunniga och andra mindre.
arbetar huvuddelen i Stockholm och andra storstadsområden, där mognadsprocessen kommit längre längre avseende den 'nya' byggprocessen som infördes för 18 år sedan....
Brandkonsulter förstår generellt funktionskraven även om dessa inte är helt beskrivna i gällande föreskrifter. Boverket har mycket arbete kvar med att utveckla sina föreskrifter så dessa beskriver fullt ut verifierbara funktionskrav. Byggherrar, arkitekter och övriga projektörer förstår generellt inte innebörden av funktionskrav. En del räddningstjänster förstår inte innebörden av funktionskrav.
Väldigt beroende på kund.
Kunskapen är ganska dålig hos andra discipliner och väldigt stora delar av brandskyddet styrs av vad som förs in exempelvis på ritningar mm
Vissa krav är logiska och det finns en acceptans, vissa är inte lika logiska och personer förstår inte
Mycket varierande beroende på vem som är 'kund'
Grundläggande koncept för utrymning, brandskydd mellan brandceller m.m.
Eller kanske nja. Men det är ju vår roll som konsulter att upplysa övriga om vilka brandkrav som påverkar och vad konsekvenserna blir.
De inser att de behövs, men lägger ingen tid på att förstå varför.
Mnga delar där man faller in i gamal synder och använder sk BABS eller SBN lösningar (gamla regler) Glömmer syftet och funktionen.
Generellt ja, men det finns ju undantag.
De flesta vet ej vilka funktionskraven är, utan i bästa fall känner man till några möjliga lösningsprinciper (delar av allmänna råd).
Kunskapen hos övriga projektörer, entreprenörer och stadsbyggnadskontor är låg. Tyvärr är kunskapen även hos räddningstjänsten allt för varierande för att kunna anses som generellt god.
Jobbar inte med dessa frågor längre.
Förstår inte helt vad ni menar med denna fråga. De sitter ju sällan och läser föreskrifterna i BBR själva utan det är ju vi som brandskyddsprojektörer som förklarar och anger hur de ska tolkas för den aktuella byggnaden.
Ja, men det varierar
Svårt att svara enbart ja eller nej, pga väldigt olika. Spridningen i kunskap är stor.
Stor variation pa forstaelse!
I stor utsträckning väldigt rudimentärt bland övriga konsulter. Olika personer kan olika delar. Arkitekterna som förr kunde väldigt mycket blir allt färre.
Varierar mycket.

Många funktionskrav är solklara men många är även klumpigt formulerade vilket gör att de kan tolkas på sätt som inte kan vara avsett. Jag tror knappt boverket förstår vad de skrivit på vissa ställen.
Franförallt i mindre kommuner är kompetensen om byggregler och byggprocessen liten och i vissa fall obefintlig.
Många byggare förstår inte funkrinskraven.
Vissa mer andra mindre
Man frågar oss brandkonsulter som ju ska förstå dem
Boverkets information har varit att BBR19 endast är ett förtydligande av tidigare regelverk och att kraven inte höjts. De flesta som nyttjar/tolkar reglerna skönjer en betydande höjning av kravnivån inom många områden, både när det gäller beställare och konsulter.
Skiljer sig enormt
Dem fleste har en ide om hur dett fungera men har svårt att tolka funktionskraven til lösningar
Mycket olika kunskapsnivå för olika byggherrar. De flesta förstår inte skillnad på föreskriftstext och allmänna råd.
Man förstår ännu inte fullt ut, men förståelsen har markant ökat sedan BBR 18 och dess föregångare.
Det krävs dock en hel del förklarningar för att få acceptans.

Question 5

Table C.6 Question 5 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	**Response Percent**	**Response Count**
Yes	4.9%	2
No	87.8%	36
Undecided	7.3%	3
Clarify answer (optional)		12
	answered question	**41**
	skipped question	**0**

Table C.7 Question 5 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	**Response Percent**	**Response Count**
Yes	9.3%	9
No	78.4%	76
Undecided	12.4%	12
Clarify answer (optional)		31
	answered question	**97**
	skipped question	**0**

Table C.8 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 5 from the survey on BBR Chapter 5 Safety in case of fire.

Clarify answer (optional)
Jag vågar påstå att om brandkonsultrollen skulle plockas bort från byggprocessen/projekteringen skulle brandskyddsnivån variera väldigt mycket mer än idag från projekt till projekt. Därför blir svaret nej!

Brandskyddet skulle då utformas av byggherre/Arkitekt, övriga konsultdiscipliner (inom resp. område) samt myndighetssidan alltjämt som kravställare. Kanske fungerade detta tidigare med detaljregler men har vid införandet av funktionsbaserade regler blivit väldigt smidigt att överlåta till brandkonsulten att ta hand om helheten. Kunskapen om Brand hos övriga har troligtvis stagnerat i och med denna utveckling. (Jag är dock för ung för att ha helhetsperspektivet över tid - det är spekulation)
det varierar från projektör till projektör. Konstruktören är normalt väl bevandrad i vad som krävs för att uppfylla funktionskraven medan det för övriga discipliner brukar krävas mer diskussion
Att förvänta sig att alla elprojektörer, vent-projektörer osv ska kunna även brandskyddsbitarna är nog lite att hoppas på för mycket. Om alla kunde det hade det inte varit lönt att vi fanns med alls i byggprocessen.
Flertalet konsulter som ej är utbildade brandingenjörer har för dålig kompetens.
Det arbete jag gör ska föras in i andra handlingar, men de saknar ofta detaljkunskaperna och det finns aldrig tid och pengar till att hjälpa dem fullt ut
Många saknar förståelse, både de med brandingenjörsutbildning och 'källarkonsulter'.
Kunderna och/eller projektledare har sällan kunskap om vad de behöver, vilket ansvar de har enligt PBL eller om kostnaden för brandskydd
Väldigt olika från projekt till projekt
Räddningstjänsten lägger sig i gällande detaljprojekteringen utan att kunna bbr. Ställer ofta överkrav.
Dom förlitar sig mycket på att man berättar om hur det ska utföras.
Det är många olika aktörer i kedjan från första systemhanding brand till exempelvis en elinstallatör som intygar att genomlyst vägledande markering sitter där den ska med rätt utförande. Folk har generellt sett koll på sitt område men det finns en hel del luckor i förståelse.
Stora luckor finns inom kommunerna. Särskilt så brister räddningstjänsterna då de låter alldeles för oerfarna personer yttra sig.
Nej, men det är där mitt arbete som konsult kommer inte. Att stötta dem som inte har all kunskap själv.
Saknar vägledningar o rådstexter Från Boverket Verksamhetsklasser och för EKS Paragraf 2
Det ställs i många fall för dåliga krav på relationshandlingar av bsd från Byggnadsnämnden. En del okvalifiserade personer gör med jämna mellanrum projekteringar av brandskyddet som de inte har nog med kunskap att göra.
Varierar kraftigt. Inte bra att låta el-besiktningsmanen slutbesiktiga brandlarmet. De är inte certifierade för det.
Många mindre konsultföretag som inte har rätt kompetens att dimensionera brandskydd
Brandskydd påverkar många olika discipliner inom byggnationer och det finns väl ingen som behärskar helheten. Många kan delar men detär svårt att få ihop helheten
Det är en stor fråga. I de projekt som jag är inblandad i som konsult får jag ju oftast frågor när osäkerhet uppstår och det kan ju räcka som kunskap och kvalifikation.
Inte möjligt därför anlitar man experter/konsulter.
Byggnadsinspektörerna på kommunerna har ofta ganska dåliga kunskaper tyvärr. Inte alla men många.
De som jag har kontakt med kanske inte kan BBR kap 5 medan lyssnar på de goda råd vi ger. Entreprenörer har ofta dålig förståelse för utförande enligt installationsanvisningar. Gäller anslutningar av dörrar, genomföringar etc.
I detta svar avser jag inte generellt brandkonsulter utan alla övriga som också involveras i byggnaders brandskydd under byggprocessen omfattande projektledare, kvalitetsansvariga, arkitekter, entreprenörer mm
andelen som är insatta ökar år för år och kan uppskattas till 805 idag
Inte samtliga personer men de sakkunniga
Vid ändringar och mindre nybyggnader är inte alltid kompetent personal på brandområdet inkopplade.
Skulle säga att det varierar över landet.
Generellt saknas kunskap om byggprocessen, PBL, brandkonsultens roll
T ex inte på byggnadsnämnd. Kan få oerhört varierande synpunkter på inlämnade brandskyddslösningar. Ofta förekommer direkta felaktigheter.

Nja också här. Det är klart att det finns de som har begränsade kunskaper.
Det finns många konsulter som projekterar enligt brandskyddsdokumentationen, men då de inte vet bakgrunden och syftet så kan det ibland bli fel.
Många delar gällande vent och bärande är det sotar brister även på dem som projekter inom områdena.
Det finns kvalitetsansvariga som inte anser sig behöva ta hjälp av någon sakkunnig brand, trots att den egna kunskapen kan variera.
Så var det inte tidigare och säkert inte nu heller.
Det är en väldigt spridning på kunskaper om brandskydd.
Olika från person till person vilket fokus de har.
Många har, men alla har det inte.
Definitionsfråga men jag kan konstatera att ett bra brandskydd ofta idag kräver aktivt arbete av någon med brandteknisk spetskompetens.
Varierar mycket, fattas en del. Vissa kan, andra kan inte själva men har vett att fåga någon som kan och då kan man väl säga att man hat tillräckliga kunskaper medan vissa inte kan och inte frågar och då är det illa.
De större förändringar som blev i samband med den stora revideringen av BBR kommer att ställa större krav på brandkonsulten, vad avser analytisk dimensionering. Det går inte lika lätt att tillämpa förenklad dimensionering i dag. Detta betyder att konsulter som tidigare enbart dimensionerade efter förenklad dimensionering inte riktigt hänger med och kan därför hamna i projekt där krav ställs på analytisk dimensionering. Något som i vissa fall händer och resultatet blir sällan bra. Vidare känns det som att det kommer att ta tid innan förändringarna i byggreglerna kommer att 'sätta' sig hos byggherren.
Det finns ett brett spann inom brandskyddskonsultbranchen. Allt från Tekn.Dr i brandteknik till IT-expert hos en arkitekt. Men samtliga har inte rätt kunskaper.
Tycker det är en otydligt formulerad fråga. Involverade i 'Byggprocessen för byggnaders brandskydd' kan tolkas ganska brett tycker jag...
Behovet av översättning av funktionskrav till nogåt närvärande behövs
Tjänstemän på stadsbyggnadskontor har otillräcklig kunskap både om byggregler och lagstiftningen. Vissa brandkonsulter har överraskande många kunskapsluckor.
Jobbar inom en mindre stad/landsbygd där det finns många äldre männsikor som inte har hängt med i utvecklingen de senaste 20-30 åren och en mesig byggnadsnämnd låter dom 'hållas'

Question 6

TABLE C.9 QUESTION 6 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

How have the overall costs related to fire safety of building projects changed since the introduction of BBR 19?		
Answer Options	**Response Percent**	**Response Count**
Increased significantly	0.0%	0
Increased a little	17.1%	7
No change	14.6%	6
Decreased a little	0.0%	0
Decreased significantly	0.0%	0
Do not know	68.3%	28
	answered question	**41**
	skipped question	**0**

TABLE C.10 QUESTION 6 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

How have the overall costs related to fire safety of building projects changed since the introduction of BBR 19?

Answer Options	Response Percent	Response Count
Increased significantly	29.9%	29
Increased a little	40.2%	39
No change	5.2%	5
Decreased a little	0.0%	0
Decreased significantly	0.0%	0
Do not know	24.7%	24
	answered question	97
	skipped question	0

Question 7

Table C.11 Question 7 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Can questions of interpretation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents, be resolved through discussions with the local Housing Committees? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	Response Percent	Response Count
Frequently	37.5%	15
Occasionally	32.5%	13
Rarely	12.5%	5
Very rarely	10.0%	4
Undecided	7.5%	3
Clarify answer (optional)		8
	answered question	40
	skipped question	1

Table C.12 Question 7 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

Can questions of interpretation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents, be resolved through discussions with the local Housing Committees? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	Response Percent	Response Count
Frequently	11.5%	11
Occasionally	33.3%	32
Rarely	16.7%	16
Very rarely	21.9%	21
Undecided	16.7%	16
Clarify answer (optional)		26
	answered question	96
	skipped question	1

Table C.13 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 7 from the survey on BBR Chapter 5 Safety in case of fire.

Clarify answer (optional)
Kompetensen kan jag inte säga är säkerställd över landet om en öppen fråga om regeltolkning ställs till byggnadsnämnden. Frågorna som uppstår är generellt av komplexare art eftersom Byggherren och dennes kompetens (konsulthjälp) inte kan besluta hur reglerna

ska tolkas under aktuell förutsättning i projektet. Men juridiskt har ju Byggnadsnämnden tolkningsrätten såsom kravställare i byggprocessen så praktiskt är det många gånger så det går till, men att byggherren och dennes konsult föreslår och motiverar hur reglerna bör betraktas och tolkas och man når konsensus.
Frågan är omvänd i vårt fall. Det går att diskutera med vissa konsulter men inte alla. De tror även ofta att de har tolkningsföreträde.
Vi på räddningstjänsten skriver yttranden på de brandskyddsdokumentationer som vi får in. Ibland uppkommer det sedan diskussioner med brandkonsulterna om hur man ska tolka vissa avsnitt.
Ofta företräds kommunerna av räddningstjänsten och då upplever jag att det är mycket magkänsla som spelar roll. Det kan ju t.ex. förklara att många kommuner ger olika besked om saker och ting.
Förstår ej frågan. Om meningsskiljaktighet uppstår mellan mig och SBN kan den förstås alltid lösas. Däremot litar jag inte på att SBN gör en korrekt bedömning och skulle inte fråga dem om deras tolkning såvida jag inte blir ombedd av beställare.
Nämnderna har generellt sett otillräckliga kunskaper inom kap 5 och hade i vissa fall behövt en egen sakkunnig inom området för att avlasta räddningstjänstorganisationerna.
Har begränsat erfarenhet av detta men min uppfattning är att byggnadsnämnderna vill underlätta för projekten men har (mycket) bristfällig kunskap om reglerna
BN har sällan sakkunskapen
Svaret beror dock på vilken byggnadsnämnd som avses.. det är stor skillnad i kompetens mellan kommunernas handläggare.
Byggnadsnämnden går i stort på räddningstjänstens utlåtande och där är diskussionsutrymmet begränsat.
Kunskap saknas Räddningstj bevakar idag sina Intressen mer än tolkar BBR De är ej neutrala till BBR
Vi diskuterar oss fram till lösningar i alla fall men variationerna kan bli stora och är oftast personberoende
Handböcker som förklarar i text och bilder/teckningar vad som gäller brukar hjälpa till hos byggnadsnämndens personal att förstå.
Tyvärr blir det sällan att diskussionerna hålls med byggnadsnämnden, de bollar över frågan till räddningstjänsten som inte bara ser till bygglagstiftningen utan även har LSO-glasögon på sig.
Nej, jag upplever inte att byggnadsnämnden har den kompetensen. De låter i sådana fall ärendet gå på remiss till rtj som får ta den dialogen.
Ej erfarenhet av detta
Jag använder väldigt sällan handböcker utan kör endast efter föreskrifter och allmänna råd.
Byggnadsmänden har oftast inte kunskapen om hur tolkning ska göras, kan ju även variera i svar som ges från Boverket
Händer i princip aldrig. Byggnadsnämnden vill inte ta ansvar för en osäker lösning. Uppfyller lösningen BBR med säkerhet behövs inte byggnadsnämndens godkännande.
Varierar starkt med erfarenhet och bakgrund hos handläggaren på stadsbyggnadskontoret. Ofta stöd från räddningstjänsten. Även där varierar dock kunskaper och erfarnhet.
Ofta så tolkas ‘bör’ och ‘ska’ att det inte finns andra lösningar. Analytisk dimensionering blir ofta sett som mindre bra lösning.
Det blir ju sällan en diskussion direkt med byggnadsnämder utan snarare med rådgivande myndighet till SBK, dvs räddningstjänsten. Där finns det ibland möjligheter att föra ett resonemang.
Jag har inte vart i den situationen mer än ett fåtal gånger hittills, men det har löst sig i de fall frågan kommit upp.
tror att det är mer givande att diskutera tolkningar med boverket
Möjligheten finns i regelverket, men praktiskt sett har man mycket sällan tid/pengar att ta den diskussionen.
Eftersom kompetensen i allmänhet är låg går det inte ha att ha en dialog på tillräckligt hög teknisk nivå. I de fall samarbete mellan BN och Rtj är god och kompetensen tillräcklig på Rtj kan en dialog föras.
Jobbar inte med dessa frågor längre.
Inte mitt arbetsområde
Har ej varit aktuellt för min del.

De har väldigt dålig koll och ingen stor vilja att diskutera. Hänskjuter mycket (Skåne) till deras remissinstans räddningstjänsten.
Självklart finns det tolkningsfrågor i byggreglerna, det har det alltid funnits även under den tid byggreglerna var detaljstyrda. Upplever det dock som att dialogen mellan byggnadsnämnd, brandkonsult och räddningstjänst är väldigt bra. Dessutom underlättar det, vad avser tolkningsfrågor, då räddningstjänst och brandprojektör, kommer in i ett tidigt skede i byggprocessen.
Se tidigare svar, det beror på vart i landet man befinner sig
Ingen erfarenhet av det.
Avseende ombyggnadsärenden
Byggnadsnämnder avstår helst från att göra tolkningar.
Generellt är kompetensen att bedöma något annat än ren förenklad dimensionering enligt allmänna råd mycket låg hos byggnadsnämnder och låg till mycket låg hos remissinstanser som kommunala räddningstjänsten. Räddningstjänster kan normalt inte heller skilja på sitt eget uppdrag och vad som faktiskt är krav enligt BBR vilket leder till att olika tolkningar görs.
Byggnadsnämnden vill inte ta ansvaret. De skjuter frågan till räddningstjänsten
Ibland genom diskussion med byggnadsnämndens stöd (räddningstjänsten). Mer sällan nu än tidigare.

Question 8

TABLE C.14 QUESTION 8 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Does Boverket provide satisfactory help with explanation of purpose for provisions and general recommendation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents?		
Answer Options	**Response Percent**	**Response Count**
Yes	42.5%	17
No	35.0%	14
Undecided	22.5%	9
Clarify answer (optional)		9
	answered question	**40**
	skipped question	**1**

TABLE C.15 QUESTION 8 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Does Boverket provide satisfactory help with explanation of purpose for provisions and general recommendation of BBR Chapter 5 Safety in case of fire, including BBRAD and other documents?		
Answer Options	**Response Percent**	**Response Count**
Yes	26.0%	25
No	52.1%	50
Undecided	21.9%	21
Clarify answer (optional)		41
	answered question	**96**
	skipped question	**1**

TABLE C.16 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 8 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Åtminstone i vissa frågeställningar.

De få frågor som man haft kontakt med dem i. Ibland blir det mer komplicerat men de senaste frågorna har varit tydliga.
Det är långt ifrån alltid som man har tid att lyfta frågan till Boverket eftersom många projekt är under tidspress.
De svarar väldigt flummigt, sannolikt för att reglerna är så dåligt skrivna och de inte riktigt själva vetat vad de tänkt när de skrev dem
Har själv inte ställt en fråga på BBR 19 men hört på omvägar om svar som kommit.
Om du ställer en fråga till boverket så är de tvungna att ge ett juridiskt korrekt svar. Om det svaret är negativt mot vad du hopats på förstör du för alla andra eftersom svaret måste följas. Slutsatsen är att det bästa är att låta bli att fråga boverket om saker.
Känslan är att Boverket inte har helt klart för sig följderna av vad de skrivit. Jag upplever det som svårt att få kontakt med dem och svårt att få ett tydligt svar kring vad de menar.
I allmänhet ja men inte i alla frågor. Frågor kring t.ex. ändringsregler och verifieringsbehov lämnar mycket att önska.
Tyvärr har de flesta svar jag sett inte hållit hög klass. I många fall motsägs bbr i det som Boverket svarar. Om de verkligen det de skriver i svaret borde de skrivit likadant i bbr.
Svaren är ofta av typen ‘god dag yxskaft’
Syftet går det säkert att få hjälp med, men frågor om hur problemet bör lösas i praktiken svarar de generellt inte på.
svårt att få raka svar
Dock endast generella svar, de vill ej uttala sig i frågor kopplat till specifika exempel. Ofta bättre att använda sig av andra kontakter (kollegor, kursare,etc) för diskussion.
De ger endast juridiska svar Inga förklaringar eller exempel på Lösningar
Men vore bra med sammanställningar av frågor o svar o förtydliganden o bakgrundsinfo. Konsekvensbeskrivningen bbr19 är inte bra.
Ingen erfarenhet.
De är för fega (får inte) uttala sig allt för detaljerat och till viss del verkar de för ett bättre brandskydd än BBR.
Jag anser att de svarar för svävande på vissa frågor vilket i princip inte ger någon vägledning alls.
Vi gör så gott vi kan
Dock hade ett biblotek där Boverket samlar sina svar varit uppskattat.
Boverket är hjälpsamma, men ibland har de inte möjlighet att svara på grund av sitt ickemandat att uttala sig i specifika ärenden (och ibland verkar de vara osäkra på denbakomliggande processen som lett fram till vissa krav - framför allt krav som funnits med länge)
Boverkets svar är att det inte är deras uppgift att tolka regler utan endast att ta fram dem.
Svar är ofta otydliga och utan tydlig förhållning från myndighetens sida
de svar som ges handlar oftare om att försvara de formuleringar som ni finns i BBR än att hjälpa till att förstå och tolka reglerna. Mycket i konsekvensutredningar anger att det inte ska vara någon påverka på brandskyddsnivå jämfört med tidigare, men tyvärr har representanterna på Boverket inte tillräcklig bakgrundskunskap om hur tidigare tolkningar gjorts inom branschen
De ‘nya’ brandskyddsreglerna har inte landat i branchkonsensus. Boverket vet inte alltid själva vad de nya reglerna kommer landa i vilket blir tydligt för dem då fråger kommer in och ändringar i regelverket måste göras.
Svar tar ofta lång tid. Svar verkar ibland inte genomtänkta och konsekvenserna på faktisk byggnad blir konstiga. Delar av formuleringarna i BBR 19 (och framåt) ger upphov till konstiga utformningar som uppenbart ‘onödiga’ (ex.vis. brandvägg i soprumsvägg mot flerbostadshus).
Får till och med svaret att Boverket inte tolkar sina egna regler utan hänvisar till byggnadsnämnd.
Ibland kan det ges förklaringar.
Har ej vart i kontakt med Boverket i det avseendet.
Däremot kan det vara svårt att få vägledning i tillämpningsexempel.
Men frågan är om de kan ge det vi förväntar oss dvs tolka regler på enskilda objekt.
Dock är detta möjligt till 80 procent

beror helt på typen av fråga och vem på boverket som svarar. ibland ges god hjälp i tolkningen, ibland vill inte boverket ta ställning och väljer att citera föreskriftstexten rätt av i sitt svar
I ett enskilt projekt finns det sällan tid, men för övergripande frågor går det att få bra svar på frågor.
Boverket har blivit mer tillgängliga i att ge svar på frågor men svaren är ibland av karaktären upprepning av föreskriftstext än stöd i tolkning eller förtydliganden. Det skall erkännas att bredden är stor och mycket är bra men mycket är också förvillande.
Jobbar inte med dessa frågor.
Föreskrifterna är i flera fall inte så som Boverket hade tänkt sej alternativt helt enkelt felskrivna, och Boverket har svårt att rätta till det. Dessutom är ett antal föreskrifter inte förankrade i verkligheten utan blir orimliga/konstiga.
Man får svar men de är ofta så svävande att de inte är till någon hjälp.
Boverket tar sig tid att svara på frågor. Svaren är dock inte alltid tydliga och blir i sin tur underlag för diskussioner inom företaget avseende vad de egentligen svarar.
Det har hänt att de ändrar sitt svar.
Varierar hur tydliga de lyckas vara.
Men det tar ofta lite tid.
För det mesta går det att få hjälp av Boverket med förklaringar av syfte för föreskrifter och allmänna råd till BBR. Dock kanhandläggningstiden vara ganska lång i vissa fall och man kan få vänta lång tid, i många fall, på att få svar.
Boverket är ofta för fega för att svara på ett konkret och bra sätt
Boverket är väldigt obenägna att svara rakt på frågor.
Vet ej, har inte frågat.
Men också delvis ja. De är bra på att ge icke-svar.
Boverkets tolkningar hjälper ofta inte så mycket. Domstolsutslag hade varit mer vägledande men finns inte i så många fall.
Det går att få viss hjälp men knappast tillfredsställande
Tar för lång tid eftersom många av de luddigare delarna inte är genomtänkta, dvs Boverket vet inte själv hur de menar helt och fullt.
Ja, de är ofta vaga och tydligt och ibland ändrar de sig till och med. Men jag förstå att det är svårt och det är bra att de inte uttalar sig för ofta men ibland måste de det anser jag.
I vissa fall - ja, men de har gjort det oerhört svårt genom en bedrövlig konsekvensutredning för BBR19 och allmän hållning att boverket skriver regler, de tolkar dom däremot inte.

Question 9

Table C.17 Question 9 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Should there be a certification requirement for qualified fire engineering designers?		
Answer Options	**Response Percent**	**Response Count**
Yes	62.5%	25
No, there should be no certification at all	0.0%	0
No, but voluntary certification is good (e.g. SAK 3)	22.5%	9
Undecided	15.0%	6
Clarify answer (optional)		7
	answered question	**40**
	skipped question	**1**

Table C.18 Question 9 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

Should there be a certification requirement for qualified fire engineering designers?

Answer Options	Response Percent	Response Count
Yes	34.4%	33
No, there should be no certification at all	7.3%	7
No, but voluntary certification is good (e.g. SAK 3)	43.8%	42
Undecided	14.6%	14
Clarify answer (optional)		30
answered question		96
skipped question		1

TABLE C.19 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 9 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Jag anser att universitets utbilding (brandingenjor) and arbetserfarenhet (inom omradet) borde vara tillrackligt.
Nej så jävla svårt är det inte och inom kunsultbranchen kvalitetsgranskas allting innan utskick.
Ja jag tror det vore lämpligt, men den bör kunna vara lite lagom komplicerad. Kanske mer som en introduktionsutbildning i BBR. Särskilt med hänsyn till att BBR inte är helt lättolkat, trots ambitionen att göra det tydligare med BBR 19.
Kontroll av om byggherren har anlitat erforderlig kompetens bör göras av byggnadsnämnden eller den lokala räddningstjänsten vid översyn av projekteringshandlingarna. Denna kontroll får antas vara mycket bristfällig med tanke på kvaliteten på vissa handlingar man emellanåt kommer i kontakt med. Certifiering, om inte denna är mycket krävande, löser förmodligen inte den varierande kvaliteten i branschen
Krav på genomförd examen känns rimligt. Bra för alla parter dessutom
Kan även lösas med frivillighetsalternativet. Det borde ställas krav på organisationen runt den enskilda projektören.
Jag tror att krav på certifiering kan bli hämmande för branschen som helhet eftersom det stora flertalet frågor kring byggnadsteknsikt brandskydd är förhållandevis okomplicerade. I vissa typer av kvalificerad projektering (tex vid analytisk dimensionering) kan krav vara lämpligt.
Jag är osäker på hur den certifieringen ska utformas för att verkligen bli bra. Jag har 22 års erfarenhet men är inte certifierad personligen. Kanske bör man kräva att företaget är certifierat och att certifieringen bygger på kvalitetssystem och kritisk massa av kompetens?
Har erfarenhet av 'egenutbildad' (ingen formell kompetens) brandkonsult i min kommun där en del av hans lösningar är ytterst tveksamma. ´Kunden som betsäller jobbet förväntar sig dom att allt är rätt då de anlitat en brandkonsult. Det skulle behövas någon form av kvalitetssäkring i arbetet.
Ger ännu högre kostnader Kvalitén är det inget fel på däremot praktisk tillämpning
Det finns allt för många brandskyddsprojektörer som inte har rätt kompetens och anledningen till att de blir anlitade är för att även beställarna saknar kompetens
Det beror på vilken nivå man arbetar som brandkonsult. Rekommendationer eller analytisk dimensionering. Lång erfarenhet inom branschen, ex mer än 10 är skall ge behörighet som brandkonsult inte enbart teoretiska kunskaper.
Marknaden styr kvalité, t ex för ISO-certifiering. Kunderna kan få välja detta.
Det finns redan.
Vissa objekt borde bara få projekteras av personer med dokumenterad kompetens
Certifieringen borde vara mera tydlig med vad den innebär och vad en certifierad kan och inte kan.
Ja, under vissa omständigheter.
Rimligt med certifiering för tredjepartsgranskning
ser inget behov av att alla är sak 3 certifierade.
Certifieringskrav kan vara lämpligt i vissa typer av projekt, men certifiering i sig säger lite om hur projektering egentligen kommer genomföras rent praktiskt och den verkliga kunskapsnivån hos brandskyddsprojektören

SBF Normen Certifierat Brandkonsulföretag 2003 Nivå K är en lämplig nivå eller SAK3:an eller BIV auktorisation
och bör premieras av skattefinansierad verksamhet, exempelvis arbeten med kommuner, landsting eller staten.
Men inte en allmän certifiering. Däremot för ansvariga inom lite mer komplicerade projekteringar.
Dagens certifiering är dock för tandlös, måste finas bättre möjligheter att dra in utfärdade certifikat
Finns många olika nivåer på byggnationer varför det är svårt att sätta rätt nivå.
Kostnaden för att certifiera samtliga berörda personer överstiger nyttan för den samma.
Det tycker jag. Eller iaf en cerifiering av företag. Nu finns det sådana lösningar som idag kan ses som frivilliga. Om det ska lagstadgas att endast certifierade företag ska få genomföra brandskyddsprojektering är jag mer osäker på. Det kanske snarare borde vara en branschpraxis.
Det skulle innebära en lägstanivå på en brandskyddsprojektörs kunskaper, något som gynnar alla i branschen. Utmaningen blir att certifieringen utförs på rätt sätt.
Men då bör man ju också specificera i vilka bygglovsärenden det behövs en certifierad brandskyddsprojektör. Vid t.ex. installation av kamin ska man ju klara sig utan.
VIktigt att det är en certifiering för projektering och en för kontroll av brandskyddet i byggskedet och vid slutbesikting.
En kvalitetsstämpel så kunden vet vad de kan förvänta sig för kvalitet skulle vara bra.
Egentligen skulle ingen certifiering utöver krav på brandingenjörskompetens vara erforderlig. För avancerade analyser kan ställas krav på fullgjorda kurser i dessa ämnen alternativt motsvarande utbildning från annan instans på motsvarande nivå, tex NIST eller NFPA.
Tyvärr har det visat sig att certifiering leder konkurrensbegränsning och och inte bidrar till högre kvalite.
Beror pa vad en certifiering innehaller. En viktig bit i projektering ar uppfoljning av kvalitet.
beroende på utformning kan det få mer eller mindre praktisk betydelse.
Tycker att ett krav på certifiering av kvalificerade brandskyddsprojektörer är rimligt, likväl som kravet finns för kontrollansvariga.
Tyvärr finns inget kompetenskrav avseende brandfrågor för myndighetssidan, nyexaminerade brandingenjörer inom konsultbranschen har alltid erfarna projektörer inblandade i projekten. Tyvärr verkar inte samma förhållanden alltid gälla tillsynsmyndighet, dvs räddningstjänster. En ensidig höjning av kompetensnivå för projektörer är därför inte någon lösning, även om detta givetvis är positivt.
Var dras gränsen för kvalificerad?
Det fungerar inte. Det är inte kunskap som saknas i de flesta fall utan vägledning i form av råd (utökad BBRAD)
Inte bara av kvalificerade utan alla.
jag ser ingen anledning, branschen löser detta

Question 10

TABLE C.20 QUESTION 10 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the new occupancy classes introduced with BBR 19 Chapter 5 Safety in case of fire, better compared to previous versions of BBR?		
Answer Options	**Response Percent**	**Response Count**
Yes	89.7%	35
No	2.6%	1
Undecided	7.7%	3
Clarify answer (optional)		6
	answered question	**39**
	skipped question	**2**

TABLE C.21 QUESTION 10 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the new occupancy classes introduced with BBR 19 Chapter 5 Safety in case of fire, better compared to previous versions of BBR?		
Answer Options	**Response Percent**	**Response Count**
Yes	79.2%	76
No	8.3%	8
Undecided	12.5%	12
Clarify answer (optional)		35
	answered question	**96**
	skipped question	**1**

TABLE C.22 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 10 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Förstår ej frågan, verksamhetsklasser fanns inte tidigare.Tror dock att de fyller en funktion och i vissa fall hjälper till att sortera kravnivåer och möjliga lösningar.
Jobbade inte med de tidigare versionerna av BBR 18.
Började arbeta ungefär samtidigt som BBR19 togs fram och det fanns en övergångsperiod. Så jag har inte arbetat så mycket med de tidigare versionerna
Tillför ingenting eftersom de inte inneburit förändrade krav för de olika verksamhetsklasserna.
Det är bra att det förtydligats vad som gäller inom vilken verksamhet. Sen lirar det inte riktigt alltid om det finns flera verksamhetsklasser i samma byggnad och vad kraven blir då.
Helt klart ett bra förtydligande av hur en verksamhet ska klassas.
Utgångspunkten är vettig. Men det blir konstig när man inte tillåts använda definitionerna pga att Boverket 'bestämt' att skolor är Vk2 mm Konstig detaljstyrning. Man borde få utgå från kriterierna för Vk klasserna full ut.
Både och. bra med förtydligande kring verksamheter men vissa hamnar mitt emellan två klasser, tex. nattdagis, och det medför problem.
Ja, tydligare vad som gäller för en viss verksamhet. Dock viss problematik att sortera in verksamheterna i rätt vk.
Det är tydligare nu men fortfarande finns ett visst utrymme för tolkning
Men inte tillräckliga. Finns en del undergrupper som saknas (tex ensamkommande flyktingbarb, mellanting mellan kontor, vård, mindre samlingslokal)
Svårt att förklara för icke insatta personer vad de olika förkortningarna står för.
Mycket bra system
Ger bättre stöd vid ändringar av byggnader när man inte gör så stora ingrepp i byggnadsverket.
Ja, jag gillar att begreppet verksamhetsklass införts men det blir problem då vissa verksamheter hittills hamnat mellan stolarna.
Ett steg i rätt riktning men inte tillräckligt noggranna, bättre i NZ c/as, särskilt den som gällde innan 2012.
De skapar en bättre struktur på bedömningarna
En ökad tydlighet i skyddsnivå för olika typer av verksamhet. Detta är ett bra initiativ
Ja, utökad tydlighet och mindre begreppsförvirring jämfört med andra kapitel i BBR - exempelvis fanns tidigare flera definitioner i olika kapitel för vad som menades med samlingslokal. Utökad tydlighet i hur man kombinerar ihop 'egna klasser' utifrån personernas förutsättningar.
Till största delen, dock är många verksamheter svåra eller omöjliga att hänföra till viss Vk
Enbart en namnändring. Spelar ingen roll om vi diskuterar 'hotell' eller 'Vk 4'. Mängden verksamhetsklasser borde vara betydligt mindre.
Det har blivit klart tydligare.
Jag har ej projekterat enligt annat än BBR19.

Har inte jobbat med det tidigare
ingen större erfarenhet av tidigare versioner men gör det lättare att hitta 'rätt' typ av verksamhet utan tvekan
Tydligare och lättare att koppla till olika krav
Systemet är bra men klassningen är inte perfekt
Jobbar inte med dessa frågor.
Nackdelen är att vissa typer av verksamheter faller mellan stolarna.
Jag har inte arbetat med tidigare BBR.
Det blir färre verksamheter som hamnar mellan olika grupperingar vid projektering av brandskyddet.
Mycket bra. Dock blir det problem med verksamheter som inte går, eller är svåra, att placera i en verksamhetsklass. tex nattis och gruppboende för asylsökande
Ger större tydlighet. Dock är det, och kommer alltid att vara, omöjligt att täcka in alla tänkbara verksamheter. Möjligheten till AD av verksamhetsklass är dock tillräcklig för att hantera denna problematik.
Generellt bra, de gråzoner som finns kan dock innebära problem.
Överlag bättre
Något bättre.
Avser frågan system med verksamhetsklasser. Tidigare fanns ju inte begreppet. Svar på frågan om systemet med verksamhetsklasser är att det både är bättre och sämre. Inom vissa områden blir kraven tydligare och mer nyanserade medan det inom andra områden blir mer fyrkantiga krav.
Generellt bra. Dock finns ibland kantbollar. Hur verifierar man analytiskt ändring av VK eller utnyttjande av andra krav än för aktuell VK. Flexibiliteten blir liten.
Vilket är bäst klartext eller kod?
Trodde det skulle bli bra. Jag hade fel.
Kommer fler i 21 som är bra. Ojämn säkerhetsnivå: jmf nattis och vk 3b.

Question 11

TABLE C.23 QUESTION 11 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the prescriptive design method for fire safety of buildings outlined in BBR 19 and later versions?		
Answer Options	**Response Percent**	**Response Count**
Yes	30.8%	12
No	56.4%	22
Undecided	12.8%	5
Clarify answer (optional)		13
	answered question	**39**
	skipped question	**2**

TABLE C.24 QUESTION 11 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the prescriptive design method for fire safety of buildings outlined in BBR 19 and later versions?		
Answer Options	**Response Percent**	**Response Count**
Yes	50.0%	48
No	38.5%	37
Undecided	11.5%	11
Clarify answer (optional)		36
	answered question	**96**
	skipped question	**1**

TABLE C.25 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 11 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Om ambitionen att FD ska kunna företas av 'alla' behöver dock ytterligare steg tas mot detta. Men det är dock närmare att detta skulle kunna fungera i och med BBR 19.
Borde inte vara så men just nu är det så eftersom reglerna till vissa delar är otydliga och tolkningsbara.
För att ha bra kompetens är inte beroende på utbildning. inte alla brandingenjörer som har rätt kompetens. Med det menar jag inte att alla kan göra det. Det krävs snarare att man kan arbetssättet och vet hur det ska användas. Erfarenhet väger nog vanligen mer en utbildning. men en certifering som måste upprätthållas bör väl kunna ge någon slags stämpel/intyg på att kompetens finns.
Fortfarande måste man förstå syftet med reglerna och när det finns tolkningsmöjligheter. Man måste ha förståelse för brand
Borde inte behövas, men eftersom det kräver en del tolkningar så är det snarare tillgång till erfarna kollegor som vet hur Boverket tänkte när de en gng skrev en regel för första gången, som behövs.
Däremot får vi ganska ofta in brandskyddsdokumentationer som är upprättade av personer som inte har tillräcklig kompetens.
För att klara förenklad dimensionering behöver du bara vara normalbegåvad och läskunnig i och med att förenkling numera innebär att de allmänna råden SKA följas.
Ja, eftersom förenklad dimensionering inte alltid är så enkel. Man måste fortfarande ha en grundläggande förståelse för vad som kan ske vid en brand.
Brandingenjörsexamen innebär i sig inte att en person har goda kunskaper i dimensionering och tolkning av regelverket, det krävs ytterligare kunskaper/erfarenheter inom området byggnadstekniskt brandskydd.
Förenklad dimensionering är på inget sätt 'enkel'
Viss kvalifikation krävs. Ingenjörsexamen?
I många fall räcker det med utantillkunskap.
Delvis, ofta missar mindre kunniga projektörer när det krävs AD. Det behöver dock inte bero på bakgrundsutbildning.
Normalt sett ja, men vid förenklad dimensionering av okomplicerade objekt är det intenödvändigt med brandingenjörsexamen. Vid analytisk dimensionering enligt BBRAD krävs viss kompetens, men det borde kunna säkerställas med krav på certifiering (som bl a säkerställer formell kompetens), eftersom examen i sig inte innebär att man har koll på PBL med tillhörande föreskrifter.
Både ja och nej. Finns bättre och sämre projektörer, men många gånger sämre tyvärr.
Renaste formen av förenklad dimensionering kräver ingen brandingenjörsexamen.
Nej,dock så kräver den förenklade dimensioneringstekniken ofta att tolkningar och analyserande för att reda ut om kraven är uppfylda. Då kommer braningenjörskompetens väl till pass.
Vid förenklad dim av tex bostäder

Så har en byggnadsingenjör bättre kunskaper eller likvärdiga med en brandingenjör om han är Certifierad hos SBF
Beror på vad som menas med liknande men man bör vara väl insatt i reglerna och kunna föra ett logiskt resonemang för de punkter där det finns ett visst tolkningsutrymme
Byggnadsingenjör, elektronikingenjör kombinerat med minst 10 års erfarenhet inom brandskydd.
Inte för förenklad dimensionering men för analytisk
Ja, eftersom det i stort sett är omöjligt att inte någon gång frångå förenklad dimensionering och det krävs kompetens för att kunna göra analytiska avvägningar.
Förenklad dimensionering kan fortfarande i många fall leda till mer tolkningsfrågor och därmed bedömningsfrågor än analytisk dimensionering. Erforderlig kompetens krävs för att rätt tolkning ska göras i dessa fall.
En generell synpunkt som jag har, men som bekräftas av ett fåtal undantag
Att tolka råd för förenklad dimensionering är i princip lika svårt som att beräkna säkerhetsnivåer med analytisk dimensionering. Förenklad dimensionering är en tolkningssport.
Förenklad dimensionering är komplicerat och erfarenhet kan många gånger vara viktigare än den faktiska akademiska utbildningen. Det finns en hel del logiska luckor i förenklad dimensionering vilket gör att förenklad dimensionering i många fall är svårare än analytisk.
Sällan projekt där det inte blir några frågetecken kring kraven i föreskrifterna, det kan då vara svårt om man inte riktigt har koll på bakgrunden.
Självklart kan tillfredsställande resultat erhållas från någon som inte är brandingenjör med hjälp av de allmänna råden, men en grundläggande förståelse för hur brandskyddet är tänkt att fungera är ändå nödvändigt för att något inte ska missas.
Eftersom man inte kan bygga enligt förenklad dimensionering utan mycket höga kostnader eller att man gör genvägar så är det kanske olämpligt i vissa byggnader. Kanske tillämpbart för vissa verksamhetsklasser eller byggnadsklasser.
Förenklad dimensionering ställer ofta ganska stora krav på handläggare. I många fall kan det vara mer komplicerat med ‘förenklad’ dimensionering än vad analytisk dimensionering är .
Det finns risk för att man inte förstår varför ett krav ställs om man inte har en bakomliggande utbildning. Det blir också svårt att bedöma rimligheten i lösningar utan utbildning.
Återigen är det osäket om man alltid kan bestämma sig för att det är förenklad som gäller utan att ha relativt bra kompetens och erfarenhet och om beställaren får rätt lösning.
svårt att svara på. väldigt dålig koppling till BBR i utbildningen, skulle tro att vem som helst kunde lära sig detta genom övning
Däremot behövs erfarenhet, men det kan de flesta som studerat något över gymnasial nivå klara ut.
Förenklingarna bygger på att man förstår bakgrunden.
Beror på byggnadens komplexitet och risk. Enkla byggnader kan många lära sej föreskrifterna om men ofta finns det några risker/kluriheter och då behövs en djupare kompetens, tex brandingenjör.
Kunskaperna som krävs för förenklad dimensionering skulle man absolut kunna lära sig på annat sätt.
Den förenklade metodiken handlar i princip om att läsa innantill, det är mycket viktigare att ha god kunskap om husbyggnad projektering.
eller tillsyn b
Det finns personer som har annan bakgrund och tillför andra kunskaper då det gäller brandskydd. Beror på personlig lämplighet.
Partisk men tycker att det fortfarande krävs en del sakkunskap att tolka reglerna rätt. Definitivt för att det ska bli rätt hela vägen till färdigbyggt hus. Många fallgropar.
Inte för förenklad dimensionering, dock tror jag att det är nödvändigt vid analytisk dimensionering.
Ja eftersom avsteg skall verifieras och brister i detta kan nästan alltid tillskrivas bristande kompetens
Detta beror på den berörda byggnadens komplexitet
För förenklad dimensionering är brandingenjörskompetens ofta inte nödvändig.
Följs råden så krävs ingen kunskap...
Utbildningen till brandingenjör har väldigt lite fokus på projektering och utbildningen sker i

huvudsak där kompetensen kring byggregler finns, dvs på konsultbyråerna. Många inom rtj är utbildade brandingenjörer men har generellt låg till mkt låg kompetens att tolka BBR.
I vissa enklare fall är det inte nödvändigt.
Speciellt nu när allt har blivit så knepigt
konsekvensen av för liten kännedom till backgrund kan bli katastrofal
Ej för småhus och likande
Förutom mycket enkla byggnader hamnar man i analytisk dimenisionering
Det hjäper stort men är inte nödvändigt.

Question 12

Table C.26 Question 12 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Is adequate guidance provided for alterations to existing buildings in BBR 19 Chapter 5 Safety in case of fire and later versions, including BBRAD?		
Answer Options	**Response Percent**	**Response Count**
Yes	30.8%	12
No	33.3%	13
Undecided	35.9%	14
Clarify answer (optional)		4
	answered question	**39**
	skipped question	**2**

Table C.27 Question 12 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

Is adequate guidance provided for alterations to existing buildings in BBR 19 Chapter 5 Safety in case of fire and later versions, including BBRAD?		
Answer Options	**Response Percent**	**Response Count**
Yes	22.9%	22
No	60.4%	58
Undecided	16.7%	16
Clarify answer (optional)		33
	answered question	**96**
	skipped question	**1**

Table C.28 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 12 from the survey on BBR Chapter 5 Safety in case of fire.

Clarify answer (optional)
Klar förbättring från en luddigare BÄR tidigare.
ingen vet idag exakt hur de ska användas och tolkas utan det får framtiden utvisa.
Saknar tillämpbara kriterier för värdering vid analytisk dimensionering av t.ex. höga byggnader (>16 våningar)
Beror på frågan skulle jag säga. Vissa fall självklart, men är som vanligt när det är osäkert som det blir svårare.
Den vägledning reglerna erbjuder är väldigt varierande i nivå. Vissa saker är övertydligt detaljstyrda på föreskriftsnivå medan i andra fall går det knappt att förstå meningen med ett allmänt råd.
Det ger utrymme för bedömningar men skriver man för mycket är risken att fel krav ställs i fel sammanhang. Samtidigt kan en avsaknad av detaljregler leda till tolkningsskillnader som kan bli problematiska att lösa.
BBR 19 blev inte bra, alldeles för många konstigheter som är svåra att tolka och svåra att

förklara för sina kunder. Att det snart kommer en BBR 21 är väl beviset på att det inte blev bra.
Att utläsa kravnivån för befintliga byggnader är näst intill omöjligt. ´Det blir heller inte lättare av att kombinera detta med den grundläggande diskrepansen mellan ändring och ombyggnad i PBL.
Antar ni menar avsnitt 1 (1:22) i BBR
Det går att utveckla ytterligare.
kap 5.8 i stort oförståeligt.
Ombyggnationer finns det inte mycket stöd. Hela BBR är uppbyggd för nyproduktion.
Skulle gärna sett lite mer vägledning kring ändring av befintliga byggnader.
Ja, fast komplement behövs av andra aktörer, som handböcker utbildningar mm
Skälighetsprincipen borde ta mer utrymme.
Kan alltid göras bättre.
Fler exempel på begränsningar till ändrade delar i olika fall och hur detta tolkas utifrån ändringen skulle dock göra avsnittet ännu tydligare.
Ändring och ombyggnad är den delen av vårt arbete där det krävs mest av omdöme erfarenhet och kunskap.
Ändringskapitlet är mycket luddigt. Känns som att det behövs rättsfall för att en skälig nivå ska kunna bestämmas.
Kan alltid bli bättre men dagens nivå fungerar säkert i många fall. Det 'är trots allt ett allmänt råd.
Ja, den ger ett gott stöd för många typer av analyser och likriktar branschen och dess tolkningar. Tillsammans med de utredningsrapporter som utgjort grunden för BBRAD så finns gott stöd att referera till vid projektering. Saknar vägledning för höga byggnader/Br0.
Ja, den är tillräckligt utförlig. Att den skjuter över målet i vissa sammanhang är en annan fråga.
Frågan skulle behöva specificeras för att jag ska kunna lämna ett relevant svar. Den kan tydas på flera sätt.
Men då krävs också att konsulten och byggaren tillsammans med beställaren jobbar väldigt nära varandra. Det är nog det svåraste området av alla.
kommer nog aldrig bli det heller, hjälp kan fås av PBL och PBF men tolkningsfrågor kan ändå föreligga. varje ändringsprojekt är unikt, där ligger den stora svårigheten att fånga in allt i föreskriftstexter
Mycket svårt att hitta rätt nivå på brandskyddet vid ändringar, dock är det svårt att skriva det mycket tydligare.
Lite för tidigt att säga
Föreskrifterna har för lite förankring i verkligheten och lämnar för stora delar som inte behandlas, alternativt behandlas på ett felaktigt sätt. BBRAD om analytisk dimensionering är en bra start, men behöver utvecklas utifrån användarens behov så att alla frågetecken om hur olika delar ska tillämpas försvinner, är inte ett bra stöd idag.
Men BBR 19 var en mycket stor förbättring jämfört med BBR 18 och BBRAD också ett stort steg framåt. 'Nej'-et handlar om punkter som behöver hanteras, inte att det är generellt dåligt.
Överlag är BBR kapitel 5 illa skriven. Den saknar den stringens som jag tycker krävs för en tvingande text. Tolkningar måste göras i många fall, även av de allmänna råden.
Svårt att reglera men anser personligen att 5.8 kunde varit bättre skrivet. 1.22 är mkt bra.
De handböcker som ges ut, är dessutom utmärkt litteratur för vägledning.
Krav på brandskydd vid ändring av byggnad är otydlig. Gäller framför allt hur man ska förhålla sig till regler som är nya i BBR.
Borde göras mer utförlig.
På det stora hela taget.
Det finns många delar som inte behandlas.
Oftast
vet faktiskt inte ännu. men den är bra mkt bättre än BBR
Vissa funktionskrav behöver utvecklas för att bli verifierbara

Question 13

TABLE C.29 QUESTION 13 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	28.2%	11
No	43.6%	17
Undecided	28.2%	11
Clarify answer (optional)		5
	answered question	**39**
	skipped question	**2**

TABLE C.30 QUESTION 13 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	39.1%	36
No	48.9%	45
Undecided	12.0%	11
Clarify answer (optional)		30
	answered question	**92**
	skipped question	**5**

TABLE C.31 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 13 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Högst beroende på vilka kunder man jobbar med. Det varierar stort. Men 'Nej' är nog svaret i det stora perspektivet.
Det beror på vilken stad i Sverige man jobbar i. I Stockholm är projekten generellt ganska bra på att engagera oss tidigt. I andra städer är det svårare, det finns en okunskap om när brandingenjörer behövs och det varierar mycket. Ibland blir vi inkopplade när allt är färdigprojekterat och ibland är vi med från början.
Oftast, men inte alltid.
Ja och nej. De stora erfarna bolagen tar in oss i tid. Mindre byggen kommer du ofta till i ett senare skede, ibland när det redan är för sent.
Vi kommer in tidigare och tidigare. I många fall dock något för sent då planlösningar huvudsakligen är satta och man måste hitta speciallösningar för att uppfylla brandreglerna. Här kan man också se en koppling till kompetensen/förståelsen hos byggherren/projektledare/arkitekt
Upplever att detta blivit mycket bättre men det finns förbättringspotential
Beror på storleken på projektet.
Det är snarare vanligt att de kommer in för sent i processen.
Ja vi anlitar dessa direkt vid Projektstart
Oftast
Tyvärr kommer ibland brandkonsulten in för sent i bygg-processen. Detta kan medföra fördyrande av bygget.
Inte alltid, tyvärr kommer de emellanåt in alldeles försent och får inrikta sig på att rätta till/rädda vad som räddas kan.
Arkitekter vet ofta inte hur mycket frihetsgrader det verkligen finns och som de skulle ha nytta av. Tyvärr är brandingenjörerna dålig på att lyfta fram möjligheterna

De flesta av våra professionella kunder inser behovet tidigt. Ju mindre proffesionella, desto senare kommer vi in i processen.
Detta varierar otroligt mycket så går inte att ge ett entydigt svar. Det har blivit bättre styrning framförallt i storstadsregionerna, men i många fall med mindre byggprojekt så tas kontakten fortfarande för sent.
Undantaget är de mindre byggnationer där behovet av brandkonsult belyses först i bygglovsskedet. Detta är upp till byggherren att besluta om.
Varierar beroende på projekt och kommun. Ibland kommer man inte in förrän det är klart och kommunen har inte ställt krav på BSD i tid.
Mycket bättre nu än för ett antal år sedan.
Oftast
Kommer in för många gånger f ör sent i processen,
Inte alltid men ganska ofta så kommer vi in för sent.
Det är många gånger en brandskyddsprojektör anlitas då andra handlingar är långt gångna, vilket ger en stor del extrajobb då ändringar måste göras jämfört med om en brandprojektör vart med från början.
Det har blivit mycket bättre.
snarare undantag än regel
Större aktörer vet vinsterna med att ta in en brandskyddsprojektör tidigt. Vissa mindre aktörer kan det vara sämre med.
Spridningen är mycket stor i denna fråga. Dett förekommer allt från att involveras redan på skisstadie till att bli utringd till färdiga byggnader som inte fåtslutbevis.
Är olika i olika delar av landet och olika beställare, många är bra men är riktigt dåligt ibland. Byggnadsnämnderna borde vara bättre på att ställa krav i tex bygglovsansökan så att man lärde sej.
Var tvungen att svara på frågan men ville egentligen inte. Det är en sån spridning på detta att det inte går att ge något entydigt svar. Det är inte en fråga om att jag är osäker utan om att svaret är: Ibland, ibland inte.
Jag arbetar mest med stora projekt.
Varierar men bland våra kunder, ja oftast.
I stora projekt oftast Ja.
I bland och i bland inte. Här måste byggherrar förstå vikten av att ta med en brandprojektör i ett tidigt skede. Från räddningstjänstens sida ges rekommendationer att anlita en brandkonsult i ett tidigt skede.
Större byggherrar och entreprenörer är förhållandevis bra, mindre aktörer missar ibland detta.
I småprojekt oftast inte; i större projekt ja.
I större projekt är min erfarenhet att man har blivit bra på att tidigt involvera brandkonsult. Problemet är väl mindre projekt (ombyggnader och dylikt) där man har en liten budget och begränsad erfarenhet av byggprocessen. särskilt i projekt , omän små, där projekteringen kan vara komplicerad.
Otydlig fråga. Vad är tillräckligt tidigt? Allt går ju att lösa, det är mest en fråga om pengar.
I förprojekten är där brandskyddsprojektören kann göra största förskell

Question 14

TABLE C.32 QUESTION 14 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

The role of the Fire Service in the building process is not statutory in the Planning and Building Act, and does therefore differ between municipalities. They are mostly given the role as advisers to the local Housing Committee. To what level should the Fire Service be involved in the building process?		
Answer Options	**Response Percent**	**Response Count**
More than the current situation	69.2%	27
Their current level of involvement is sufficient	25.6%	10
Less than the current situation	5.1%	2
Undecided	0.0%	0
Clarify answer (optional)		14
	answered question	**39**
	skipped question	**2**

TABLE C.33 QUESTION 14 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

The role of the Fire Service in the building process is not statutory in the Planning and Building Act, and does therefore differ between municipalities. They are mostly given the role as advisers to the local Housing Committee. To what level should the Fire Service be involved in the building process?		
Answer Options	**Response Percent**	**Response Count**
More than the current situation	20.7%	19
Their current level of involvement is sufficient	47.8%	44
Less than the current situation	22.8%	21
Undecided	8.7%	8
Clarify answer (optional)		43
	answered question	**92**
	skipped question	**5**

TABLE C.34 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 14 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Framför allt bör räddningstjänsten bli mer kunnig i byggnadstekniskt brandskydd, det finns tyvärr stora brister idag.
Fullt tillräckligt. Jobbar alltför ofta 'mot' Byggherrar och brandkonsulter av hävd, snarare än att utgå från att ett samarbete genom hela processen gagnar slutresultatet. Då blir även övergången till förvaltningsskede och tillsyn enligt LSO också något som kan ske i samverkan med konsulten i projektet - en koppling som det upplevs att Rätj inte alls är intresserade av att plocka upp och bjuda in till.
Räddningstjänsten bör tillfrågas i frågor som direkt berör deras arbete, dvs räddningstjänst och tillsyn. Gällande projektering är min uppfattning att kommunen i vissa fall borde anlita en annan konsultfirma och på så sätt få bättre stöd än från många räddningstjänster då många räddningstjänster arbetat för lite med praktisk tillämning av regelverken.
Deras rådgivande roll är viktig, speciellt med tanke på att man med BBR 19 och framåt kan använda de som en del i utrymningsstrategin. Däremot är deras roll i dagsläget svårdefinierad och byggnadsnämnden (i vissa kommuner) tar väldigt hårt på deras rekommendationer och kan tex hålla upp ett startbesked för att en vägledande markering är felplacerad. Deras rådgivning gällande placering av centraler, angreppsvägar osv är viktig och de bör komma in tidigare i projekten. Det är dock viktigt att deras rådgivande roll skiftar fokus,

Samordning med räddningstjänsten i ett tidigt skede av byggprocessen ger ofta bättre förståelse för t.ex. föreslagna utformningar som skiljer sig från förenklad dimensionering.
Vi är mkt med men det är framförallt på senare tid, men håller på att utveckla det ännu mer. Det märks stor skillnad när man får vara med och det ger ett bra stöd åt sammhälsbyggnad.
Beror av om byggnadsnämnden har den kompetens som kan behövas.
Räddningstjänsten ska vara rådgivande, absolut inget mer. Då finns risken att man blir jävig sen när man kommer och ska göra tillsyn. Dock har räddningstjänsten svårt många gånger att få komma in i byggprocessen och får ibland för dåligt underlag av stadsbyggnadskontoret. Det hade varit bra om räddningstjänsten blev mer involverad men inte på något annat sätt än som rådgivande till stadsbyggnadskontoret.
Egentligen skulle jag vilja hävda att det är knutet till vilken kompetens som faktiskt sitter på respektive räddningstjänst.
I vissa kommuner är det för lite men i vissa är det säkert bra som det är idag.
Det tråkiga är att räddningstjänsten kommer in när byggnadsnämnden inte fattar. Och min erfarenhet är att folket i räddningstjänsten inte jobbar med byggreglerna tillräckligt ofta för att få den erfarenhet som krävs. Det blir lite frustrerande som konsult ibland, för det är lätt att känslomässiga värderingar läggs in då de inte riktigt fattar vad vi gör.
Jag har sällan kontakt RJT i byggprocessen. Och jag tycker egentligen inte att det gör något. Visst vore det skönt med en motpart ibland men det är ju jag som ska göra mitt jobb och inte RTJ.
Byggnadsnämnderna bör i större utsträckning använda sig av egna brandsakkunniga i ärenden som endast berör kontroll att man följer regelverket. För att förmedla räddningstjänstens erfarenheter från LSO (tillsyn, insatser etc.) bör man skicka remiss i de ärenden sådant är behövligt, som många gör idag.
Om inte byggnadsnämnden får stärkt kompetens om brandskydd så behöver räddningstjänsten involveras, inte minst för att 'rensa upp' bland de grövsta felaktigheterna som görs. Räddningstjänsten har dock ofta bristfällig kompetens om byggnadstekniskt brandskydd och brandskyddsprojektering
Blir afta 'tyckande' i stället för sakliga resonemang.
De borde satsa mer på att fånga källarkonsulterna.
PBL/BBR/EKS ställer krav på att byggnader och anläggningar ska utföras med olika former av system vars syfte är att kopplat till kommunens (räddningstjänstens) ansvar att genomföra räddningsinsats enligt LSO (t ex bärförmåga, slussar, räddningshissar, brandgasventilation av garage etc). För att funktionskraven ska kunna värderas måste systemet ställas i relation till räddningstjänstens förmåga. Denna värdering bör räddningtsjänsten vara delaktig i mer än idag, i synnerhet vid analytisk dimensionering. Samma sak gäller om projektören väljer dimensionerande förutsättningar som påverkar kommunens ansvar att genomföra insats enligt LSO. Det är dock inte motiverat att räddningstjänsten ska utgöra någon form av kontrollinstans (i byggnadsnämndens ställe) som nagelfar de lösningar som projektören presenterar. Detta ska i första hanteras med hjälp av projektörens interna kvalitetssystem. Ett annat omårdet där räddningstjänsten har en roll att fylla är kopplingen mellan kommunens ansvar att förebygga olyckor enligt LSO och den riskhantering som sker i plan och byggprocessen enligt PBL. Ett exempel på detta är ny-/ombyggnad av skolor i en kommun med problem med anlagda bräder i skolor. Ett vanligt scenario är brandspridning från utsidan, vilket inte omfattas av BBR. Det kan dock vara samhällsekonomiskt att beakta den typer av risker och invester i system som ökar skyddet.
Rtj ska delta som part för att kommunicera kring insatsförutsättningar, utformning av system som är till för att underlätta rtj-insats och dylikt. I övrigt bör rollen begränsas.
De saknar oftast kvalitetssäkring av sina utlåtanden och det de skriver får alldeles för stor betydelse.
Vi har problem med att BN anser att om alal dokument som ska lämnas in inför bygglov (ex brandskyddsdokumentaion etc) så är allt ok. De är inte intresserade av att granska vad som står i dokumenten utan menar att det är den som tagit fram dokumenten som svarar för att de uppfyller gälland elagkrav. Vi på rtj ser dock vid tillsyner och när vi får frågor att så inte är fallet. Ofta har man antagit saker som inte stämmer med de lokala förutsättningarna i kommunen. Hade rtj involverats mer hade troligtvis detta kunnat lösas.
De är inte objektiva mot BBR utan ställer överkrav med egna PM för bl.a. Stegutrustning
Betydligt mer när det gäller utformningar som berör oss operativt

Det måste vara lika bedömning av brandskyddet över hela Sverige. Räddningstjänsten i en kommun skall inte kunna hitta på egna regler om byggherren har fått brandskyddet godkänt i en annan kommun.
om man har en aktiv roll gentemot byggnadsnämnden. Kan annars bli negativa konsekvenser om räddningstjänsten först kommer in efter byggnaden sätts i drift och man enligt LSO börjar underkänna vissa lösningar med konsekvens med onödiga fördyrningar.
Men bara utifrån bygglagstiftningens villkor. LSO gäller bara befintliga byggnader
Fokus borde ligga på kompetensen hos den personal som handlägger ärendet istället för att förlita sig på den allmäna kompetensen hos en viss myndighet.
För att räddningstjänsten ska vara en naturlig del i byggprocessen så ska de anpassa kontrollbehovet efter brandkonsultens kompetens samt vara mer kunniga i byggprocessen. samt BBR51
Brandskyddet i samhället tar idag alldeles för lite hänsyn till räddningstjänsternas förmåga (i ett operativt skede). Detta bör kunna få ett större inslag genom en ökad roll för räddningstjänsterna i byggprocessen.
Även här varierar ju engagemanget från räddningstjänsten per region. Jag kan bara svar utifrån Göteborgsregionen där jag anser att man generellt har en lagom nivå på engagemang och fungerar som rådgivande till byggnadsnämnden, men i större mer komplexa projekt kan vi även ha en direkt dialog under projektets gång.
Räddningstjänsten får inte gå in och skapa lokala regler i geografiska områden eller projekt. Detta händer ändå. Irriterande och kostsamt.
Räddningstjänstens roll bör begränsas till att delta där deras insats är en förutsättning för byggnaden, exempelvis vid stegutrymning. De bör även vara med i byggnader där stora antal brandinstallationer är uppenbart riktade för räddningstjänstens insats, dvs. de är brukaren. Exempel kan vara hus med räddningshissar, stigarledningar mm.
Svårt att svara på eftersom det är olika för kommun till kommun.
De kan ha åsikter om sin insats och möjligen upplysa byggnadsnämnd om konsult gör uppåt väggarna fel, annars ska de hålla sig undan
Jag är av den uppfattningen att räddningstjänsten bör bevaka de intressen som endast rör räddningstjänsten. I stället kanske man ska titta på Norge och ta in en tredjepart oftare för extern granskning.
...om de har tillräcklig och rätt kompetens. Att sätta en trött brandinspektör att analysera Br0-byggnader kommer inte att fungera.
Räddningstjänsten har många gånger bra kommentarer, men kan ibland vara lite för konservativa gällande nya lösningar på brandskydd. En ökad inblandning skulle innebära att högre kunskapskrav ställs på Räddningstjänsten.
Varierar mycket från kommun till kommun och svaret blir därför beroende av var du jobbar.
Åtminstone sett till förutsättningarna inom vårt förbundsområde.
Rtj ska använda mycket av det som brandskyddsprojektören föreskriver. Dock upplever jag ofta att räddningstjänsten inte har tillräcklig detaljkunskap om BBR för att göra yttranden utanför det som rör deras insats.
Så sent som idag kontaktades jag av en mycket erfaren brandkonsult med lång karriär även inom kommunal räddningstjänst som var närmast förtvivlad över RTJs agerande. Petighet i småfrågor, formaliadiskussioner snarare än sakfrågor och en avsaknad av förståelse för helhetssyn kryddat med en myndighetsattityd som inte hör hemma i dagens samhälle. Ord och inga visor. Å andra sidan mötte jag förra veckan en mycket klok handläggare i ett församråd där kompetensen var hög, bemötandet mycket bra och dialogen utmärkt. Så milsvitt varierande att frågan i princip inte går att svara på.
Om byggherreansvaret ska gälla så ska inte myndigheter vara inne och lägga en önskelista.
Beror på kompetens. Både hos projektör och rtj.
Så mycket som möjligt! BN har för dålig koll
I Stockholmsområdet är deras inflytande begränsat vilket är fullt tillräckligt.
Olika kunskapsnivå i olika kommuner.
Bollplank till BN.
Det beror på byggnadsnämndens handläggares konskaper på området, men de är oftast begränsade.
I min kommunen har det blivit stora förändringar under de senaste 15 åren. I dag är vi en naturlig roll i byggprocessen och är alltid involverade.
Som sakkunnig åt beslutande myndighet (Byggnadsnämnden), rådgivare åt byggherrar och

deras sakkunniga men ALDRIG som sakkunnig åt byggherrar
RTJ bör inte involveras mer än som rådgivande inom de områden som de har kunskap om. Dvs, analyser och liknande bör endast översiktligt granskas av RTJ. Deras roll bör även förtydligas mot byggherrar och liknande som ofta tar deras ord på alldeles för stort allvar.
Det är ju inte ovanligt att de lägger sig i mer än de borde och sedan saknar kompetens att granska de verifieringar och beräkningar som de kräver.
Räddningstjänstens fokus bör i större omfattning omfatta att bevaka förutsättningarna för insats. Kommuner bör i större utsträckning bli bättre på att utnyttja externkompetens (ex tredjepartskontroll9 från andra brandkonsulter) eller hålla med egen kompetens inom stadsbyggnadskontoren (iaf i större kommuner)
Enbart vad gäller räddningstjänstens insats.
bygger på vilken kompetens de besitter
Men detta kräver också att de förstår sin roll, dvs att bedöma exvis brandskyddsbeskrivning utifrån PBL och BBR. Idag är inte kunskapen på många håll tillräcklig för att de ska kunna göra denna bedömning. Återigen, kompetensen finns i huvudsak på konsultnivå.
Bör ha god kompetens och insikt i skälighet.
Mer än nu men det ställer högre krav på kompetens hos rä.tj. än idag.
Beror helt på byggnadsnämndens kompetens i kommunen. Ibland behövs rtj i stor grad, ibland i mindre.
Mer än i Stockholm där det är nästan osynliga.
De bör koncentrera sig på saker som rör deras möjlighet till räddningsinsats. Inte lämna generella remissvar som förvirrar beställare och som tar tid/pengar att bemöta
I kommunnen jag mest jobbar (Göteborg) i är de i princip alltid delaktiga. Det är lätt att ha direktkontakt och diskutera med dem vilket är mycket bra.
Tyvärr har erfarenhetsmässigt Räddningstjänsterna svårt att hålla isär vilken lagstiftning som tillämpas LSO kontra PBL t.ex. samt det slumpmässiga tyckandet som ibland ges spelrum är mycket störande för processen
Det blir bäst om RTJ och byggnadsnämnden sammarbetar tät för att ha hög kompetens i samma tolkning av brandkyddet på nya byggnader.

Question 15

TABLE C.35 QUESTION 15 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the general recommendations in BBRAD a step in the right direction for performance based fire safety design in Sweden?		
Answer Options	**Response Percent**	**Response Count**
Yes	71.8%	28
No	2.6%	1
Undecided	25.6%	10
Clarify answer (optional)		2
	answered question	**39**
	skipped question	**2**

TABLE C.36 QUESTION 15 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Are the general recommendations in BBRAD a step in the right direction for performance based fire safety design in Sweden?		
Answer Options	**Response Percent**	**Response Count**
Yes	82.6%	76
No	4.3%	4
Undecided	13.0%	12
Clarify answer (optional)		20
	answered question	**92**
	skipped question	**5**

TABLE C.37 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 15 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Mycket bättre och ger en jämnare nivå och mindre konkurrens mellan konsulter som baserar sig på vilka som är 'snällare' än andra.
har inte direkt använt dessa, ås kan inte säga.
Ja, rätt riktning, men dagens produkt har kanske lämnat lite väl mkt att önska
Bra med vissa riktlinjer men jag har t.ex. svårt att se kopplingen högt personantal-kraftigare brandförlopp etc.
Nu finns det ju en massa värden och kriterier att jobba mot, det tar bort många osäkerheter och konsult-hittepå.
Jag har begränsad erfarenhet av BBRAD och väljer att inte kommentera för mycket. Vägledning är behövligt men hur den ser ut och vilken detaljnivå som tillämpas måste väljas med omsorg. Blir det för styrt är det i princip en lite luftigare variant av förenklad dimensionering. Jfr hur det funkar i NZ.
Det finns alltid stora osäkerheter i tolkningar när man kommer till komplicerade byggnader som kräver analytisk dimensionering. Allmänna råd blir kanske för allmänna?
Bör utvecklas med mera Vägledningar
Om följer allmänna råden/rekommendationer skall man uppfylla lagens minimikrav. Analytisk dimensionering skall användas vid byggnadstekniskt komplicerade byggnader.
tror att detta kommer att innebära att folk med för lite kompetens utför analytisk dimensionering med BBRAD som 'handbok'
Däremot är inte alltid nivån rimlig.
men det finns fortfarande mycket att göra för att utveckla detta
BBRAD har sänkt säkerhetsnivån i våra byggnader vilket är ok om Boverket menar att det är denna nivå brandskyddet ska ligga på. BBRAD medger en likriktning av analytisk dimensionering. Granskande myndigheter måste göras medvetna om att BBRAD inte är föreskrifter utan råd vilket betyder att andra utformningar, kriterier och verifieringsmetoder är tillåtna och möjliga.
Helt rätt. Det är bra att sätta kriterier för analytisk dimensionering.
Risknivån i BBRAD speglar inte den i förenklad dimensionering utifrån BBRs allmänna råd. Det skapar en snedvridning som är oacceptabel.En scenarioanalys på ett vanligt kontor skulle tex visa på att utrymning inte kommer att kunna ske innan farliga förhållanden uppnås medan den i FD är fullt acceptabel. Jag har inte analyserat om det är är ansttserna i de styrda indatavalen eller definitionen av 'farliga förhållanden' som är problemet. Rimligen borde en AD och en FD ge samma riskbild och FD speglar mycket väl den nivå samhället godtar. Ad ligger avsevärt högre.
Jobbar inte med dessa frågor.
Men behöver bli bättre och mer utifrån användarens behov.
Problemet har tidigare varit omdömeslösa brandingenjörer med hybris. Nu styrs det upp, men jag är inte säker på att vi slipper omdömeslösheten tack vare detta.
Mindre spretighet. Tycker det är bra.

Standardiserad vägledning är rätt väg att gå. Dock finns det mycket att jobba vidare med.
De allmäna råden medför att nivån förhoppningsvis blir mer likartad över landet än tidigare.
Det borde lämnas större utrymme för brandskyddsprojektören att objektsanpassa indata.
Märklig formulering på fråga då steg i rätt riktning är ytterst subjektivt
Ja ett steg i rätt riktning men inte helt på plats än

Question 16

TABLE C.38 QUESTION 16 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

A large part of BBRAD described scenario analysis. How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method outlined in BBRAD?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety	5.1%	2
Acceptable level of safety	43.6%	17
Lower than acceptable level of safety	10.3%	4
Undecided	41.0%	16
Clarify answer (optional)		6
	answered question	**39**
	skipped question	**2**

TABLE C.39 QUESTION 16 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

A large part of BBRAD described scenario analysis. How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method outlined in BBRAD?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety	38.2%	34
Acceptable level of safety	40.4%	36
Lower than acceptable level of safety	2.2%	2
Undecided	19.1%	17
Clarify answer (optional)		29
	answered question	**89**
	skipped question	**8**

TABLE C.40 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 16 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
inte stött på några än. så oklart.
När det blir analytisk dimensionering så behöver man motivera saker noggrant för att Räddningstjänsten ska acceptera det. I Förenklad dimensionering går inte alltid Räddningstjänsten igenom det lika noggrant och tveksamma lösningar kan smita igenom.
Ingen erfarenhet av BBRAD
Om man gör analysen rätt ska det ju bli en acceptabel nivå.
För lite erfarenhet av BBRAD
Per definition acceptabel säkerhetsnivå. Däremot, hade man gjort scenarianalys av förenklad dimensionering, finns det väldig många fall man ej skulle kunna verifiera med scenarioanalys. Ur den aspekten får man en hög brandskyddsnivå med scenarioanalysen såsom BBAD beskriver den.

Erfordrat scenario 3 (utan sprinkler) blir oftast dimensionerande. Den mindre påfrestningen, 2 MW med fast tillväxt tex, är ganska tuff
Beror på vad som projekterats, men generellt är det en hög säkerhetsnivå
Det finns dock fall där den inte är likvärdig mellan de olika scenarierna.
Mycket högre. Skillnaden mellan kraven i FD och AD är mycket stor.
Brandeffekterna känns inte verklighetsförankrade
Tillräckligt bra som det är
INte tillräcklig erfarenhet av frågan
Om man dimensionerar för en verksamhetstyp med de aktuella scenarior som finns för dem och sedan ändrar verksamhet utan att ta hänsyn till den nya verksamhetens riskbild/worst case/scenarior kan detta bli icke acceptabla lösningar.
Eftersom det är Boverket som gett ut råden måste de per definition MINST uppfylla föreskrifterna och därmed hamnar man högre än acceptabel nivå.
I 'vanliga' rum kan vi aldrig visa att en byggnad är tillräckligt säker med scenarioanalys. Allmänna råd måste användas.
Projektören kan många gånger själv styra den slutgiltiga dimensionering mot högre än acceptabel säkerhetsnivå men lägsta nivå bedöms utgöra acceptabel säkerhetsnivå.
Beror på handläggaren.
Beror på konsulten som utfört analysen..
Så länge rätt scenarion hittas bör säkerhetsnivån bli acceptabel eller högre än acceptabel.
Svår fråga då scenarioanalysen kräver en mycket längre tid och större inblick i projektet samt att man då ser på helheten gällande säkerheten. Och på så vis bör konsulten få bättre koll på säkerheten. Men då den nivån är svår identifierad för sk Br 0 byggnader så förlitar man sig på att den tid som läggs ner av tillräckligt kvalificerade konsulter gör att byggnaden får en acceptabel säkerhetsnivå.
då takhöjd inte regleras inom ramen för förenklad dimensionering kan man komma undan med mycket där som inte skulle godkännas i en scenarioanalys
Om det med acceptabel säkrhetsnivå avses lika FD
Jobbar inte med dessa frågor längre.
Genom att man sätter in andra säkerhetssystem än fd och använder senarioanalys får man ofta högre säkerhet då tex sprinkler ger oftast ett mycket bra brandskydd och då fd inte alltid ger en särskilt hög skyddsnivå.
Kan dock skilja mellan olika verksamheter
Du kan aldrig visa att en normal lokal med normal takhöjd är acceptabel med scenarioanalys. Det krävs speciella lokaler med hög inneboende säkerhet för att klara det.
Dimensionering enligt BBRAD ger i de flesta fall ett brandskydd som är klart högre än om samma byggnad hade dimensionerats enligt förenklad dimensionering, undantaget lokaler med mycket hög takhöjd. Att försöka 'räkna hem' okomplicerade lokaler som t.ex. kontor enligt BBRAD är oftast mycket svårt trots att man utan problem uppfyller förenklad dimensionering.
Men beror helt på konsult! STOR variation
Väldigt tuffa krav normalt sett. Många FD-lokaler har inte en chans att klara det.
Givet rätt kompetens på brandsakkunnig blir säkerhetsnivån acceptabel eller bättre...
Förenklad dimensionering kan av erfarenhet ofta inte räknas hem med analytisk dimensionering. Säkerhetsnivån med analytisk dimensionering blir därmed ibland bättre.
Definitivt högre. Detta har troligtvis också varit boverkets avsikt.
Takhöjden spelar enormt stor roll i AD men inte alls i FD
Beror väldigt mycket på verksamheten och byggnadens förutsättningar.
Visa krav enligt förenklad dimensionering går inte eller är åtminstone mycket svåra att entydigt visa analytiskt att de uppfyller föreskriftstext. Om det brinner i hallen i en lägenhet där alternativ utrymningsväg utgörs av fönster, hur visar man analytiskt att den som ligger och sover i sovrummet kan utrymma innan kritiska förhållanden uppstår?
Mitt svar är lämnat utifrån förutsättningen att de förenklade reglerna utgör acceptabel säkerhetsnivå

Question 17

TABLE C.41 QUESTION 17 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Previous research has shown a wide variation of the fire safety levels for building designed in accordance with BBR 18 or earlier versions. Do you consider that the introduction of BBR 19 has resulted in a more consistent level of fire safety for different buildings with the performance based design method?		
Answer Options	**Response Percent**	**Response Count**
Yes	41.0%	16
No	12.8%	5
Undecided	46.2%	18
Clarify answer (optional)		7
	answered question	**39**
	skipped question	**2**

TABLE C.42 QUESTION 17 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Previous research has shown a wide variation of the fire safety levels for building designed in accordance with BBR 18 or earlier versions. Do you consider that the introduction of BBR 19 has resulted in a more consistent level of fire safety for different buildings with the performance based design method?		
Answer Options	**Response Percent**	**Response Count**
Yes	55.1%	49
No	21.3%	19
Undecided	23.6%	21
Clarify answer (optional)		33
	answered question	**89**
	skipped question	**8**

TABLE C.43 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 17 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Bör göra det men vet ej om det faktiskt är så
Redovisning av brandscenarier mm i BBRAD bör ge en mer likvärdig säkerhetsnivå.
inte stött på några än. så oklart.
Har som sagt inte jobbat så mycket med tidigare versioner.
För tidigt att säga
Därmed inte sagt att man inte skjuter över målet i BBRAD
Alla jobbar mot samma gränsvärden
Jag tror att skillnaderna är ganska lika. Möjligen att vissa riktiga speciallösningar har blivit svårare att få utföra.
Ja, men nivån är fortsatt varierande. Kraven på AD har dock gjort det tydligare vad som förväntas
För tidigt att säga. Porjektering är en bedömningssport och jag tror att det kommer att finnas skillnader även om BBR19 har blivit ett steg i rätt riktning!
Spridningar finns lika tidigare Tag tex tekniska byten vid sprinkler De finns idag ingen övre gräns
Inte generellt, men i vissa typer av byggnader.
Eftersom den ställer tydligare krav på när analytisk dimensionering ska göras och

För lite tid för att kunna göra en bedömning. Framtiden för visa om resultatet har blivit bättre med BBR 19 eller senare versioner.
Ambitionen i alla fall.
Likvärdig Ja, men kanske inte helt rätt för alla olika byggnader.
Undviker säkert de värsta avarterna dock
Finns inga studier gjort på detta än
Mer än tidigare, men inte 100%.
Acceptanskriterier för funktionskrav har inte satt sig ännu. Jämför vi olika företags dimensioneringar och dokumentationer så finns det ganska stora skillnader. 'Gamla sanningar' hänger ofta kvar.
Trots en uppstyrning av analyser mm så varierar det fortfarande en hel del avseende tillämpning och hur omfattande analyser som görs. Har blivit bättre men fortfarande spretar det en hel del. Lite för tidigt för att kunna dra dessa slutsatser
Skillnaden är dock troligen liten. Större kompetens behövs hos granskande instanser för att lösningar ska hålla mer likvärdig nivå
Om dimensionering sker enligt FD spå är svaret ja. Om den sker genom AD (svarta hålet) så kan säkerhetsnivån skifta väsentligt.
För tidigt att svara på.
Likvärdig men betydligt högre. Jag tror att den stora mängden projekt är högre men att det finns fler 'bottennapp' projekterade enligt BBR 20
Mer likvärdig lägstanivå. Utöver det kan nog säkerhetsnivån fortfarande variera mycket
Jag har endast kommit i kontakt med BBR19 och senare versioner.
Fortsatt tror jag att variationen kommer att bli stor det viktiga är att den som är sämst inte är smre än den acceptabla nivån. Många av de anlyserade projketetn får nog en säkerhetsnivå som är mycket över den acceptabla som vi fortsatt inte riktigt vet var den är.
bbr19 är alldeles för färskt för att kunna svara på detta
BR0-begreppet har förtydligat när analytisk dimensionering krävs för vissa byggnader, men säkerhetsnivån har inte förbättrats med BBR 19, snarare med BBRAD i så fall.
En styrning av AD är bra så BBRAD har ett gott syfte.
Jobbar inte med dessa frågor längre.
Det borde ha inneburit en förbättring men jag har ingen kunskap om hur det verkligen har blivit.
Att BBRAD finns är bra. Innehållet är dock inte bra i alla delar.
Fortfarande stor spridning. Resultatet varierar mellan konsulter
Har inte arbetat med tidigre versioner
Ingen uppfattning
Det finns fortfarande oseriösa konsulter som inte följer regelverk och kan komma undan med det.
BBR 19 är mer styrande så så borde vara.
Säkerhetsnivån kan nog fortfarande variera, men en mer likvärdig lägstanivå bör nog finnas nu,
Lite, men inte så mycket som tänkt.
Större variation. Se t.ex diskussionen rörande bärverk i Br2-byggnader eller olika tolkningar av utrymningsplatskraven

Question 18

Table C.44 Question 18 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

The scenario analysis method in BBRAD includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios	5.1%	2
Credible scenarios, but not worst case	41.0%	16
Less severe scenarios	2.6%	1
Do not know	48.7%	19
Other (please specify)	2.6%	1
	answered question	**39**
	skipped question	**2**

Table C.45 Question 18 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

The scenario analysis method in BBRAD includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios	31.5%	28
Credible scenarios, but not worst case	37.1%	33
Less severe scenarios	0.0%	0
Do not know	19.1%	17
Other (please specify)	12.4%	11
	answered question	**89**
	skipped question	**8**

Table C.46 Responses to the category 'Other (please specify)' to question 18 regarding what scenarios the variables in BBRAD describe, from the survey on BBR Chapter 5 Safety in case of fire.

Other (please specify)
Värsta scenarier. Ofta överdrivet konservativa när det gäller sot m.m.
Värsta otroliga scenarier i många fall. Tillväxtkurvorna ger en överskattning av brandförloppen då förbrinntid saknas. Tider för beslut och reaktion mm är i vissa fall orealistiskt långa.
Alla olika parametrar som skall sättas in någon analytisk ekvation kan vara ej till fullo relevanta, Resultatet blir då därefter. Praktiska scenarior med utvärdering av sannolikheten att något skall inträffa kan ge lika bra eller bättre resultat än en teoretisk beräkning av brandskyddet.
Generellt ej kopplade till verkligheten
Värden för bränder är enligt mig inte en represantation av verkligheten utan en beskrivning av en acceptabel nivå på brandskyddet.
God vägledning och representativa scenarier som testar brandskyddet ganska tufft. Bör dock uppmanas till vakenhet från projektören som får studera varje enskilt fall.
I många fall troliga värsta fall men sannolikt finns en betydande variation
Använder BBRAD för sällan eller aldrig
De representerar framförallt kända scenarion, utifrån vad vi vet om brandutveckling idag. De måste fortsätta utvecklas i takt med att kunskapen i området ökar för att inbegripa så många allvarliga situationer som möjligt.
Skiljer sig mellan olika verksamheter men oftast troliga

Oftast konservativa värden som staplat på varandra ger en mycket hög säkerhetsnivå.
Väldigt konservativt om sikt. Värsta troliga. Dock ej för katastrofbrand, maximal global påverkan i stort/högt hus där man befinner sig utanför startbrandcellen. Allt går åt helvete och lokal överändning, kommer alla i en 14 vån kontorsbyggnad ut? Den värsta 'last line of defence'-biten (mest aktuellt i Br0) definieras inte väl.
Troliga scenarier

Question 19

Table C.47 Question 19 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Is the guidance in BBRAD for design of Br0 classified buildings comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	15.4%	6
No	15.4%	6
Undecided	69.2%	27
Clarify answer (optional)		5
	answered question	**39**
	skipped question	**2**

Table C.48 Question 19 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

Is the guidance in BBRAD for design of Br0 classified buildings comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	9.0%	8
No	51.7%	46
Undecided	39.3%	35
Clarify answer (optional)		20
	answered question	**89**
	skipped question	**8**

Table C.49 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 19 from the survey on BBR Chapter 5 Safety in case of fire.

Clarify answer (optional)
inte stött på några än. så oklart.
Beror på kompetensen på den brandkonsult som ska använda dem.
Har inte hunnit med några Br0-byggnader än
Finns dock vägledning i tex BIV:s dokument vilket kan ersätta behovet av ytterligare vägledning
BIV:s stöd för tillämpning kompletterar väl
Har för liten egen erfarenhet av detta för att kunna svara
Inte läst.
Vägledning från Boverket önskas BIVs är inte neutral för höga krav Där hänsyn till kostnad nytta saknas
Ingen erfarenhet
Br0-byggnader kan skilja sig så pass mycket åt att vägledningen blir mera ett hinder
Stor kunskap behövs av den enskilde projektören. Regler kan inte finnas om alla

specialbyggnader.
Behöver kompletteras med vilka delar som fortfarande kan klaras av med FD
Höga byggnader > 16 plan och dylikt saknar helt vägledning.
Klara brister om ambitionsnivå för dessa byggnader. Plus att det är en märklig klassning av vad som bör vara Br0-byggnader.
Ytterligare vägledning nödvändig, dock inte säkert att det är Boverkets uppgift att ta fram,
Nästan. Den kan bli tydligare.
Jag har hittills inte dimensionerat en Br0 byggnad.
Men vad akn vi göra åt det just nu? Kunskapen saknas om vi inte går tillbaka till att ge detaljerade föreskrifter föra alal typer av byggander vilket torde hämma utvecklingen och bli allt för oflexibelt. Arbete pågår inom olika grupper så med stor sannolikhet kommer det att komma inom några år.
ingen erfarenhet av br0
Jobbar inte med dessa frågor längre.
Ger ingen som helst praktiskt vägledning.
Har inte dimensionerat en Br0 byggnad
Inte så väl uppstyrt. Se förra frågan.
Vägledningen är i stort sett obefintlig.
Möjligheten till tolkning kommer leda till variation i angreppssätt.
Ingen uppfattning
Jmf BIVs vägledning som är mer utförlig.
Ytterligare vägledning behövs

Question 20

TABLE C.50 QUESTION 20 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you believe that an alternative fire safety design outside the scope of the general recommendations of BBRAD is possible to get through the review process?		
Answer Options	**Response Percent**	**Response Count**
Yes	53.8%	21
No	2.6%	1
Undecided	43.6%	17
Clarify answer (optional)		12
	answered question	**39**
	skipped question	**2**

TABLE C.51 QUESTION 20 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Do you believe that an alternative fire safety design outside the scope of the general recommendations of BBRAD is possible to get through the review process?		
Answer Options	**Response Percent**	**Response Count**
Yes	57.3%	51
No	10.1%	9
Undecided	32.6%	29
Clarify answer (optional)		31
	answered question	**89**
	skipped question	**8**

TABLE C.52 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 20 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
ingen erfarenhet av detta.
...att få genom i granskningsprocessen??
Det vet vi eftersom det hänt.
inte stött på några än. så oklart.
Alla mojliga losningar kan inte beskrivas generellt i dokument. Det ar dar brandingenjorens specifica kunskap och inte minst erfarenhet spelar en stor roll.
Möjligt men det kan vara svårt att verifiera lösningarna på ett bra sätt.
Inte provat, men det borde ju vara det eftersom de är allmänna råd.
Helt beroende av inom vilken kommun det utförs.
De flesta verifieringar jag genomfört har varit av kvalitativ karaktär utan direkt koppling till BBRAD.
Det är ju bara råd. Kan man påvisa annat borde det vara öppet för diskussion
KOntrollen har skärpts i nya PBL men vi ser ändå att frågor faller mellan stolarna och missas.
Ej haft.
Vet inte, har inte provat.
Tolkningsutrymmet blir för stort och många granskare inom byggnadsnämnd och räddningstjänst vågar inte acceptera sådant som inte klart står i BBRAD
pga extern kunskap låg generellt, dessutom svårt att läsa en rapport och faktiskt förstå.
Ja om resultatet är lika bra eller bättre än de allmänna råden.
Beror helt på kompetensen hos sakkunnig brand och myndigheten som granskar underlaget. Där finns byggnader som ej går att göra några standardlösningar på. Men i huvudsak måste BBRAD följas.
Att man gör analytisk dimensionering handlar främst om att välja annat sätt än de allmänna råden men fortsatt uppfylla föreskriften
Tredjepartsgranskare är ibland ett krav vid dessa tillfällen.
Detta skulle mycket väl vara möjligt då det i flera fall finns personer som ska bedöma detta i granskningsprocessen som inte har tillräcklig kunskap
Detta beror dock troligen i sådana fall på kompetensbrist hos granskningsinstansen
Det är ju trots allt råd och möjlighet finns till andra värden som är aktuella för det specifika fallet. Exempelvis kan ju ombyggnationer behöva förhålla sig till befintliga förutsättningar.
Men det är stor sannolikhet att byggnadsnämnd har synpunkter/frågor
Absolut. Det handlar ju om att visa att får ett minst lika bra brandskydd som via BBRAD. BBRAD kan ju ses som en förenklad analytiskt dimensionering i vissa aspekter.
Jag har ej suttit i den situationen ännu.
Det saknas exempelvis råd gällande bttradngasvent.
bbrad utgör miniminivå
Har inte testat detta, men med väl underbyggda argument ser ag inget problem med det.
Kompetensen hos granskarna är ibland för låg.
Byggnadsnämnder har inget att sätta emot då de är dåligt pålästa eller vågar ställa krav speciellt i mindre kommuner
Beror på kompetens hos granskare
Vi på rtj sätter stopp, men utan granskning så är risken stor att saker glider igenom då BN har för dålig koll...
Har ej varit aktuellt ännu.
Kanske i vissa enstaka fall.
Beror av kompetensen på aktörerna i själva processen
Ofta uppstår frågor pga avsaknad av erfarenhet och kompetens hos granskare. Detta brukar dock lösa sig men medför ofta merarbete och kostnader som drabbar byggherren.
BBRAD är ett allmänt råd likt övriga. Finns anledning att frångå rådet är detta givetvis möjligt.
Däremot fäljer den kanske inte lagen.
För lite erfarenhet.
Ja dessvärre. Byggnadsnämnd har inte alltid rätt kompetens för detta.

Det beror på vad som menas med 'granskningsprocessen'.
Men kvalitetsnivån i struktur, tydlighet och utformning ska vara motsvarande BBRAD
Om det är en AD som inte beskrivs i BBRAD
Varier stort beroende på kompetensen inom varje kommun.

Question 21

Table C.53 Question 21 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Can persons involved in the building process, who should be able to review a sensitivity analysis, generally assess its adequacy?		
Answer Options	**Response Percent**	**Response Count**
Yes	28.2%	11
No	41.0%	16
Undecided	30.8%	12
Clarify answer (optional)		6
	answered question	**39**
	skipped question	**2**

Table C.54 Question 21 with results from fire safety consultants from the survey on BBR Chapter 5 Safety in case of fire.

Can persons involved in the building process, who should be able to review a sensitivity analysis, generally assess its adequacy?		
Answer Options	**Response Percent**	**Response Count**
Yes	13.5%	12
No	49.4%	44
Undecided	37.1%	33
Clarify answer (optional)		24
	answered question	**89**
	skipped question	**8**

Table C.55 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 21 from the survey on BBR Chapter 5 Safety in case of fire.

Clarify answer (optional)
Definitivt inte - baseras i mångt och mycket på tyckande och subjektivitet....
Beror på region
Avsaknaden av känslighetsanalys är bland det vanligaste vi påpekar i granskningsförfarandet.
inte stött på några än. så oklart.
Krävs en hög kompetens.
Förstår inte frågan.
Varierar mycket mellan kommuner
Troligen inte, men det beror på vem som granskar. SBN har knappast den kompetensen om de inte har en brandingenjör. RTJ kan vara hyfsade på det men den som bäst förstår en verifiering är den som arbetar med det regelbundet. Typ SAK 3.
Min uppfattning är att kunskapen om analytisk dimensionering (val av verifieringsmetod, kravnivåer etc.) med vissa undantag är mycket bristfällig hos byggnadsnämnder och räddningstjänster
Denna kompetens finns normalt inte på kommunens bygglovavdelning eller motsvarande. Det är även tveksamt om räddningtsjänsterna har denna kompetensen om det inte finns anställda inom organisationen som arbetat som projekterande brandkonsult.

konstig fråga. Generellt kan endast brandingenjörer granska känslighetsanalyserna, och oftast endast vissa väl drillade personer.
Jag tror kunskaperna är alldeles för låg för det
Kan inte bedöma det
Förstår inte frågan. Vilka är 'personerna'?
Transperansen i utförda beräkningar är ofta liten vilket medför svårigheter i granskningen.
Även detta varierar otroligt mycket i olika regioner. I de flesta fall skulle svaret vara Ja, men jag tror även att kunskapsnivån fortfarande behöver höjas
Kunskaper hos byggnadsnämnd och räddningstjänst är låga.
Anlita en SAK3 i sällsynta fall.
Det finns undantag. Men generellt är den kunskapen mycket större i konsultbranschen än inom myndigheter.
Jag har ej suttit i den situationen ännu.
'personer invloverade i byggprocessen' täcker in en oerhört bred grupp, kan därför inte svara på detta. vissa kanske kan, men majoriteten kan nog inte
Vissa kan men långt från alla
Personer inom byggprocessen, förutom brandskyddsprojektören, granskar aldrig projektörens beräkningar. De vill bara ha ett resultat.
Troligtvis inte, om det inte skett rejäla kompetenslyft de senaste åren.
Räddningstjänsten kan detta generellt sämre än konsulten som utfört analysen.
Väldigt lite granskas på djupet utanför respektive konsults egna initiativ.
Möjligen i de större städerna
förstår inte riktigt frågan
Förstår inte frågan.
Det beror på vad som menas med 'personer inblandade i byggprocessen'. Det är ju väldigt många...
Inte alle kann göra den bedöningen
Granskning sker internt på konsultfirma. Byggnadsnämnd med rtj ska enbart granska om rätt kompetens finns.

Question 22

Table C.56 Question 22 with results from persons within the Fire Service from the survey on BBR Chapter 5 Safety in case of fire.

Is the guidance for quantitative risk analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	23.1%	9
No	15.4%	6
Undecided	61.5%	24
Clarify answer (optional)		3
	answered question	**39**
	skipped question	**2**

TABLE C.57 QUESTION 22 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for quantitative risk analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	21.3%	19
No	30.3%	27
Undecided	48.3%	43
Clarify answer (optional)		11
	answered question	**89**
	skipped question	**8**

TABLE C.58 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 22 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
Saknar acceptanskriterier för kvantitativ riskanalys för Br0-byggnad som saknar tillämpbara referensobjekt (t.ex. >16 våningar).
inte stött på några än. så oklart.
Inte tillämpat ännu.
Har inte jobbat tillräckligt med denna fråga heller.
Anvisningar för bärverk saknas Map dim brand samt överteändningskontroll
Inget är så bra att det inte kan bli bättre. Grunden i all kvalietssäkring.
Acceptanskriterier måste utvecklas! Hur ska en byggnad kunna dimensioneras med kvantitativ riskanalys om inget riktvärde för acceptabel risk finns! Kvantitativ riskanalys bör tas bort som verifieringsmetod och istället ansättas som beräkningsmetod för indata till scenarioanalyser.
Gyllene avvägning av hur mycket styrning som ska finnas för att inte påverka friheten i utformning. Tror dock att det finns potential för att utveckal riktlinjerna en del.
Saknas ju i praktiken så den kan ju inte vara tillräcklig
Jobbar för lite med AD.
Den kan dock alltid bli bättre.
ingen erfarenhet av denna
Har inte tillämpat kvantitativ riskanalys så mycket att jag kan göra den bedömningen.
Jobbar inte med dessa frågor längre.
Det behövs acceptanskriterier för att riskanalysen ska bli ett vettigt och likriktat verktyg.
Ingen uppfattning

Question 23

TABLE C.59 QUESTION 23 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for scenario analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	30.8%	12
No	15.4%	6
Undecided	53.8%	21
Clarify answer (optional)		3
	answered question	**39**
	skipped question	**2**

TABLE C.60 QUESTION 23 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for scenario analysis in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	50.6%	45
No	15.7%	14
Undecided	33.7%	30
Clarify answer (optional)		6
	answered question	**89**
	skipped question	**8**

TABLE C.61 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 23 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
inte stött på några än. så oklart.
Saknas en del information om bla sotmängder. När sådant specificeras så känns det som att man styr in användaren mot en särskild typ av modell (datormodell).
Den är FÖR utförlig.
Har inte jobbat tillräckligt med denna fråga heller.
Anv för bärverk saknas såsom Dim brand o övertndningskontroll
Se pkt 22.
Gyllene avvägning av hur mycket styrning som ska finnas för att inte påverka friheten i utformning. Tror dock att det finns potential för att utveckal riktlinjerna en del.
I ett första skede ja, men det behövs säkert en utveckling även här.
Jobbar för lite med AD.
Hä rär det nog diskussionen om man kan använda något som är mer anpassat till den byggnad man sak verifiera som är lite oklar. Den dimensionerande bäränder och scenarier som föreslås är miniminivån men det borde vara möjligt att dimensionera utifårn brandbelastning. Tyvärr är det nog så att om alla har samma last (dimensinerande brand) så gör alla lika rätt eller fel vilket varit ett mål med de ny rådet.
Jobbar inte med dessa frågor längre.

Question 24

TABLE C.62 QUESTION 24 WITH RESULTS FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for qualitative assessment in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	25.6%	10
No	20.5%	8
Undecided	53.8%	21
Clarify answer (optional)		3
	answered question	**39**
	skipped question	**2**

TABLE C.63 QUESTION 24 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Is the guidance for qualitative assessment in BBRAD comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	41.6%	37
No	25.8%	23
Undecided	32.6%	29
Clarify answer (optional)		7
	answered question	**89**
	skipped question	**8**

TABLE C.64 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 24 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Clarify answer (optional)
inte stött på några än. så oklart.
Inte tillämpat ännu.
Har inte jobbat tillräckligt med denna fråga heller.
Se pkt 22.
Jobbar för lite med AD.
Den kan dock alltid bli bättre.
tror att detta missbrukas rätt rejält på många håll. borde anges fler tydliga exempel på när detta är ok som verifieringsmetod
Jobbar inte med dessa frågor längre.
Den passar verkligen inte för alla objekt, och är i praktiken omöjlig att tolka på ett enhetligt sätt.
Stort spann av möjliga scenarion...

Question 25

TABLE C.65 QUESTION 25 WITH RESPONSE PERCENTAGE RESULTS OF EACH STATEMENT FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S1. The mandatory requirements of BBR Chapter 5 Safety in case of fire are clear.	18.4%	56.0%	10.6%	10.6%	0.7%	3.5%	141
S2. The general recommendations for the prescriptive design method of BBR Chapter 5 Safety in case of fire are clear.	17.0%	55.3%	12.8%	9.9%	0.7%	4.3%	141
S3. The general recommendations for the performance based design method in BBRAD are clear.	4.3%	50.4%	17.7%	9.9%	0.0%	17.7%	141

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S4. The mandatory requirements of BBR Chapter 5 Safety in case of fire allow for creative building designs.	14.9%	32.6%	20.6%	16.3%	3.5%	12.1%	141
S5. The general recommendations in BBRAD allow for creative building designs.	18.4%	38.3%	15.6%	6.4%	2.1%	19.1%	141
S6. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification that the functional requirements are complied with during the building process.	13.5%	34.8%	29.8%	5.0%	2.8%	14.2%	141
S7. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has generally resulted in an increased level of fire safety for buildings.	14.9%	43.3%	19.9%	5.0%	5.7%	11.3%	141
S8. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in more consistent interpretations of the mandatory requirements.	14.2%	44.7%	19.1%	5.7%	5.0%	11.3%	141
S9. The specific performance criteria, such as visibility, that are included in BBRAD has resulted in a better indication if the building is safe or not in the event of a fire.	12.1%	25.5%	22.7%	10.6%	2.8%	26.2%	141

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S10. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification process for a buildings safety in the event of a fire.	17.0%	44.0%	17.7%	3.5%	2.1%	15.6%	141
S11. The prescriptive design method according to the general recommendations in BBR Chapter 5 Safety in case of fire is uncomplicated to apply for non-complex buildings.	22.0%	40.4%	11.3%	10.6%	7.8%	7.8%	141
						answered question	**141**
						skipped question	**14**

TABLE C.66 QUESTION 25 WITH RESULTS OF EACH STATEMENT FROM PERSONS WITHIN THE FIRE SERVICE FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S1. The mandatory requirements of BBR Chapter 5 Safety in case of fire are clear.	28.2%	66.7%	2.6%	0.0%	0.0%	2.6%	1.74	39
S2. The general recommendations for the prescriptive design method of BBR Chapter 5 Safety in case of fire are clear.	30.8%	64.1%	0.0%	0.0%	0.0%	5.1%	1.68	39

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S3. The general recommendations for the performance based design method in BBRAD are clear.	5.1%	43.6%	15.4%	7.7%	0.0%	28.2%	2.36	39
S4. The mandatory requirements of BBR Chapter 5 Safety in case of fire allow for creative building designs.	20.5%	20.5%	20.5%	15.4%	0.0%	23.1%	2.40	39
S5. The general recommendations in BBRAD allow for creative building designs.	25.6%	28.2%	2.6%	7.7%	0.0%	35.9%	1.88	39
S6. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification that the functional requirements are complied with during the building process.	17.9%	33.3%	33.3%	2.6%	2.6%	10.3%	2.31	39
S7. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has generally resulted in an increased level of fire safety for buildings.	23.1%	38.5%	20.5%	5.1%	2.6%	10.3%	2.17	39

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S8. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in more consistent interpretations of the mandatory requirements.	25.6%	35.9 %	17.9%	7.7%	2.6%	10.3 %	2.17	39
S9. The specific performance criteria, such as visibility, that are included in BBRAD has resulted in a better indication if the building is safe or not in the event of a fire.	12.8%	25.6 %	15.4%	2.6%	5.1%	38.5 %	2.38	39
S10. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification process for a buildings safety in the event of a fire.	25.6%	41.0 %	15.4%	2.6%	0.0%	15.4 %	1.94	39
S11. The prescriptive design method according to the general recommendations in BBR Chapter 5 Safety in case of fire is uncomplicated to apply for non-complex buildings.	28.2%	43.6 %	2.6%	5.1%	5.1%	15.4 %	2.00	39

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No opinion	Rating Average	Response Count
							answered question	39
							skipped question	2

TABLE C.67 QUESTION 25 WITH RESULTS OF EACH STATEMENT FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE.

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No opinion	Rating Average	Response Count
S1. The mandatory requirements of BBR Chapter 5 Safety in case of fire are clear.	14.0%	51.2%	14.0%	17.4%	1.2%	2.3%	2.39	86
S2. The general recommendations for the prescriptive design method of BBR Chapter 5 Safety in case of fire are clear.	12.8%	50.0%	18.6%	15.1%	1.2%	2.3%	2.40	86
S3. The general recommendations for the performance based design method in BBRAD are clear.	4.7%	52.3%	18.6%	11.6%	0.0%	12.8%	2.43	86
S4. The mandatory requirements of BBR Chapter 5 Safety in case of fire allow for creative building designs.	12.8%	37.2%	19.8%	18.6%	5.8%	5.8%	2.65	86

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S5. The general recommendations in BBRAD allow for creative building designs.	14.0%	44.2%	20.9%	5.8%	3.5%	11.6%	2.33	86
S6. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification that the functional requirements are complied with during the building process.	11.6%	39.5%	26.7%	5.8%	3.5%	12.8%	2.43	86
S7. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has generally resulted in an increased level of fire safety for buildings.	12.8%	50.0%	17.4%	4.7%	5.8%	9.3%	2.35	86
S8. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in more consistent interpretations of the mandatory requirements.	10.5%	53.5%	19.8%	2.3%	4.7%	9.3%	2.31	86

Please indicate your opinion for the following statements related BBR 19 Chapter 5 Safety in case of fire, and later versions.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S9. The specific performance criteria, such as visibility, that are included in BBRAD has resulted in a better indication if the building is safe or not in the event of a fire.	11.6%	26.7 %	26.7%	11.6%	2.3%	20.9 %	2.57	86
S10. Compared to previous versions, BBR 19 Chapter 5 Safety in case of fire has resulted in a better verification process for a buildings safety in the event of a fire.	12.8%	48.8 %	18.6%	2.3%	3.5%	14.0 %	2.24	86
S11. The prescriptive design method according to the general recommendations in BBR Chapter 5 Safety in case of fire is uncomplicated to apply for non-complex buildings.	18.6%	38.4 %	15.1%	15.1%	9.3%	3.5%	2.57	86
							answered question	**86**
							skipped question	**11**

Question 26

TABLE C.68 OPEN-ENDED ANSWERS TO THE OPTIONAL QUESTION 26 FROM THE SURVEY ON BBR CHAPTER 5 SAFETY IN CASE OF FIRE WHERE RESPONDENTS WERE ASKED TO DESCRIBE PROBLEMS AND RESPECTIVE SOLUTIONS TO BBR CHAPTER 5 AND OTHER FIRE SAFETY DESIGN DOCUMENTS ISSUED BY BOVERKET IN SWEDEN.

Response Text
Kompetens hos projektörerna varierar kraftigt. Många är kvar i tidigare versioner av BBR, speciellt när det gäller analytisk dimensionering.
Högre kompetens hos byggnadsnämnden så de kan ifrågasätta rätt saker.

Response Text
Problemen är egentligen inte i kap 5 utan i kontrollsystemet som helhet. Byggherrarna och dess projektörer tar inte det ansvar som det är tänkt att de ska göra. Avsaknaden och bristen av egenkontroller i kontrollplanen är påtaglig samt görs slentrianmässigt. Kontrollsystemet är satt ur funktion.
Jag anser att tredjeparts granskning borde vara obligatoriskt, samt att for vissa projekt (objekt med hogt antal personer, hog hojd, stor yta, dvs valdigt speciella projekt) en granskningsgrupp borde tillsattas. Med dagens system kan en hel byggnad goras fel utan att det marks, alldeles for stor tillit laggs pa konsult firman som utfor jobbet. Se pa hur detta gors utanfor sverige, man kan dra mycket lardomar fran andra lander.
Det har kommit in för mycket teoretiska lösningar som inte är genomtänkta. Ett exempel är att om brandceller är större än 1250 m2 så krävs brandsektioner, brandlarm eller sprinkler. Detta ställer till jätteproblem till ingen nytta i parkeringsgarage. En annan är kravet på täta takfötter och synen på kallvindar (som boverket i efterhand fått gå ut och förtydliga). Nu finns krav på EI 60 gräns var 1200 m2, EI 30 var 400 m2 och tät takfot, det är högre krav än vilken annan brandcell som helst i byggnaden som ju får vara 1250 m2. Är verkligen bränder på kallvindar ett sådant stort problem att det måste vara så här, allt som finns där är ju lite virke och en halvmeter lösull. Det behövs mer praktisk erfarenhet från verkligheten i BBR och mindre nyexade brandingenjörer från Lund.
1. För mycket detaljkrav i föreskriftstext (d.v.s. ej funktionskrav). 2. Borde finnas fler möjligheter till avsteg med hänsyn till sprinkler. 3. Införande av utrymningsplatser medför stora kostnader och liten eller ingen nyttoeffekt. 4. Införande av räddningshissar medför stora kostnader och liten eller ingen nyttoeffekt (utom i mycket höga byggnader > 16 våningar).
Ett primärt problem är att det i föreskrifterna förekommer detaljkrav. Dessa ska vara funktionskrav så att man kan välja lösning med analytisk dimesnioering. EX, 5:734 Räddningshiss ska finnas i byggnader med fler än 10 våningar. Superdumt skrivet, eftersom förutsättningarna kan vara sådana att räddningshiss inte alls behövs. Det finns många sådana exempel. Ett sekundärt problem är att förenklad dimensionering inte innehåller alla krav. Man kan exempelvis inte dimensionera brandgasventilation i trapphus med fläkt utifrån allmänt råd (5:732) då det inte framgår vilka flöden etc som ska uppfyllas med en sådan fläkt. Eller så finns det inga krav om man ska tolka allmänna rådet rätt. Betyder det att jag med förenklad dimensionering kan ha en lite paxfläkt på 20 l/s? Nej för i det allmänna rådet finns också helt plötsligt ett funktionskrav '...ska utformas så att ansamlingar av brandgaser begränsas...' Principen är god med förenklad/analytisk dim men det behöver göras renare. Tydligare detaljkrav i allmänna råd och bort med desamma från funktionskraven.
Krav på tredjepartsgranskning skulle sannolikt innebära en stor förbättring
antalet revideringar av BBR, marknaden, projektörer, beställare mm orkar inte längre att varje år leta efter förändringar och förstå vad som gäller. Nu behöver marknaden arbetsro.
I EKS är det otydligt hur man ska påvisa att övertändning inte inträffar (alt inträffar med viss sannolikhet) Likaså vilken storlek man ska använda på ev lokal brand. Råd kring effektutveckling (alt effektutveckling per ytenhet) för både övertädningstest och lokal brand vare bra.
Ett omårdet som känns ofärdigt är krav på trycksatta stigarledningar. Det saknas bra standarder och en hel del frågor om exermpelvis reservkraft är inte klargjorda. Motsvarande problematik finns till viss del för räddningshiss.
Alla föreskrifter måste vara formulerade som funktionskrav. Alla allmänna råd ska innehålla krav som är verifierbara. AD måste även kunna tillämpas på Föreskrift. Kraven på gångavstånden måste valideras. Bättre harmoni mellan säkerhetsnivåerna mellan FD och AD behövs. Flexibilitet vid mindre avvikelser från FD måste göras möjlig. Tex vid 0,5 meter för långa gångavstån, 100 m2 för stor brandcell. Nu finns ingen flexibilitet. Byggheren måste få ta sitt ansvar för brandskyddet. Räddningstjänsternas attitid som godkännande instans måste nyanseras. BBR 19 är en tillbakagång till detaljstyrning istället för funktionsbaserat tillvägagångssätt. Allt för ofta handlar det nu mera om bokstavstolkning istället för om bra brandskydd.
Det saknas Verksamhetsklasser och det finns några punkter som saknar fullständig bearbetning. Man skulle ha jobbat med BBR 19 djupare innan den släpptes.
EKS är väldigt svår att tolka och det är svårt att se om kraven uppfylls eller ej vid byggnation.

Response Text
Exempel bilagor saknas Lika tex brandskyddshandboken Vägledningar saknas i Eks för Paragraf 2 Överändning Kollaps vad avses Dim brand för bärverk
Om det är ett krav för att få bygglov att brandlarm och/eller sprinkler installeras enl. gällande standarder skall det vara ett fullskydd. Dessutom skall leveransbesiktning utföras före i drifttagande, samt årliga revisionsbesiktningar, då anläggningarna uppvisar stora brister. Anmärkningar och rekommendationer i besiktningsintyget åtgärdas inte alltid. Anläggningarna uppfyller då inte kraven, vilket grunden för att få bygglov. Här behövs en tydlig skärpning i BBR.
Boverket borde vara de som mer tydligt går ut och deklarerar att kraven i byggreglerna (inte bara brand) är samhällets minimikrav för att man ska få bygga. De borde förtydliga att om man följer kraven innebär inte att man får en bra eller säker byggnad, det innebär bara att den uppfyller samhällets minimikrav. Att sedan vissa krav i hela BBR är på tok för hårda Tex. tillgänglighet är något som myndigheten borde se över generellt. Regeringen har aldrig sagt att byggnaderna är för osäkra och velat skärpa kraven men däremot sagt att man ska minska byggkostnaderna. Att minska på kostnaderna borde innebära att minska på kraven men det vågar ingen chef eller tjänsteman på Boverket föreslå. När det blir byggfel handlar det väldigt sällan om att kraven är för låga, det är istället dimensionering eller utförande som är boven i dramat.
Exempelvis avsnitt om maximal storlek på brandcell och krav på brandsektionering ger ökade kostnader för brandskyddet vilket inte alls identifierats i konsekvensutredningen. BBRBE ger konsekvenser där man nu ställer högre krav exempelvis avseende brandbelastning för köpcentra etc och detta får stora konsekvenser om man ska börja bygga brandväggar istället för brandcellsgränser. Finns fortfarande många skrivningar som kan misstolkas, tyvärr är inte allt lika tydligt som man hade önskat.
För branschens utveckling borde Boverket få bättre resurser samt uttala sig tydligare i sina skrivelser och inte bara hänvisa till vad som står i BBR
Avsnittet känns generellt inte tillräckligt genomarbetat. Processen att ta fram avsnittet gick alldeles för snabbt.
Fokusera mer på kostnad/nytta och rensa bort en massa krav som inte påverkar personsäkerhet. Om personsäkerheten är och en brand inte sprider sig till grannbyggnad/annan verksamhetinom samma byggnad är samhällets kravnivå uppnådd.
19 är mer inkonsekvent och stelbent. Det verkar inte som om man tänkt färdigt och att man inte har tillräcklig erfarenhet från hur det ser ut i samhället.
I många fall har vi nu hamnat i att glöma att tänka på andra egenskaper då vi bokstavtroget tolkar föreskrift och råd. Exempel är takfot, gångavstånd och hur man tolkar kravet på lägre beläget tak. Det har blivit tydligare men i vissa enskilda fall också lite svårt att motivera varför man måste ha exakt så långt och trots en bedömning från konsult så kommer man inte fram. Kompromiss för att få en bättre kvalitet av andra skäl i byggnaden. jag vet att man inte kan ha bättre elsäkerhet för att kompenser sämre brandskydd och det är inte den kompromissen jag söker.
Otydlighet kring hur loftgångar, takfötter och brandcellsindelning på vindar ska utformas och när kraven träder i kraft. Skydd mot omfattande brandspridning är mycket svårt att tolka, särskilt då befintliga byggnader byggs till. Tydligare vägledning från Boverket hade varit önskvärt.
Möjlighet för certifierade tredjepartsgranskare dit byggnadsnämnder kan vända sig. Exempel finns där tex **** har lösningar som knappast andra seriösa konsulter skulle godta!!! För dålig kunskap eller möjlighet finns att ifrågasätta dåligt undergrävda avsteg och analytiska dimensioneringar

Response Text
Typen av lösningar skiljt sig allt mer vilket gör de svårt att värdera resultatet. Det märks ofta att man använder metod efter önskat resultat dvs där inte utrymningsprogrammen klarar komma fram till acceptabelt resultat används flödesberäkningar istället osv. En mer filosofisk fråga är väl om det är uppbyggligt att dimensionera byggnader så att sista simulerade utrymmare kommer ut 1 sekund innan ett godtyckligt värde på tex siktsträcka. Att applicera någon slags rimlighetsbedömning på en rökfyllnadsberäkning ses som bakåtsträvande och ej relevant. Motsvarande problem finns bland annat i konstruktörvärlden där simuleringsprogrammen ersatt sunt förnuft och ingenjörsmässiga bedömningar vilket får till följd att misstag i konstruktioner inte upptäcks. Som mindre räddningstjänst är det dessutom svårt att få hjälp i svårare ärenden då den typen av kompetens inte är möjlig att hålla 'in house' och fristående sakkunnig är svår att få fatt i.
Största problemet är att en hel del av föreskrifterna men framförallt de allmänna råden inte är genomtänkta och förankrade i verkligheten i kombination med rena skrivfel gör att det är svårt att tolka och följa föreskrifterna och de allmänna råden. Tankarna bakom med utökade krav på sprinkler, verksamhetsklasser och vissa lättnader på brandskydd som inte medför så stort skydd (bgv av stora byggnader) är bra men tappar sin funktion när föreskrifterna och allmänna råden är så luddigt och felaktigt skrivna. Svårt att veta om saker är felaktigt skrivna eller bara dumt skrivna
Man bör lära av NZ escape height istället för antal våningar för att bestämma byggnadsklass
Eftersom analytisk dimensionering endast är tillåtet för allmänt råd, ej föreskriftstext, bör en genomsyn göras av vilken text som står på vilken nivå. Det upplevs inte alltid som helt logiskt. BBRADs koppling till EKS (som det står om i inledningen på BBRAD) bör tydliggöras. BBRAD är väldigt omfattande avseende utrymning vid brand. Övriga delar bör arbetas igenom på samma nivå. Det finns ologiskheter i BBRAD. kontor får dimensioneras för medium brandtillväxt för utrymningsförlopp men det krävs dimensionering enligt snabbt förlopp för ventbrandskydd.
BBR 19 innehåller en rad otydligheter och direkta motsägelser som ger upphov till långa diskussioner inom vårt konsultföretag. Detta ger inte ett mer likvärdigt brandskydd i olika byggnader utan tvärtom olika nivåer beroende på hur man tolkar föreskrifterna och de allmänna råden. Antalet frågor till Boverket och de ibland luddiga svaren vittnar om att osäkerheter kring hur reglerna ska tillämpas är stor. Detta är den största bristen idag vid tillämpning av BBR.
Väldig spridning av tolkning. Skillnad på kunskap inom branschen gör att nivån på brandskyddet skiljer sig markant. Även kunskapen och kraven från olika stadsbyggnadskontor skiljer sig samt i vissa kommuner får räddningstjänsten 'tycka' i allt för stor utsträckning, utan att de har krav på sig att härleda sina resonemang.
Jag tycker att Boverket ska anställa personer med lång erfarenhet från byggprocessen. Det är orimligt att människor utan egen erfarenhet av byggprocessen ska ha ett så stort genomslag på regelverket.
Vissa saker på föreskriftsnivå känns som att de hör bättre hemma i allmänna råd. Konstiga låsningar i vissa fall.
Framtagandet av reglerna har gått alldeles för snabbt. Det är ett hastverk. De nya reglerna är ett steg i rätt riktning men känna inte tillräckligt genomarbetat.
Detta regelverk är klart bättre men tillsynen över hur kommunerna hanterar byggprocessen måste också bli bättre. Tyvärr är det där problemet ligger i dag.
Största problemet handlar om tolkningsfrågor gällande kravnivå. Olika bynnadsnämnder, räddningstjänster och delvis brandkonsulter tolkar regler på lite olika sätt. Boverket svarar, om man överhuvudtaget får svar, inte på specifika frågor utan hänvisar till byggnadsnämnder. Detta kan medföra olika tolkningar beroende på vem man frågar. En generell kompetenshöjning inom branschen hade varit bra. Bygglovshandläggare har sällan kompetens inom brandområdet och förlitar sig på räddningstjänsten. Dessa i sin tur arbetar inte alltid huvudsakligen med byggnadstekniskt brandskydd och/eller har för kort erfarenhet. Certifiering av projektörer är möjlig och det bör strävas efter att fler skaffar sig den kvalitetsstämpel. Samtidigt är det dock minst lika viktigt att en kvalitetshöjning sker på myndighetssidan.
Problem med BBR och EKS med att de inte är applicerbara på stora industribyggnader, dvs antal våningsplan kan inte styra brandskydd av bärverk i en stor byggnad. Jag tycker att det ska fram en certifiering av brandprojektör för att ensa branschen och rensa upp bland oseriösa i branschen.

Response Text
Fler ‘godtagbara’ lösningar/beräkningsprocesser’ måste tas fram för att brandskyddsprojekteringen skall kunna bli mer kostnadseffektiv.
Största principiella problemet är att inte all föreskriftstext är funktionskrav. Exempel 5:546 ..8 lghtr... Exmepel 5:734 ...10 våningsplan.... Vissa krav har förts in utan att möjliga lösningar är genomtänkta. Exemeplvis tvåvägskommunikation i utrymningsplats.
De allmänna råden beskriver inte alla projekteringsfall. Upplägget i BBRAD är omständigt och kan vara tidsödande. Ändringarna har hittills lett till ökade projekteringskostnader. Boverket måste komma med tydligare direktiv om hur olika allmänna råd ska tolkas. EKS skulle behöva skrivas om (idagsläget är det ett glapp mellan brandkonsulter och konstruktörer där ingen vet hur man ska hantera tolkningar)
Kompetens- och kvalitetskrav måste ställas på brandskyddsprojektörer, brandskyddsprojekterande företag och granskande myndigheter.
Funktionskraven måste ändras så att cellplast inte kan användas som isoleringsmaterial på samma vis som idag. Sannolikeheten för att små initialbränder orsakar totalskador är idag oacceptabelt hög.
Kort: Brandsektionskraven i Br3:or <-- ämnade att hantera miljö- och egendomskrav som jag knappast tror existerar. Utrymningsplats bärverk br2
Mina svar grundar sig i det arbete jag utför, analytisk dimensionering av ventilationsbrandskydd och det största frågetecknet är vilken nivå man ska lägga sig på vad gäller brandflöde. Där saknas det helt klara direktiv att gå på. Tror att branschen i sin helhet är oense och uppfattar detta som ett problem om man skulle fråga olika aktörer.

New Zealand – Survey on NZBC Clause C Protection from fire

Question 1

TABLE C.69 TYPES OF EMPLOYMENT DESCRIBED FOR THE CATEGORY 'OTHER (PLEASE SPECIFY)' OF QUESTION 1 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Other (please specify)
manufacturer
Supplier / manufacture

Question 2

The open-ended answers to the optional category 'Clarify answer (optional)' to question 2 from the survey on NZBC Clause C Protection from fire have not been included in this report in order to protect the confidentiality of the respondents.

Question 3

TABLE C.70 ANONYMIZED RESULTS TO QUESTION 3 REGARDING YEARS OF EXPERIENCE IN THE FIRE SAFETY INDUSTRY FOR EACH RESPONDENT FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Number	Years	Number	Years	Number	Years	Number	Years
1	0	25	7	49	12	73	20
2	0	26	7	50	12	74	20
3	1	27	7	51	12	75	21
4	1	28	7	52	12	76	25
5	1	29	7	53	13	77	25
6	1	30	7	54	13	78	25
7	2	31	8	55	13	79	28
8	2	32	8	56	14	80	30
9	3	33	8	57	14	81	30
10	3	34	8	58	14	82	30
11	4	35	8	59	15	83	30
12	5	36	8	60	15	84	30
13	5	37	9	61	15	85	34
14	5	38	10	62	15	86	35
15	5	39	10	63	15	87	37
16	5	40	10	64	15	88	40
17	6	41	10	65	16	89	40
18	6	42	10	66	16		
19	6	43	10	67	17		
20	6	44	10	68	17		
21	6	45	10	69	17		
22	6	46	11	70	18		
23	6	47	11	71	18		
24	7	48	11	72	20		

Question 4

TABLE C.71 QUESTION 4 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do the persons involved in the building process for fire safety generally understand the functional requirements of NZBC Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	47.6%	10
No	42.9%	9
Undecided	9.5%	2
Clarify answer (optional)		6
	answered question	**21**
	skipped question	**0**

TABLE C.72 QUESTION 4 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do the persons involved in the building process for fire safety generally understand the functional requirements of NZBC Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Yes	54.5%	30
No	30.9%	17
Undecided	14.5%	8
Clarify answer (optional)		18
	answered question	**55**
	skipped question	**0**

TABLE C.73 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 4 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Most supply a low level of information and hope it gets approved
Depends who the question applies to. There is a wide range of levels of understanding across both the design profession and the regulatory approval authorities
Auckland Council have produced a fire policy which confirms that they don't understand the process. The first version, in particular, was technically wrong in some instances and cumbersome in many others.
75% of application come with a specialized reort
It will take a while and some experience before the industry fully understands the functional requirements.
The buildiers generally follow the consent without understanding the reasoning for some of the provisions.
One of the biggest problems is lack of knowledge experience by BCA fire safety reviewers - every BCA has a slightly different interpretation of what is required or the INTENT of a particular clause. The result is differing standards from BCA to BCA. *** The recent changes to the Acceptable solutions have are to restrictive and are resulting in increased costs to fire safety design with limited benefit.
some do, but many do not.
The requiements and teh understanding on how to achieve compliance has totally gone out of the industry. Council no longer are able to assist on site as they are scared of liability.
Generally they are viewed as a 'mystery', and many are not interested in the 'why' but only in what products or systems 'have to be installed'. If they had an understanding of the functional requirements then less confusion would exist between the simple things like where single or two way FRR requirements apply

Architects in particular
Although Code Clauses C1 - C6 are more clear than before, the vast majority of people do not know what they are.
Some do but a large portion do not increasing time and work involved to obtain consent
Most designers understand it. Many architects, contractors and council staff reviewing work do not.
Variable level of understanding across the design fraternity. In general terms, architects and architectural designers do not have a good understanding of the Building Code requirements.
In particular, that is performance requirement and that others have to demonstrate compliance by incorporating fire design in their documents.
depends on who is involved: fire engineer, NZFS, fire peer reviewer - yes, BCA - generally yes, architect - not really, client - no
Generally, sometimes not
While many fire engineers may understand it, the understanding of many others (eg architects) is often poor or incomplete.
Untrained persons processing and providing design documentation
There is still a lot of misunderstanding around the new (after April 2012) NZ Building Code
It varies but 'generally' I would say yes in NZ's major metropolitan areas, Auckland, Wgtn, Chch, and Hamilton. that covers probably 80+ of the NZ construction industry.
Most understand what could be best described as 'minimal' functional requirements - including myself. I have not met anyone who as a full understanding.
In general it is the performance requirements and not the functional requirements which are more important when it comes to demonstrating compliance with NZBC Claise C. Did you specifically mean the functional requirements? If so then my answer would be 'No' as I don't believe most people have cause to understand them fully. If you mean the performance requirements then I would change my answer to 'Yes' as I think these are generally better understood.
Typically only the fire enigneer understands the functional requirements. building owners and other not directly familiar only tend to understand then to the extent that they are to some extent common sense.
I do, but the people in other organisations appear not to.
if this question relates to those carrying out the installation of fire safety
Understanding of the functional requirements varies significantly over all areas of the fire engineering and approvals sectors
I dont have enough experience of NZ buildinbg process to comment

Question 5

Table C.74 Question 5 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	**Response Percent**	**Response Count**
Yes	9.5%	2
No	76.2%	16
Undecided	14.3%	3
Clarify answer (optional)		7
	answered question	**21**
	skipped question	**0**

TABLE C.75 QUESTION 5 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

In principle, do you consider that all persons involved in the building process related to fire safety have the competence and knowledge required?		
Answer Options	Response Percent	Response Count
Yes	10.9%	6
No	83.6%	46
Undecided	5.5%	3
Clarify answer (optional)		23
answered question		55
skipped question		0

TABLE C.76 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 5 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Most do not know the level of information that is required for accessment
Regulatory authority staff expect to be able to understand complex design and approval issues, but in most cases they do not. Many fire designers overestimate extent of their knowledge and are not realistic about their competence limitations.
Main group that I consider lack sufficient knowledge is the regulators; not specifically fire engineering trained but expected to review and process specific 'engineered' solutions.
Issues arise over intrepretation which is about poor compliance documents.
Questionwas ALL, and therefore cannot categorically say they all do. A majority do now but they also have a natural reserved and negative view in their process, their job is to find problems. If they have been educated by reading acceptable solutions then they are unable to applyengineering consideration and judgement as to the value or need for the items they are reviewing.
There are many engineers and Council staff who struggle to get to grips with how to drive C/VM2. Some go overboard and produce far more than they should, while others get scared of it and struggle to make sensible headway.
Designers do not appear to be able to apply the acceptable solutions for themselves
For new buildings following the acceptable solution -yes, but for existing buildings, there are still issues where C/VM2 must be applied. A limited number of chartered engineers is available.
Fire engineers and some fire designers are capable of following acceptable solution and engineers are able to provide a VM2 design. On site application of the construction methodology is hit and miss.
As above - reviewers need to understand how fire spread, how people react in an emergency so they can interpret the acceptable solutions. In
many regulatory officers are not adequately trained on assessing this item, so this seems to be referred to external consultants, which an unnecessary expense to the applicant. Likewise there are very few training sessions for the construction sector to deal with this item, unless within a very expensive training session at limited locations.
Knowledge is lacking in every scope of the industry. Tradesman do not understand products , designer don'e understand construction methods and teh council are afraid to take a stand or give direction . The governement regulators are all the failed persons from the above.
Fire Engineers - yes Fire Designers - Re Acceptable solutions -some good, some not so good. BCA Officers: Some Good, some not so good Builders: Most struggle Specified sytem installers - some good, some not so good. Building Owners: Hopeless
paragraph 1.3 clearly states the acceptable solutioncan judge compliance with the code to the extent required by the Act. Yet consent are still held up with questions about VM2 and DRU because full compliance is not demonstrated.

It is highly dependant on a) background qualifications relating to fire, and b) background fire safety related history and experience gained since obtaining qualifications, and c) an appreciation of the persons own acknowledgement of their limitations in expertise in a fire safety related field. Many do not appear to have a lot of any one of these aspects, even when it comes to an ability to apply/design/construct using the Acceptable Solutions
Believe the Building Consent Authorities lack experience and qualifications in fire safety engineering. Some Architects and Structural Engineers try and undertake fire design when they shouldn't due to lack of experience/knowledge.
One of the reasons for developing the new Acceptable Solutions C/AS1-7 was to make it easier for architects and architectural designers to do their own fire safety designs for relatively simple buildings, rather than engage fire engineers (therefore making it cheaper for the client). From my observations, the majority of architects and architectural designers still prefer to engage fire engineers for projects within the scope of C/AS1-7. Fire engineers seem to be spending a lot of their time on projects which do not require their specific engineering design skills.
As for 4
as noted above
BCAs are good on the wording but often have limited understanding of the reason why or how the same result can be achieved
Many consultants do not have the skills/ expertise to undertake the level of modelling required for C/VM2
Competance and knowledge varies greatly, in particualr for modelling and the correct application of modelling tools
As above
Mainly building trades
Some Council staff do not have adequate knowledge
There are still many people involved in fire safety designs (and fire engineering) that do not have the necessary knowledge and still too many operators who want to take short-cuts
There is an asymmetry of knowledge whereby Chartered Professional Engineers (Fire) no more than other 'engineers' and both groups typically know more than the regulators and Authorities Having Jurisdiction.
There is a huge lack of knowledge in Councils (BCA's)
New Zealand still has no bench mark for qualifications, experience etc. what systems are in place have been shown to be flawed time and time again as New Zealand operated in an environment where time spent in the industry is taken as competence. There are many practitioners in the fire industry that have been practicing for years without any formal training or qualifications. Some of these individuals are considered industry experts for no other reason than their longevity in the areas even though for some of them they are inept and have practiced unchecked for years. Bad practices in New Zealand have become ingrained in the industry and have become accepted practice, exacerbated by poor and sometimes even no regulation.
once again - similar to above. Too often when inspecting on site construction - certain requirements and details are not completed as specified and need to be clarrified/corrected
There are still people who feel that they can enter into a C/VM2 design who do not understand either in inputs or outputs, such as architects, ex-firemen, and IQPs
Consultants are limited by the tools they have at their disposal, most of which are not fully developed or tested yet. Furthermore, they are also limited by their ability to learn the use of such tools which can be a long process in itself. All in all, fire safety engineering is still at its infancy stage.
There is still a large difference in the delivery of ANARP assessment across the industry, even with the extensive guidance from MoBIE. The changes have made ANARP assessment one of the more complex forms of assessment, as it needs to consider and compare fundamentally different options and outcomes. New design is relatively easy as the design can be developed to provide a more easily justifiable solution.

Question 6

TABLE C.77 QUESTION 6 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How have the overall costs related to fire safety of building projects changed since the 2012 revision of Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Increased significantly	61.9%	13
Increased a little	28.6%	6
No change	4.8%	1
Decreased a little	0.0%	0
Decreased significantly	0.0%	0
Do not know	4.8%	1
	answered question	**21**
	skipped question	**0**

TABLE C.78 QUESTION 6 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How have the overall costs related to fire safety of building projects changed since the 2012 revision of Clause C Protection from Fire?		
Answer Options	**Response Percent**	**Response Count**
Increased significantly	67.3%	37
Increased a little	18.2%	10
No change	3.6%	2
Decreased a little	1.8%	1
Decreased significantly	0.0%	0
Do not know	9.1%	5
	answered question	**55**
	skipped question	**0**

Question 7

TABLE C.79 QUESTION 7 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Can questions of interpretation of NZBC Clause C Protection from Fire, including the C/AS1 to C/AS7 and C/VM2 documents, be resolved through discussions with the Building Consent Authorities? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	**Response Percent**	**Response Count**
Frequently	28.6%	6
Occasionally	52.4%	11
Rarely	9.5%	2
Very rarely	9.5%	2
Undecided	0.0%	0
Clarify answer (optional)		2
	answered question	**21**
	skipped question	**0**

TABLE C.80 QUESTION 7 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Can questions of interpretation of NZBC Clause C Protection from Fire, including the C/AS1 to C/AS7 and C/VM2 documents, be resolved through discussions with the Building Consent Authorities? Questions of interpretation relate to both clarification and application of the provisions.		
Answer Options	**Response Percent**	**Response Count**
Frequently	16.4%	9
Occasionally	47.3%	26
Rarely	20.0%	11
Very rarely	12.7%	7
Undecided	3.6%	2
Clarify answer (optional)		26
	answered question	**55**
	skipped question	**0**

TABLE C.81 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 7 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
More often the discussion around interpretation occurs with a peer fire designer rather than Building Consent Authority. For peer designers the resolution through discussion occurs frequently.
Individuals within the BCA's rarely have the knowledge or confidence to determine whether an interpretation is appropriate or not. Generally the BCA that I deal with will defer to the most cautious interpretation or state that they require guidance from MBIE.
For Christchurch Council has been reviewed and publically criticised for its QA process and had their Insurance put at risk, they therefore will follow their literal worst case interpretation unless someone higher (MBIE) advise otherwise on an interpretation.
This is a loaded question and it depends what you mean by resolved. Also the questions very wide and I wouldn't expect BCA to understand vm requirements that is why engineers need to be involved both ends
I have noticed since May a change in attitude where there is a dispute, no matter how minor, building owners are clearly saying - do what they want, well do it lets get the building started - very evident in Christchurch. I have a number of examples wherby an owner was putting additional passive fire protection in a building, the BCA have quarried the requirement the owner has withdrawn the additional protection solely to get the job started.
In christchurch it is too difficult to discuss with BCA, as no free parking and no direct communication available to discuss without too much performance
No one will assist , there is so muchj of you tell me and I will think about it. The New Docunment are so restictive they force the use of VM2 which is unworkable, and time consuming to achieve the smallest of jobs
C/AS1 to C/AS7: Frequently C/VM2: BCAs require peer reviewer or similar input.
BCAs are reliad on by Designers Patricularly with Particularly alteration or change of use of existing buildings and decisions on means of compliance
BCAs have the attitude that people on the other side of the counter are incompetent or untrustworthy. They bully the industry into doing it their way.
More often than not queries relating to compliance documents requirements can be resolved, and where not some input from MBIE technical advisor can be sought
We deal largely with existing buidings undergoing alteration. In many instances consideration is required as to what is reasonable and practicable. What is considered reasonable varies considerably.
Depends on the person at the Building Consent Authority as to whether logic and reasonable practicalities can be applied.
I believe there is good in-house Protection from Fire knowledge within the larger metropolitan BCAs and they have staff who specialise in this area, but this cannot be said for the majority

of BCAs.
some BCAs require clarification from another CPEng or MBIE
BCAs are reluctant to commit to any interpretation other than their own
BCA's tend to be risk averse and apply the provisions of C/VM2 without congisence of reality.
All are awaiting the ministry (MBIE) to provide guidance/ clarification which was promised many months ago
Acceptable Solution should not require discussions; C/VM2 always need discussion. It's not fair mixing the two together.
VEry difficult to get an answer for BCAs in terms of acceptance and ANARP. This is not new to the new documents but goes back years. It varies between BCAs with the smaller ones generally being better.
There is no interpretation. The documents are black and white. I understand that there is some 'sanctioned' departures from the documents.
BCA's take a black and white stance
Depends on the Council and their technical expertise
It depends on the Council and the staff at that Council.
Most questions regarding the interpretation are discussed with MoBIE or peer-reviewers
BCA's are usually happy to engage in questions of interpretation without a formal Determination process being launched.
the documents are now absolute and allow no interpretation...
Ususally guidance is sought from MBIE
Typically the Building Consent Authorities do not have the expertise to answer questions on the fire documents. There are also many Building Consent Authorities and therefore many different interpretations provided. The new changes have made it difficult for the BCAs to provide advice and many of them are cautious about providing interpretations, when the point of the changes were to provide clear design requirements that should not need interpreting.
Have experienced 1 or 2 consenting officers who have their own individual interpretation and will not budge or accept others views with qualifying information.
BCAs tend to adopt their own interpretations, particularly the larger BCA's. These may not be aligned with guidance from MBIE. Smaller BCAs (not Chch, ALK, WLG) often dont understand the C Clauses and compliance documents.
Interpretation with peer reviewer is more commonly place. Council are satisfied if they get a PS2.
If conducted at an early stage and all participants are very clear in their understanding of fire safety requirements, solutions and a pragmatic approach to resolution.
The BCA are in a phase of conservatism following a number of legal cases against them, such as leaky buildings. They are often taking the literal meaning of many clauses in isolation irrespective of any commentary or the actual NZBC clause wording. MoBIE have also been unresponsive or obstructive in requests for clarification. Generally their approach is to just restate the words from the acceptable solution or verification method. In many cases the actual application and implications of the wording has not been considered. This results in either requirements being disconnected from the NZBC clauses, requirements not being able to be actually achieved, or the requirements creating a paradox with other compliance documents.

Question 8

TABLE C.82 QUESTION 8 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Does the Ministry of Business, Innovation and Employment provide satisfactory help with interpretation and clarification of NZBC Clause C Protection from Fire including the C/AS1 to C/AS7 and C/VM2 documents?		
Answer Options	Response Percent	Response Count
Yes	14.3%	3
No	66.7%	14
Undecided	19.0%	4
Clarify answer (optional)		3
answered question		21
skipped question		0

TABLE C.83 QUESTION 8 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Does the Ministry of Business, Innovation and Employment provide satisfactory help with interpretation and clarification of NZBC Clause C Protection from Fire including the C/AS1 to C/AS7 and C/VM2 documents?		
Answer Options	Response Percent	Response Count
Yes	27.3%	15
No	38.2%	21
Undecided	34.5%	19
Clarify answer (optional)		27
answered question		55
skipped question		0

TABLE C.84 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 8 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Assistance with interpretation and clarification does not occur in a timely manner and often lacks true insight into the intent of performance based design and intent of the Code clauses.
A response will be given to a question; however often without due consideration for the wider implications of the answer. e.g. a response within 30mins of asking a question about interpretation that might make or break a design, or result in thousands of dollars difference in solution.
They have done a poor job. They are happy for interpretations which cost significant time and physical installation cost to keep occuring with little care or regard.
Their Q & A process has been woefully inadequate. Sold by them as being an outlet for responses to minor technical queries, it currently provides only generalistic advice at best. We are aware that many other questions have been answered by them in draft format, but not posted on their website for others to use.
Why this question
The use of VM2 for small alterations to large buildings has become problematic and MBIE are meant to be providing guidance, however, this has not been forthcoming and is to little to late givent the changes have been in for months now.
Most definitely note - the fire advisers will not give interpretations even when clear case study is provided.
Total waste of time.So of the staff are just plain is abusive arrogant.
Experience has shown me that if the BCA is asking a question for it's own knowledge then MBIE generally give assistance. As soon as MBIE known it relates to a any specific project

where a dispute may or may not arise they fall back to a position of ‘Determination required’.
Very limited training at introduction.
I am on the Ministry's email list but did not receive any invitation to the last C Docs tour. You provide guidance to BCAs as to what you believe is the word, but do not follow through with ensuring their interpretations are the same. The stock answer by designers is to ‘give them what they ask for to get the consent’. No one learns or improves with this attitude.
there are contradictions in the acceptable solution code documents C/AS1 - C/AS7 and existing buildings frequently do not fit well within them. In these instances the documents require the building be assessed using principles of C/VM2. This is also often not practical or time consuming and unaffordable. Changes are required.
MBIE have created a major mess for the fire industry and now appear to be in hiding.
depends on how well structured query is
Variable response depending on the query. Usually satisfactory
And when you can get their advice it is never binding.
Inconsistent advice/interpretation given via individuals in the Ministry to individual consultants. This gives them commercial advantage. Advice varies between consultants.
Help provided, but answers are often not as expected
Very slow or non existent replies an major issues - e.g. minor variations to C/ASx,and exisitng buildings, very long time getting answers on ‘equivalent’ SFI / SDI numbers to new Group numbers, changes poorly advised to e.g. materials suppliers and the fact they would need to retest all materials, with no consideration on industyr capacity or that materials to AS3837 would need to be retested to get the identical result in ISO5660
At time, advice is contradictory.
Yes, but the documents are sometimes conradictory or do not allow for certain situations
Direct email or telephone contact normally results in a speedy and mostly satisfactory response
MBIE provides very very limited interpretation and clarification. Worse than that, where it is provided it is typically informal and offered as opinion of the MBIE individual not a 'binding' clarification meaning there are differing opinions given to different parties from MBIE regarding the same issue.
no guidance to date
I have not had the opportunity to seek this kind of help from MBIE
Haven't used before
typically
However, MBIE cannot change incorrect clauses or unclrae clauses quickly. It takes time.
MBIE provide as much advice and help as could be reasonably expected considering that the point of the changes were to provide clear design requirements that did not need interpreting. It is also difficult given that the documents are not working and have not achieved what they said they would.
MOBIE are not the BCA and are not regulated as the authority to decide such matters unless application is made for a determination.
MBIE are providing assistance. However there have been numerous situations in which they have issued contradicting clarification to different people. Further these clarifications have mostly been made by email, not presented in a public forum.
Still some misunderstanding about application/applicability and ANARP
I have no experience with them
They are in a no win position on this front. We do have reasonably good communication with MoBIE, but often they cannot answer the question. The formation of the technical committee to provide am mechanism for the development and response to interpretations is good, but has taken far to long to come into being. The committee are still debating some of the core interpretations for fire design, such as what constitutes the exposure of 1000 people to the effects of fire to determine acceptance criteria. This is a fundamental design question, but MoBIE have not been able to answer.

Question 9

TABLE C.85 QUESTION 9 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Should there be a certification requirement for Fire Engineers doing performance based designs?		
Answer Options	**Response Percent**	**Response Count**
Yes	95.2%	20
No, there should be no certification at all	0.0%	0
No, but voluntary certification is good (e.g. CPEng)	4.8%	1
Undecided	0.0%	0
Clarify answer (optional)		2
	answered question	**21**
	skipped question	**0**

TABLE C.86 QUESTION 9 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Should there be a certification requirement for Fire Engineers doing performance based designs?		
Answer Options	**Response Percent**	**Response Count**
Yes	67.3%	37
No, there should be no certification at all	5.5%	3
No, but voluntary certification is good (e.g. CPEng)	18.2%	10
Undecided	9.1%	5
Clarify answer (optional)		25
	answered question	**55**
	skipped question	**0**

TABLE C.87 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 9 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Certification levels are very difficult to define and also difficult to measure without becoming too arbitrary to be of real value
Some form of evidence that a person is competent to undertake the design; i.e. that they understand the basis of design intent and the implications of the design (in particular on life safety), rather than applying 'acceptable solution' mentality and tweaking it as they see fit.
Yes and a more diligent process for poor work such that they can be eliminated from certification.
Performance based fire design is a technical design field, as is structural engineering and many others and should be treated that way.
Not enough people for nthe amount of work supposedly required
Part of my career is as a Fire safety Officer - I have seen many examples of where the client has over ruled the fire engineer - One CPENed engineer gave as a solution - an axe to be left at the final exit door to be used in an emergency on two jobs that I reviewed for a Council.
Most projects do not warrant the expense of a fully qualified fire engineer, when many of us that have been involved in industry for many years do not have qualifications or able to afford the ridiculous costs to get qualified. But have very good practical knowledge
No because the whole premise of the Acceptable soultion was that anyone can do a design these new C Doc's have shanghai the fire design work for the engineers only and this goes against the whole premise of what the Acceoptable soultion were set up for so NO to the designs but the regulators and Fire Service DRU personal should be.
Tricky one to answer as we 'expect(almost require) they be CPEng, and if not a Peer Review

from a CPEng engineer to accompany their design docs.
If VM2 or computer software based on it are able to be understood by the layman, then they should be able lodge calculations using it.
This is a matter of designing for high levels of public life safety and only qualified/certified professional engineers should qualify where such level of expertise is necessary.
CPEng minimum, but IPENZ need to stop their apparent 'no fail' policy for persons applying for CPEng.
Some buildings 'just' outside the scope of CA/AS1-7 require design using vm2, yet these Vm2 designs are considered not 'complex' enough to count towards CPEng, yet BCAs require CPEng to carry them out.
the e.g of CPEng is being taken as the only acceptable qualification and no other qualification is accepted. The criteria of ability to do the job has been lost
In effect this already exists for VM design through BCA lists (arguably with no legal sanction).
Why just fire engineers? There are other professionals who can achieve the same results and in most cases more practically based assessment rather than a exercise in mathematics as is the case with C/VM2's
C/VM2 is not performance based design -it is acceptable solution. Need to confirm fire modelling skills & experience
Yes but it shouldn't be a blanket CPEng fire
I believe that there should be a compulsory registration process along with compulsory insurance requirements. There are still too many people who are deemed to by competent (either by age/experience or some form of association membership) who are clearly not competent
Absolutely yes
The fire engineer who is responsible for a project utilising performance based design (inc. using C/VM2) should be CPEng.
like in QLD or Victoria Australia, you need to be a licenced or registered fire engineer (like CPENG)
I would like to live in a world where you could trust engineer's. Unfortunately in an open market where the lowest price wins it is not possible to compete in an environment where highly qualified engineers are required to compete against sole practitioners who have no training, qualification or experience in the field they are practicing in. As there are no consequences with undertaking poor fire engineering there is no reason to do a good job. Ultimately performance based designs are rare in New Zealand and the new changes have been put in place to reduce the need for PBD even lower. Some stakeholders are now actively preventing PBD. Voluntary certification is not good, it is what is in place and has been for years and has been demonstrated to have failed – hence one of the main changes to the code. Mandatory certification is necessary
No certification but a peer review is essential.
There are still people, particularly outside of CHCH, ALK and WLG who call themselves fire engineers, but are not qualified. They often practise in regions with a smaller BCA who dont really understand the requirements.
Performance based design not being C/ASx or C/VM2 designs
Should demonstrate formal Fire qualification not just Eng degree.
Performance-based designs should only be allowed for fire engineers only. Engineers from other disciplines would not have the adequate background knowledge or sufficient training in terms of fire safety to enable them to correctly comprehend the outcome of a performance-based design which often involves tools such as fire simulation packages.
for author or reviewer of the report
Unfortunately to date the open gate policy on who can undertake fire design and the low knowledge level at a lot of BCA has created a very low benchmark for the assessment of fire design. It has become an almost 'she'll be right because I said so' level of design. Fire engineering has a basis in science, from chemistry and physics to psychology and biomechanics. With performance design we can demonstrate to a higher level that a design solution passes or fails certain criteria. As such the person undertaking the assessment need to have sufficient knowledge in the relevant areas and the engineering judgement to assess the outcomes. Often the outcomes are not black and white, so considerations is needed.

Question 10

TABLE C.88 QUESTION 10 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the new risk group classification system in the Acceptable Solutions C/AS1 to C/AS7 better compared to the previous acceptable solution used before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	33.3%	7
No	38.1%	8
Undecided	28.6%	6
Clarify answer (optional)		3
	answered question	**21**
	skipped question	**0**

TABLE C.89 QUESTION 10 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the new risk group classification system in the Acceptable Solutions C/AS1 to C/AS7 better compared to the previous acceptable solution used before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	18.2%	10
No	38.2%	21
Undecided	43.6%	24
Clarify answer (optional)		24
	answered question	**55**
	skipped question	**0**

TABLE C.90 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 10 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Categorising uses into predefined descriptors is always going to have major limitations in performance based design. For prescriptive solutions the Risk Groups seem to work better than pre-2012 Purpose Groups.
I very infrequently use acceptable solutions.
I don't see there being any significant difference.
Doesnt work for small buildings that were previously IA.
This is clearly a change for the sake of change - we now have two sets of Risk group the current model and when dealing with a compliance schedule you then revert back to the old risk group classification
Certainly easier to only have to refer to one AS document, but just need more practice with using different layout.
Risk group have further confused the industry and it doesn't tie up with the regulations and Act. another Stuff up
Blunt instruments result in blunt answers
far easier in my mind.
Appears similar - just new naming really
about the same
It's confusing when the combined with the building use, as defined in the building regs
Not really much difference. Am unsure why car parking has been deemed an excessive risk classification in it's own right. All the old Purpose Groups are still in existence under the Change of Use Regulations, so essentially we're still using both (when it comes to building compliance schedules)

The building regulations include classified uses which used to align with uses in the pre 102 fire code (the old C/AS1). The new risk groups are inconsistent with the classified uses and building warrant of fitness. this adds another level of confusion.
It causes confusion with the existing NZ Building Act's purpose groups.
it is similar to previous, but now the requirements are more stringent than previous with arguments surrounding whether the additional requirements provide additional benefits
Still some holes in classification eg for aged accommodation and disabled people,Recognition of home occupation within planning limits as being a residence activity
It is just different.
Does not tie in with other legislation (Change of use etc). Too broad.
In some places, no in others
The new acceptable solutions are still having the same problems as the previous acceptable solutions
Risk groups are too broad brush approach
I don't see any significant difference
There seems no good reason for the change to Risk Groups over the 'old' Purpose Groups.
it conflicts with Regulations
In my humble opinion, of course
To some extent it is. However it is still not broad enough to capture many types of buildings/infrastructure and can be very limited in its scope and narrow application to the type of buildings they are intended to capture.
Apartments and duration of stay are a lot more confusing. Storage activities are poorly mixed with office activities. Apart from that, yes, the current version is better.
there are a couple of previous purpose groups which have now been classified under a different group which can sometimes be awkward to justify the change of use
It is simple for common buildings, but can cause difficaulties in speciallist buildings. Particularly, C/AS5 dealing with working risk group is not suited to industrial type applications.
Not convinced yet
The previous classification system was also not perfect, but provided better ability to classify the two parts of the fire safety risk within a building, being the people (purpose group) and fire risk/consequence (Fire Hazard Category).

Question 11

Table C.91 Question 11 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the Acceptable Solutions C/AS1 to C/AS7?		
Answer Options	**Response Percent**	**Response Count**
Yes	28.6%	6
No	71.4%	15
Undecided	0.0%	0
Clarify answer (optional)		4
	answered question	21
	skipped question	**0**

TABLE C.92 QUESTION 11 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do you consider that fire engineering qualifications or similar are necessary to design buildings in accordance with the Acceptable Solutions C/AS1 to C/AS7?		
Answer Options	Response Percent	Response Count
Yes	16.4%	9
No	74.5%	41
Undecided	9.1%	5
Clarify answer (optional)		22
answered question		55
skipped question		0

TABLE C.93 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 11 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
The AS are clear to for min' required, But most are trying to do less
The 2012 Acceptable Solutions are specifically intended to be applicable without needing any fire design training.
Although not intimately familiar with the acceptable solutions I believe that there is no critical thinking, analysis or calculation required; a monkey 'should' be able to do it. [Except I also believe there are still some potential questions of interpretation].
Having had a qualification it is hard to judge, to me it seems easy and obvious. I do not understand what it has hoped to have achieved by dumbing down the content.
No, I have seen architects with no fire experience drive it accurately.
The acceptable soultion has been dumbed down for designers they just need to reed it and follow it.
But yu do need to understand fire behavioujs - spread conduction radiation etc and the way people behave in fire. A two day curs on the Fire docs does not make you a fire engineer.
as above
They've been made blunt instruments for the very reason of giving simple answers that anyone can follow and have therefore moved in the opposite direction from the knowledge and experince required for the previous acceptable solutions
Acceptable Solutions are deemed to comply. Therefor why increase the costs in the industry by limiting their use to a very small field.
However, training and experience is important
To determine requirements, no particular expertise is needed. to apply the requirements to building design in practice does however need a reasonable understanding of fire engineering....particularly when it comes to detailing.
Knowledge and experience is definitely required but no need for CP Eng.
depends, experience is more important, and that comes with time using the C/ASx documents
that was the basic tenet of the design of the c/as documents
But they sure can help.
This was stated by MBIE as the objective of the new compliance docs - no qualifications required.
However experience required though
Acceptable Solutions should be sufficiently clear that non engineers can apply them e.g. architects in the same manner as other Compliance docs, such as D1.
Not necessarily qualifications but experience. Some architects are quite capable on smaller projects. Most architects now prefer to pass all the fire side on to a fire engineer anyway so maybe the answer should be yes but obviously the qualifications would be less than for VM2 design
However, Council staff must have knowledge of these documents to ensure these are followed fully and correctly.
Too many unqualified people are still trying and still trying to see what they can 'get-away with'

A level of training is necessary to navigate the Acceptable Solutions for all but the simplest of buildings.
Provided that the designer of a building recognises the limitations on compliance without having a suitable qualification in specialist FE.
But as per the MBIE line, they cannot be deviated from.
No they are not necessary. that is the answer to the question. However they should be.
a clear knowledge of building construction is neccessary
not if deviating from the AS document is not permitted. In other words if the AS has to be followed in full (as is currently the case) then anyone can do it. If deviations could be justified using fire engineering then it would be essential that the work is done by qualified designers.
But it certainly helps - but sometimes a little knowledge can be dangerous as it seems in the building industry, buildings are engineered to save upfront construction costs, rather than consider whole of life and property/business protection/best practise
A fire engineering qualification will help immensely in better 'understanding' the implication behind the clauses within these acceptable solutions.
The acceptable solution is a simple complies or does not comply document. There is little background understanding required to undertake a design to the acceptable solution.

Question 12

Table C.94 Question 12 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Is adequate guidance provided for alterations and extensions to existing buildings in the Acceptable Solutions C/AS1 to C/AS7 and the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Yes	14.3%	3
No	76.2%	16
Undecided	9.5%	2
Clarify answer (optional)		6
	answered question	**21**
	skipped question	**0**

Table C.95 Question 12 with results from fire safety consultants from the survey on NZBC Clause C Protection from Fire.

Is adequate guidance provided for alterations and extensions to existing buildings in the Acceptable Solutions C/AS1 to C/AS7 and the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Yes	20.0%	11
No	63.6%	35
Undecided	16.4%	9
Clarify answer (optional)		24
	answered question	**55**
	skipped question	**0**

Table C.96 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 12 from the survey on NZBC Clause C Protection from fire.

Clarify answer (optional)
MOBIE are slow and most of the time unclear with there guidance
In particular the way in which compliance documents apply to buildings designed using Alternative Solutions is unclear (ie. designs that were not prepared in accordance with a pre-2012 Compliance Document)

These compliance documents are black and white about design philosophy/verification. So although they do not currently contain information about altering/extending existing buildings, I do not believe that the compliance documents is the 'right' place to provide guidance on application to existing buildings. This would be better issued as commentary or formal Guidance from MBIE regarding application of Section 112 of the Building Act. It is the Act, not the compliance documents, that describe the requirements for alterations to buildings (e.g. 'near as reasonably practicable,' or 'not reduce the level of compliance'... doubt I have accurately quoted the second example).
Only yes in the fact it is limited and therefore do all C/VM2 or not. The need to start looking at the building in the first instance given it may be only 2years old has no guidance.
No, this is, in my view, the weakest area of the new codes. No guidance was provided (by MBIE) before or during the transitional period and the guidance subsequently provided was heavy handed and is now being undermined by many BCA and appears inconsistent.
Too much ambiguity and unclear crossover of rediculous information
This is not currently there but in a month there will be
It is difficult to provide guidance in every case, but the Ministry, which ran a seminar on the subject, should also provide more worked examples. To some extent the Ministry expects BCAs to make decisions.
MBIE expects VM2 to be used as a basis for an ANARP assessment and this is onourous and costly where the alteration on encompasses a small part of the building
MINBE have confussed thi issue by ofering a alterative solution of trade offs but the people doing this don't under stand the implications
This has improved with the amendments to Acceptable solutions and recent seminars - however the people making the decision as to what is ANARP have limited experience - therefore inconsistent decision making.
They force you to VM2
It hasn't been, but BCAs initially, and now MBIE (after confusing and frustrating everyone) are taking a pragmatic approach
I believe it is, but BCAs still tell me that because I do not comply fully with the Acceptable Solution, a VM2 calculation is required.
It is very dependent on who is making a decision - still alot of judgement therefore the result is dependent on the competence of those involved
However, it is a shame that the avenue to reason on ANARP is lost for C/ASx applications
Confusion as to when horizontal spread of fire is to be assessed for extensions with regard to the size of the extension
The new acceptable solutions do not quite lend themselves to efficient application of S112 or S115. A differing approach to their application is certainly necessary. MBIE have a draft guidance relating to this, which is currently being trialled at Chch city council (only), and this appears to offer a potentially more efficient approach to the acceptable solutions use.
Evaluation is required using principle's of C/VM2 which can be extremely time consuming and expensive. There seems no point undertaking costly evaluations where it is evident the building does not comply and could not be made to fully comply. In most instances a decsion is better based on what can be provided or what can be done to improve the existing building - viz what is reasonable and practicable.
Confusion exists on when and when not to consider external spread of fire
additional information keeps coming out. indicates that what is currently out there is still being fine tuned
main issuses are in the provision of 'whole of building fire reports , intermediate floors and storage to the capability of the building.
Yes, but the requirements are invariably too expansive and inflexible, particularly when large parts of an existing building may be totally unaffected (in relation to fire safety) by the proposed work.
This is the key problem. MBIE guidance currently states that full VM2 assessment required if adding toilet onto Warehouse
The requirement to apply the VM if the existing building does not comply in anyway with C/asx is unworkable for minor deviations, or esp for fitouts of a small part of the building
There's no clear transition from previous C/AS1 to new C/ASx.
Guidance from MoBIE and Building Consent Authorities is still incomplete and there are differences in interpretation and implementation from the BCA's

absilutelty not...the whole system is on the verge of collapse.
I have yet to review the latest published guidance provided by MBIE that has been the result of a lack of guidance to date.
however there are some grey areas that require discussion with other learned associates to provide a solution
Existing buildings have been handled very poorly. The drafted guidance from MBIE for the assessment of existing buildings goes soem way to rectify this, but it has taken a long time to even get a draft, and is a major back-track on what MBIE have previously stated.
Still misinterpretation on legislation and use of compliance documents
I havent had experience with this
There is no guidance within either document for these situations. Separate guidance has been provided by MoBIE and some BCA on the approach to alterations and extensions

Question 13

Table C.97 Question 13 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	14.3%	3
No	66.7%	14
Undecided	19.0%	4
	answered question	**21**
	skipped question	**0**

Table C.98 Question 13 with results from fire safety consultants from the survey on NZBC Clause C Protection from Fire.

Are Fire Engineers generally brought into the design process early enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	38.2%	21
No	50.9%	28
Undecided	10.9%	6
	answered question	**55**
	skipped question	**0**

Question 14

TABLE C.99 QUESTION 14 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Building Consent Authorities must seek advice from the Fire Service for some types of buildings in regards to means of escape and firefighting operations. To what level should the Fire Service be involved in the building process?		
Answer Options	**Response Percent**	**Response Count**
More than the current situation	9.5%	2
Their current level of involvement is sufficient	66.7%	14
Less than the current situation	19.0%	4
Undecided	4.8%	1
Clarify answer (optional)		6
	answered question	**21**
	skipped question	**0**

TABLE C.100 QUESTION 14 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Building Consent Authorities must seek advice from the Fire Service for some types of buildings in regards to means of escape and firefighting operations. To what level should the Fire Service be involved in the building process?		
Answer Options	**Response Percent**	**Response Count**
More than the current situation	12.7%	7
Their current level of involvement is sufficient	38.2%	21
Less than the current situation	32.7%	18
Undecided	16.4%	9
Clarify answer (optional)		24
	answered question	**55**
	skipped question	**0**

TABLE C.101 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 14 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
There is little value in having the Fire Service involved as a second-tier design approval authority. Responsibility and authority for regulatory approval is blurred.
At present the Engineering Unit provide effectively a second peer review, critiquing all elements of an FEB or a fire engineering design. This seems an unnecessary double-up on a task already undertaken by the BCA (acceptable solutions) or peer reviewer (C/VM2). The NZFS definitely should be consulted about fire fighting equipment locations and matters of means of escape, but not stating the obvious or, in some cases currently, asking for confirmation/clarification of design aspects beyond their statutory role.
The current level of involvement is so uncertain that it is difficult to answer this question. For new C/VM2 buildings it is about right. For other buildings it seems to depend on the BCA as to how involved they are.
Only pushing their barrow for outcomes not covered by Building Act
It isn't about novel event in the process it is about whether or not they provide useful input
all alteration including minor alteration should not need to go to the Fire Service
I am aware that there is a call for the NZFS to be involve prior to lodgement of building consent and this is a better proposition than the current one as the design may need to be changed at the latter stage adding delays and costs to the applicant.
I believe that the requirement for fire service advise needs to be amended and discussion as to what the fire servce should be looking at shuld made in conjunction with the Fire Service - I

do not believe that it is good practice for the fire service to have to review fire alarm upgrades - let them get on with the more serious work.
They should not be invovled until late in the consent process, the involvement of the fire service in FEB's is a conflict of interest. How can they design and then be a regulator???? Just fundamentally wrong.
Current level in the FEB process and Gazette Notice requirements are fine
Now no need unless C/VM2
When you apply for a building consent to instal a new wash hand basing, and the DRU demands the Alarm, is upgraded from a Type 2 rto a Type 4, then their value is seriously questionable.
This is depend on what is the goal we (BCA and teh FS) liek to achieve. The current arrangement is less than satisfactorily in term of getting to a final outcome; it is only process where the FS offer only advice on the regulatory requriement; but not a lot of practcial guidance or pragmatic approach to resolve the issue with teh designer. If that is continue, would rather have less involvement.
Provided that their fire fighting facilities checklist is easier to use online. Finding someone to send it to is confusing. Also, that it is not mandatory, refers to old acceptable solutions, etc.
Fire Service review is of no value to the Building Consent process.
Their involvement should occur as part of the design process prior to the building consent application lodgement with the BCA.
Need to take liability for their actions.
Fire fighting facilities checklist is the mechanism, but it needs to be made more visible to architects and easy to use online.
there didnt seem to be any thing wrong with the previous level of involvement. now they seem more limited as they are not permitted to review the final fire report for a new C/VM2 building
The boundaries of the extent of fire Service involvement are not adhered to Ok within the limits of fire fighting and egress
A building consent requires only that a building complies to the building Code, The NZFS cast a wider net in their considerations and will decline proposals that comply with the code. I have seen them refuse a proposal for sprinkler protection when the building did not require sprinklering, on the basis that the sprinkler design was incomplete!
They should stick to their statutory mandate as opposed to trying to offer or impose design advice. With regard to Q13: the real answer is sometimes.
They add no value to the process, operate outside the regulatory framework, and take no design liability/ responsibility. They try to get involved in design process. They need to be kept out of FEB.
C/VM2 is a ‘deemed to comply’ document and only operations should need to be involved
Involvement needs to be regulated, design process has risk of being held up due to lack of timely responses and advice should not be mandatory as stalemate situations could occur stalling projects.
The law should be changed to make it mandatory for the NZFS to be involved (and give approval or refuse to give approval) right up until consent stage and for the life of the building
they should not dabble in the Statutory requirements outside of the NZFS Act.
Any building design that requires an FEB should be examined by the FS prior to consent being issued.
But this would be reliant on Councils having more than their current level of knowledge of fire engineering.
It is essential that the NZFS approve operational facilities and ensure that where alternative solutions are being implemented that they are still compatible with fire fighting needs. However, the NZFS can be highly variable in the advice they provide and often focus on matters of fire engineering and design and not operational matters which is the core of their business and involvement.
One of the principles of the Building Act is to ensure fire fighters safety. However; the Fire Service can be ridiculous in what they require from a building, and often request more than the performance criteria of the NZ BC. Although their input is valuable and buildings should never be designed to provide the absolute minimum level of safety.
none of the above. The involvement should be different. Currently almost all alterations and change of use require Fire Service review, but there would be no need for that when the

Acceptable Solution is followed in full. However, there is currently no need for new designs under C/VM2 to be sent to the Fire Service - they should be.
Fire service involvement in the C/VM2 process has been good, adding value to the projects
I dont know what their current level of involvement is
Some need to understand the is a limitation on their scope to comment on designs.

Question 15

Table C.102 Question 15 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Is the introduction of Verification Method C/VM2 a step in the right direction for performance based fire safety design in New Zealand?		
Answer Options	**Response Percent**	**Response Count**
Yes	42.9%	9
No	19.0%	4
Undecided	38.1%	8
Clarify answer (optional)		10
	answered question	**21**
	skipped question	**0**

Table C.103 Question 15 with results from fire safety consultants from the survey on NZBC Clause C Protection from Fire.

Is the introduction of Verification Method C/VM2 a step in the right direction for performance based fire safety design in New Zealand?		
Answer Options	**Response Percent**	**Response Count**
Yes	49.1%	27
No	29.1%	16
Undecided	21.8%	12
Clarify answer (optional)		28
	answered question	**55**
	skipped question	**0**

Table C.104 Open-ended answers to the optional response category 'Clarify answer (optional)' to question 15 from the survey on NZBC Clause C Protection from fire.

Clarify answer (optional)
To early to tell
Reassurance and confidence of regulatory approval in a performance based design environment is necessary if building owners are going to invest in a relatively more expensive specific design process. VM2 offers reasonable design confidence while maintaining opportunity for design flexibility.
It assists in simplifying the process of agreeing on (primarily) inputs for a design, which in the past has caused significant time and cost to be added to projects if the nominated peer reviewer had a different opinion to the designer, and agreement would not/could not be reached between the two parties on input parameters. Adding performance-based acceptance criteria into the Building Code itself that has clarified the required outcomes (since C/VM2 simply restates those). It is helpful in getting a common ground. [Acknowledging that there is still the possibility of a true engineered design for 'special' types of structures for which C/VM2 is not really appropriate, e.g. tunnels].
Result in increased costs.
Perhaps the content needs some work but the intent is good.

It has resolved some very painful FEB debates we have had in the past around tenability criteria and modelling parameters.
Can have an outcome that is less desirable
not enough experience yet due to the smaller sized BCA
The only issue is that performance based building codes allow for alternative methods. C/VM2 is presented as the main engineering solution with very few exceptions permitted for alternative methods/solutions.
There needs to be a higher threshold for its use when applying ANARP to small projects
have not dsseen a C/VM2 solution yet, restricted by lack of fire engineers in NZ.
Im still not convinced that the correct type of buildings are being used for the verification method - clearly this new fire code is an effort to give fire engineers a regular work load - not convinced and to be fair I don't think the average fire engineer is convinced this is the correct approach.
Haven't had the chance to use the VM yet, only AS so far.
NO Way FEB's prove nothing
If Fire Engineers using the C/VM2 it makes more sense than the previous situation of varied 'alternative solutions'
Hugely time consuming and expensive for small jobs that dont quite fit with Acceptable solutions
To a point, as it is still some what prescriptive although it is no different to other engineering design/practice i.e. structural, hydraulic.
Is a good step in that quantification of Building Code requirements can be measured in a uniform methodology. I feel that C/VM2 however offers some designers, & particularly the public, a misconception that C/VM2 approach to quantifying compliance is somehow reflective of 'real' measure of what can happen in any given fire scenario. We have been advised by MBIE technical advisors in numerous seminars etc. that C/VM2 is not 'real'. I personally believe this is an ethical/moral dilemma the fire engineering profession faces in applying C/VM2 blindly.
But the document is full of holes and should never have been released in its current state.
It appears to give answers to a number of questions, but in reality becomes a default basis for any alternative design outside of the VM
it sets a level playing field for all fire engineers, meaning innovative solutions of the past are more regulated. whether that regulation stifles the innovatve nature of designs is still to be seen
Consent authorities tend to defer to the fire service, so the process is not balanced.
Greta idea in theory. C/VM2 is not performance based design. eg. Warehouse full of non combustibles (steel) must be designed as if it stacked high with polyurethane foam. C/VM2 usually does not relate to actual use and fire loading in building. It is an Acceptable Solution that should be optional.
The c?VM2's I have seen are simply a,most like the old CAS1 documents but written in such a way in theory can only be done by CPENG fire engineers
I dont use the C/VM2 to be able to comment
Very time consuming process. For sprinklered buildings where the answer is more less known it seems a waste of time.
As per any one size fits all approach, there are many cases where it is overly conservative, and others where it produces a legally safe but dubious bilding - e.g multilevel atrium shopping centre with no smoke control and 999 people, apartments with the escape routes potentially blocked by smoke, but FED is still ok.
C/VM2 is NOT performance based design. It is a tightly specified calculation method for building code compliance. As with all rigid design frameworks they can produce inappropriate results. C/VM2 dangerously assumes that the designers using the C/VM2 method are not capable of applying fire engineering.
Its a start and could be refined.
What was needed was an agreed set of guidelines not a mandatory set of rules that allowed no leeway
With the ne C/VM2 there are now some fixed parameters for design/modelling inputs, as previously fire designers would manipulate modelling inputs and parameters to achieve the desired results
No at all. it is full of mistakes and is V restrictive. A mess really

C/VM2 is a fanticy world invented by the cronies at MBIE and a few sicentists/academics without real world design experiance
The VM has killed performance-based fire safety design and will be detrimental to the long term objective of raising the level of fire engineering and knowledge in New Zealand. the VM is nothing more than prescriptive design but using a very narrow set of tools within mandatory bounds of use.
Yes, because it provides better prescriptive based pass/fail benchmarks. But, the design fire scenarios and design fire rules are overly prescriptive, for example fuel load in storage areas may not be adequate.
not my area of expertise
Defining the modelling inputs has sped up and simplified the process. However sometimes simplifications have been too general and dont suit some applications. Further the use of B-Risk for VM2 solutions is worrying, given how often the valid range of the model changes. VM2 should include some guidance as to when a zone model is not sufficient.
Not convinced of this yet
C/VM2 set the baseline for performance based design and it should not stop here. Blanks should be filled in as research in fire safety progresses in the future.
More flexibility should be introduced by allowing some engineering judgement. The content in C/VM2 can be used well, but is not always applicable and should in my opinion be used as a guideline instead.
Although in its present form it is too restrictive. The quantification of acceptance criteria and inputs is very useful
Providing prescribed performance criteria is ok. The form in which these have been applied is the issue. Placing the performance criteria in the NZBC is not appropriate. The NZBC should remain a semi generalised performance document, with the prescriptive criteria located in a verification document or standard. The locating of the criteria in the NZBC has turned the assessment into a black and white, pass or fail assessment irrespective of the context of the specific building. ASET > RSET by 1s is perfectly fine, but ASET < RSET by 1s cannot be considered acceptable. I have undertaken several design using probabilistic assessment and often found that the fire scenarios considered are a combination of a number of worst case considerations that generate a very long statistical tail. We are effectively designing for the statistical anomaly, well beyond the 99th percentile.

Question 16

TABLE C.105 QUESTION 16 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method described in the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety.	4.8%	1
Acceptable level of safety.	38.1%	8
Lower than acceptable level of safety.	4.8%	1
Undecided.	52.4%	11
Clarify answer (optional)		3
	answered question	21
	skipped question	0

TABLE C.106 QUESTION 16 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

How would you generally describe the level of fire safety provided in a building designed with the scenario analysis method described in the Verification Method C/VM2?		
Answer Options	**Response Percent**	**Response Count**
Higher than acceptable level of safety.	23.1%	12
Acceptable level of safety.	46.2%	24
Lower than acceptable level of safety.	9.6%	5
Undecided.	21.2%	11
Clarify answer (optional)		22
	answered question	**52**
	skipped question	**3**

TABLE C.107 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 16 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
acceptable' consiering that the outcome of a design in my experience has typically been similar to the socially accepted outcome before the 2012 Building Code
It does away with some of the arbitrary requirements provided by prescriptive designs and provides a solution better tuned to what is actually required.
Refer last Q
My experience since **** that it provides lower standard many of the designs rely heavily on ongoing inspection and maintenance.
Just a waste of everyones time , you do teh FEB and then you design around it. Buildings are doing the process and once the consent is approved the amendment start roling in to get around the FEB
Insufficient number of C/VM2 designs presented to this BCA to date to decide
Have not personally worked with C/VM2
'acceptable' compared to what? C/VM2 is deemed to be the acceptable level/approach to verifying the quantified acceptance criteria of the NZBC are achieved. As there has been no cost/risk benefit on the new Building Code (compared with old), it is somewhat hard to quantify if C/VM2 is a higher or lower level, as the public has not been party to what this 'acceptable' level of safety is. It certainly seems to encourage building owners to sprinkler protect their buildings though doesn't it?
C/VM2 trades off too heavily on sprinkler protection. Can do apartment buildings with a central atrium and no fire separations and this is OK as C/VM2 allows people to move through smoke.
Outside my technical understanding.
There is no statistical basis for the level of life safety in NZ building codes. WE do not know whether the level available under NZS 1900:5, or NZBC is exteremely high, or just right. WE do know it is not too low.
in some situations the C/VM2 does not reflect a realistic fire for the building use. in some cases this can be underestimated
The answer with C/VM2 should be slightly less conservative than the C/AS solutions . in fact they the acceptable solutions will not meet the VM2 criteria or even cime near e.g. for care facilities situations
A question you might ask is what is an acceptable level of safety. The NZBC allows 50 people to have a single dead-end means of escape! Does this mean that a fire that kills no less than 50 people is somehow acceptable?
Eg Warehouses that pass C/AS5 7 C/AS6 fail Vm analysis. Rest homes cannot be made to work with VM design. Acceptable solution rest home design fails VM
I dont use C/VM2 so much to be able to comment
Sprinklers 'engineered out' of warehouses and provided with smoke detection is a common example of how VM2 is being used.

Can vary betwen much higher than the acceptable solution (e.g. resthome C/AS3 ward will fail in VM) to less safe (e.g. not requiring visibility in a sprinklered building with 999 people)
Can create unnecessary expense for no gain in fire safety.
It depends on the project. There are many cases that comply with C/ASx but are inherantly unsafe eg mezzanines
Especially for non-sprinklers office spaces (where these exceed 500m²)
The C/VM2 and Building Code still leaves me sometimes wondering if the level of safety is high enough. There is still a continued lack of focus on Housing which is where the most fire deaths and injuries occur.
It's all over the place and very difficult to quantify. The aim of the VM was to produce the same level of safety as an equivalent building designed to the Acceptable Solution. It is quite clear that this is not the case.
Again, the fuel load density may not be enough in storage buildings. Human reaction time can result in fails for evacuation time in a 2.4m high ceiling. The VM2 method poorly accounts for peoples safety in low occupancy buildings. Surely even a single death is one too many, except that VM2 excludes some scenarios due to low occupant numbers, and small room sizes.
It depends on buildings
There is no guidance as to the level of safety afforded by VM2. As such, any manipulation that can be made under C/VM2 to achieve compliance is considered as signifcant level of safety. As such some designs have become an exercise in manipulating inputs, rather than acheiving a certain level of safety
Acceptable in some case, over conservative in others
As noted in previous response, we are effectively design for the statistical anomaly beyond the 99th percentile.

Question 17

Table C.108 Question 17 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Has the introduction of the Verification Method C/VM2 resulted in a more consistent level of fire safety for different buildings when compared to performance based designs undertaken before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	19.0%	4
No	14.3%	3
Undecided	66.7%	14
Clarify answer (optional)		7
	answered question	**21**
	skipped question	**0**

TABLE C.109 QUESTION 17 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Has the introduction of the Verification Method C/VM2 resulted in a more consistent level of fire safety for different buildings when compared to performance based designs undertaken before 2012?		
Answer Options	**Response Percent**	**Response Count**
Yes	42.3%	22
No	28.8%	15
Undecided	28.8%	15
Clarify answer (optional)		19
	answered question	**52**
	skipped question	**3**

TABLE C.110 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 17 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
To early to tell
Not Yet - there are some circumstances in which I have found a C/VM2 assessment shows that a building 'cannot work' almost regardless how many fire safety systems/features are thrown at it. I believe this is largely due to some of the prescribed inputs of C/VM2. However, I also understand that MBIE are aware of many of these complications and are working to resolve these. Unfortunately, many may have been resolved before the official introduction of the new Code/Compliance Documents if more rigorous trial/testing of the document had occurred beforehand. I also believe at present that there is crossover and in some cases redundancy of Design Scenarios - often based on an individuals interpretation of the current wording. e.g. there is a suggestions that a UT scenario fire affecting >50ppl needs to be modelled, where the Challenging Fire scenario (which one would expect, logically, to be more Challenging) is not required because this would only apply if >150ppl were potentially affected).
Due to consistent input parameters and tenability criteria it has improved
But it is too early to tell overall
No information or statistical analysis done to back any view.
The fire engineers often do not agree on outcomes and this leaves the applicant paying for the debate that follows.
To early to be able to give an accurate answer.
refer above
Insufficient number of C/VM2 designs presented to this BCA to date to decide
Possible But scenarios proposed by FEs are often less than worst case
Have not worked with C/VM2 enough to consider
a more consistent design approach, would more likely create cosnsistent level of safety; but may not always neccessary to provide a more consistent level of fire safety.
Depends on the designer
Consistently less safe than previous performance based design. This is OK overall though as previously performance based designs were required to be overly conservative.
Outside my technical understanding.
as noted above.
too soon to say
VM2 designs have pushed costs for applicants way way up, they are a poor response to the needs of industry. After all someone has to pay for these fanciful notions!
Overdesign is now the norm
I dont use C/VM2 so much to be able to comment
The requirement to consider robustness was often not considered in previous designs. This is less the VM than poor previous practice.
It is still too early to say, but the fixing of design/modelling inputs and parameters is a step in

the right direction
no tat all. There is no overall level of consistancy or competency in fire in NZ.
Not really, it has provided a mechanism for simplification provided that standardised solutions are used.
The VM are not performance-based designs. It is not possible to quantify this either as PBD can only be compared to the performance requirements of the code not each other or a compliance document. It could be argued that more consistency is being achieved with designs undertaken now than before the introduction of the VM, However it is evident that there is still a great deal of variability of application and interpretation occurring across the country so the answer has to be No.
More consistently following a wrong direction, like relying upon unventilated furnace tests to determine fire rating performance for products used in a ventilated environment.
since B-Risk has become an excercise in manipulation, those who better understand how to manipulate it can still reduce build costs where others cant
Consistency in the interpretation of the clauses and the modeling rules are not known
I have no experience of Pre-2012, but i suspect yes
Consistent, yes. It has brought the level of a number of other firms up to the standard that others had already been achieving.

Question 18

Table C.111 Question 18 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

The scenario analysis method in the Verification Method C/VM2 includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios.	14.3%	3
Credible scenarios, but not worst case.	23.8%	5
Less severe scenarios.	4.8%	1
Do not know.	52.4%	11
Other (please specify)	4.8%	1
	answered question	**21**
	skipped question	**0**

Table C.112 Question 18 with results from fire safety consultants from the survey on NZBC Clause C Protection from Fire.

The scenario analysis method in the Verification Method C/VM2 includes specific variables and values. In your opinion, what type of scenarios do the majority of these values represent? If no alternatives apply please use 'Other' and specify.		
Answer Options	**Response Percent**	**Response Count**
Credible worst case scenarios.	34.6%	18
Credible scenarios, but not worst case.	25.0%	13
Less severe scenarios.	3.8%	2
Do not know.	5.8%	3
Other (please specify)	30.8%	16
	answered question	**52**
	skipped question	**3**

TABLE C.113 RESPONSES TO THE CATEGORY 'OTHER (PLEASE SPECIFY)' TO QUESTION 18 REGARDING WHAT SCENARIOS THE VARIABLES IN C/VM2 DESCRIBE, FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Other (please specify)
We cannot consider these 'worst case'; otherwise we would be required to assume that every space is designed based on hypothetically what COULD be in the space rather than what IS in the space. [Which I have already seen several suggestions of from my most frequented BCA, for example suggesting that any space with a high ceiling must be designed as if it has storage to the height of the ceiling, even if it is not going to be used for storage at all]. In many cases the inputs will be conservative, e.g. fire growth rates that ignore the incipient phase; however conservatism is different to exaggeration.
The CF scenario is generally credible. The CS and UT scenarios, where modelling is required, are a farce. Depending on the modelling of internal partitions they are either the same as the CF (walls not modelled), or show that a fire burning in an enclosed room is fine, provided that detection is included.
I have doubts that such scenarios are of value - there are so many variables in predicting fire behaviours - all fire engineers working in this area need to get onto the fire ground and away from the lecture room??
Insufficient number of C/VM2 designs presented to this BCA to date to decide
Probably more like worst case scenarios.....and hence the benefit of sprinkler protection in the 'acceptable' level of fire safety.
credible in most cases but not for Unknown Threat
Worse than credible worse case scenarios, particularly when applied to existing buildings.
Incredible worst case scenarios. 50 MW fires reached in < 200 seconds. 30 s alarm polling time for automatic alarm system. Requirement for fire service intervention in unprinklered buildings (2 m clear layer height at 1200 s) more onerous than life safety requirements (occupants may escape though smoke provided visibility > 10m).
I dont use C/VM2 so much to be able to comment
In some situations the scenarios result in the need to provide excessive levels of fire safety.
Generally credible scenarios, but not necessarily the worst case
excessive scenario despcritions leading to unrealistic outcomes.
Sometimes appropriate but when clearly not appropriate the alternative design route is now seen as an absolute final option.
Some are credible, some are not. It depends on the situation. The whole problem with the VM is that is prescribes variables and values with the intent of achieving a defined level of performance. As with any prescriptive requirement it will be conservative for some buildings and not for others.
The majority represents medium to large size buildings with med to high level of occupancy where failure could result in deaths of 10-50 people minimum. The VM2 method does not account for smaller low occupant load buildings. It is possible to design a small storage building in accordance with VM2 but have it exempt from all 10 fire design scenarios.
WS lean towards the credible worst case whilst others are close to credible scenarios
They are in my opinion inconsistent as they will provide the worst credible case scenarios for some buildings, but less severe scenarios for other types of buildings and occupancies. They do not reflect reality.

Question 19

TABLE C.114 QUESTION 19 WITH RESULTS FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the guidance for design of complex buildings provided in the Verification Method C/VM2 comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	28.6%	6
No	14.3%	3
Undecided	57.1%	12
Clarify answer (optional)		2
	answered question	**21**
	skipped question	**0**

TABLE C.115 QUESTION 19 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Is the guidance for design of complex buildings provided in the Verification Method C/VM2 comprehensive enough?		
Answer Options	**Response Percent**	**Response Count**
Yes	23.1%	12
No	46.2%	24
Undecided	30.8%	16
Clarify answer (optional)		24
	answered question	**52**
	skipped question	**3**

TABLE C.116 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 19 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
VM2 is a framework, but does not contain enough material to be considered design guidance. VM2 relies heavily on designers making appropriate design decisions for design aspects that are not covered by VM2.
Design of a complex building under C/VM2 should be no different to a simple building under C/VM2: apply the scenarios as relevant, and demonstrate that the acceptance criteria are demonstrated. It is simply the number of Design Scenarios and number of spaces within the building that differ. [The main area lacking guidance presently is Interpretation of some paragraphs that can be understood differently depending on the individual reader and their role in the design/review process.]
Provided the designer is competent.
It is a work in progress
Insufficient number of C/VM2 designs presented to this BCA to date to decide
Have not worked with C/VM2 enough to consider
Generally
Except for the part on disproportionate collapse. Everyone appears clueless.
C/VM2 appears to cover basic generic usage for fire modelling and occupant egress rules only.
I have not used them sufficiently.
Outside my technical understanding.
What guidance? There are a number of statements made, but it is difficult to determine what is a nice idea, and what is statistically important.
usually depends on peer review input

Depends on complexity not enough for very complex or non standard buildings
I dont use C/VM2 so much to be able to comment
Good that there is the VM commentary, as it provides the basis for the values, and therefore a means of assessing over time if they are still valid or accurate in the face of new research. Some of the examples in the commentary do not comply with the VM requirements (warehouse growth rate, FED method in FDS example) or are unrealistic (resthome example vs actual resthome wards and
But there are lots of questions that get asked of MOBIE. There should be a list of these published regularly. The FAQ list on the website is a joke, it hasn't been updated for a very long time if at all
There are still a number of areas where the requirements are not clear.
Guidance could probably still be a bit better, but on the whole it is reasonable
what guidance...?
However it needs to recognise that many complex designs will fall outside some of the guidance given. In this case, MBIE should be able to provide specific guidance - for free.
for 'normal' buildings within NZ
It seems to have been tested (verified) an some simple layouts which worked and not pushed to its extents or tested enough.
too many loop holes and unclear sentences
There is still a lot of guidance from the commentry document, the MBIE website, and calrification emails from MBIE used to define the inputs.
But it goes a long way to covering most building types
More example case studies should be provided.
Yes and no. Guidance can be found in many places, and I am not convinced that a regulatory document is or can be sufficient for this purpose. I think it should be up to the engineer to seek out guidance for complex buildings and apply as appropriate, not necessarily be forced to apply standardised information as from C/VM2.
in my limited experience

Question 20

Table C.117 Question 20 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Do you believe that an alternative fire safety design outside the scope of Acceptable Solutions and the Verification Method is possible to get approved by Building Consent Authorities?		
Answer Options	**Response Percent**	**Response Count**
Yes	71.4%	15
No	23.8%	5
Undecided	4.8%	1
Clarify answer (optional)		4
	answered question	**21**
	skipped question	**0**

TABLE C.118 QUESTION 20 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Do you believe that an alternative fire safety design outside the scope of Acceptable Solutions and the Verification Method is possible to get approved by Building Consent Authorities?		
Answer Options	**Response Percent**	**Response Count**
Yes	57.7%	30
No	11.5%	6
Undecided	30.8%	16
Clarify answer (optional)		27
	answered question	**52**
	skipped question	**3**

TABLE C.119 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 20 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Have no experience with trying to get approval. Probably depends on the extent to which a design departs from VM2. Consent authorities are likely to want to be most comfortable applying VM2 requirements wherever possible to alternative solutions.
In theory. I have not tried yet. I think there would be an expectation of using as many of the inputs/acceptance criteria from C/VM2 as a starting point, and only further investigating and proposing alternative input/acceptance criteria where those of C/VM2 are not relevant or appropriate.
I have been involved in one project where this did happen.
As a BCA we are applying a common sence approach to small projects such as fitouts where for instance, fitting a cleaners sink to a bakery and the adjacent tenancy has an alarm system. We do not insist on the alarms extension to the effected fire cell.
is happening round the country
BCAs do not have the expertise and are unlikely to get the expertise. There got to be a better way if we are going to continue downs this track
The department has made it clear to councils ' if you approve such a design we will pull you accreditation' FACT well know in the industry , no one will write it put the department has told senoir staff this.
I'm sure it's happening all the time
If you have the right credentials and letters after your name, they will approve anything you say.
Not really possible;
Have not attempted this yet. It would likely be difficult
These are increasingly becoming evident where buildings/structures fall outside of both C/ASx and C/VM2 and which require utilising alternative solution for determining a mutually acceptable/compliant level of fire safety for the application at hand. I am aware Chch City Council are on occasion open to this and so to are Selwyn District Council.
For one-off, unique building types eg tunnels, Sky-like towers.
Only after an a lot of argument with MBIE, who solely want to use VM2 as the only method of determining alternative designs.
it is as long as building designing is a departure from the traditional building and there is sufficient research and thought in the alternative approach. it largely depends on peer review, NZFS and BCA involved
But the cost and time for the design is prohibitive.
Depends on Building Control Authority. MBIE have provided guidance advising BCAs not to allow. Christchurch Council inflexible and generally does not allow.
This question is also incorrect. Alternative solution is still an accepted mechanism to obtain approval in accordance with the ministry's guideline.
As was the case before the new code came into force
Theoretically possible, practically impossible

I have yet to try but will do so in the near future
Provided the BCA is open to the idea.
I had a case ** which wasn't in the VM and MBIE said to just ignore the VM and go ahead! Fire Service comment was they agreed with my design even though it didn't comply with the BC and that was accepted.
I have not seen examples of Alternative Solutions used since the new NZBC and C/VM2 became active
but just about as possible as a snowball lasting for a day in hell
However MBIE have made it clear that this should be an ansolute last resort and Councils (BCA's) do not have the skill to review the design so its seen as more trouble than it is worth.
maybe, but it all depends how knowledgable and open to new methods, the Building Concent Authorites are.
The building act allows compliance to be demonstrated '...by any means, including using a compliance dicument...'
Yes but it is very difficult. I have been directly involved in projects that cannot comply with the acceptable solutions or VM and as a result PBD has to be applied. These types of projects can get consent but they have taken months/years to get through the approvals route, have costed tens of thousands of dollars more than they should have and some stakeholders have objected and put barriers up to designs that do not comply with the AS or VM event though they cannot comply.
Only by determination. It should likewise be possible to use a UK fire safety standard to design a building in NZ, but have it approved by determination based on similar or better level of public safety results.
no experience
But BCA's are generally now too risk adverse to accept these
If fire safety is demonstrated to an acceptable level. However, in fire consulting, time is of the essence.
I have no experience with this, but suspect no
We have undertaken alternative deisgn These did not fit into either the C/AS or C/VM2.

Question 21

Table C.120 Question 21 with results from persons within a Building Consent Authority from the survey on NZBC Clause C Protection from Fire.

Should sensitivity analyses of input variables be more included in performance based fire safety designs in New Zealand than it currently is?		
Answer Options	**Response Percent**	**Response Count**
Yes	33.3%	7
No	4.8%	1
Undecided	61.9%	13
Clarify answer (optional)		2
	answered question	**21**
	skipped question	**0**

TABLE C.121 QUESTION 21 WITH RESULTS FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Should sensitivity analyses of input variables be more included in performance based fire safety designs in New Zealand than it currently is?		
Answer Options	**Response Percent**	**Response Count**
Yes	44.2%	23
No	23.1%	12
Undecided	32.7%	17
Clarify answer (optional)		23
	answered question	**52**
	skipped question	**3**

TABLE C.122 OPEN-ENDED ANSWERS TO THE OPTIONAL RESPONSE CATEGORY 'CLARIFY ANSWER (OPTIONAL)' TO QUESTION 21 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Clarify answer (optional)
Specific input values are important for design confidence. However, there is probably scope for more demanding application of the Robustness Check to test how sensitive or vulnerable a solution is to the various design assumptions.
Long term, yes this facilitates a risk-based approach to design. I doubt that NZ is currently ready for that, including likely few people who would have the right skills to undertake a thorough study. Based on present design approach of starting with C//VM2 (for performance based design) sensitivity studies are not current Required, but there is nothing preventing a diligent and thorough fire engineer from Choosing to investigate what difference changes in the input parameters would make to the design, and potentially Choosing to apply that in their consented design.
Provided that it does not muddy the waters around what is required and what is not.
Insufficient number of C/VM2 designs presented to this BCA to date to decide
only with clear guidance as to what do they mean and what do they represent in plain English
There is generally a lot of redundancy in the design already.
It can be proposed during FEB stage.
design parameters already appear conservative.
Outside my technical understanding.
We do not have a statistical basis for any of the fire code clauses, so how can we have any sensitivity analysis?
C/VM2 states it is not necessary, but for alternative designs, designers should always incorporate this as it is indicated in the IFEG
The level of sensitivity needs to be commensurate with the complexity at the moment there is only one size fits all
We are dealing with models of simplified systems and assumed fires that are going to be say +/- 15% wrong. There are times when I suspect that the statutory authorities have no idea what sensitivity analysis means (and nor do some fire engineers).
But not for VM design. The value are already excessively conservative
I dont do performance based designs so much to be able to comment
Not required for VM, but for first principles design, it needs to be done, and ideally some consideration of the likely hood and risk also included - i.e. 'is it likely enough to matter'
Not when we are using worst case fires
This would add further costs to already increased costs.
Most of the prescribed VM2 inputs are appropriately conservative. Sensitivity analysis would serve little purpose other than creating an additional level of complexity, cost and something to argue about between engineers and BCA's, the Fire Service and Peer Reviewers.
Mostly the inputs used in C/VM2 appear to include sufficient sensitivity, but at other times there should be more sensitivity analysis required
Not clear on the question. If you means a sensitivity analysis on the C/VM2 input variable,

then no. If you mean a sensitivity analysis on input variables used as part of an Alternative Solution, then yes.
BUT I'm presuming you're not directly relating this to adding sensitivity analysis to C/VM2
Should sensitivity analyses of input variables are a must and have historically been poorly applied in NZ. The problem is that it costs money to undertake sensitivity studies and clients do not want to pay for them. The situation is then exacerbated when incompetent engineers who have a very small fee are involved and cannot afford to do more than the most basic analysis and assessment
There should be more options available for the various types of buildings, ceiling heights, familiarity of buildings and therefore reduced reaction times, and storage intentions in buildings. There should also be better prescribed methods for smoke development.
Based on the values in VM2 I assume input sensitivity and distributions has been considered.
combining a number of credible worst case variable does not result in a credible worst case answer. This is a statistical anomaly. A sensitivity assessment would allow the key variable to be identified and more appropriately targeted design be undertaken. At the moment the answer to most problem is to add sprinklers to change the acceptance criteria, which in many cases does not actually change the exposure the occupants might experience.

Question 22

TABLE C.123 QUESTION 22 WITH RESPONSE PERCENTAGE RESULTS OF EACH STATEMENT FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S1. The requirements of NZBC Clause C Protection from Fire are clear.	10.8%	71.1%	4.8%	9.6%	2.4%	1.2%	83
S2. The requirements of the Acceptable Solutions C/AS1 to C/AS7 are clear.	9.6%	60.2%	6.0%	16.9%	3.6%	3.6%	83
S3. The requirements of the Verification Method C/VM2 are clear.	2.4%	43.4%	24.1%	16.9%	4.8%	8.4%	83
S4. The requirements of NZBC Clause C Protection from Fire allow for creative building designs.	4.8%	31.3%	27.7%	21.7%	12.0%	2.4%	83
S5. The requirements of the Verification Method C/VM2 allow for creative building designs.	3.6%	36.1%	30.1%	12.0%	10.8%	7.2%	83

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S6. The 2012 revision of NZBC Clause C Protection from Fire has resulted in better control that the functional requirements are complied with during the design process of a building.	6.0%	34.9%	31.3%	16.9%	9.6%	1.2%	83
S7. The 2012 revision of NZBC Clause C Protection from Fire has increased the level of fire safety for buildings.	6.0%	33.7%	26.5%	24.1%	6.0%	3.6%	83
S8. The 2012 revision has resulted in more consistent interpretations of the requirements within NZBC Clause C Protection from Fire.	2.4%	28.9%	33.7%	25.3%	6.0%	3.6%	83
S9. The specific performance criteria, such as visibility, that are now included in NZBC Clause C Protection from Fire has resulted in a better indication if the building is safe or not in the event of a fire.	1.2%	27.7%	39.8%	15.7%	9.6%	6.0%	83
S10. The 2012 revision of NZBC Clause C Protection from Fire has resulted in a better verification process for a buildings safety in the event of a fire.	4.8%	37.3%	31.3%	15.7%	2.4%	8.4%	83

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.							
Answer Options	**Strongly agree**	**Agree**	**Un decided**	**Dis agree**	**Strongly disagree**	**No opinion**	**Respo nse Count**
S11. The new Acceptable Solutions C/AS1 to C/AS7 are straightforward to apply for non-complex building designs.	7.2%	55.4%	12.0%	13.3%	8.4%	3.6%	83
						answered question	**83**
						skipped question	**6**

TABLE C.124 QUESTION 22 WITH RESULTS OF EACH STATEMENT FROM PERSONS WITHIN A BUILDING CONSENT AUTHORITY FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S1. The requirements of NZBC Clause C Protection from Fire are clear.	10.0%	70.0%	5.0%	15.0%	0.0%	0.0%	2.25	20
S2. The requirements of the Acceptable Solutions C/AS1 to C/AS7 are clear.	5.0%	75.0%	5.0%	15.0%	0.0%	0.0%	2.30	20
S3. The requirements of the Verification Method C/VM2 are clear.	0.0%	40.0%	25.0%	10.0%	10.0%	15.0%	2.88	20
S4. The requirements of NZBC Clause C Protection from Fire allow for creative building designs.	0.0%	25.0%	40.0%	30.0%	5.0%	0.0%	3.15	20

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S5. The requirements of the Verification Method C/VM2 allow for creative building designs.	0.0%	25.0%	50.0%	5.0%	5.0%	15.0%	2.88	20
S6. The 2012 revision of NZBC Clause C Protection from Fire has resulted in better control that the functional requirements are complied with during the design process of a building.	5.0%	40.0%	40.0%	5.0%	10.0%	0.0%	2.75	20
S7. The 2012 revision of NZBC Clause C Protection from Fire has increased the level of fire safety for buildings.	5.0%	30.0%	40.0%	10.0%	10.0%	5.0%	2.89	20
S8. The 2012 revision has resulted in more consistent interpretations of the requirements within NZBC Clause C Protection from Fire.	5.0%	35.0%	30.0%	25.0%	5.0%	0.0%	2.90	20

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S9. The specific performance criteria, such as visibility, that are now included in NZBC Clause C Protection from Fire has resulted in a better indication if the building is safe or not in the event of a fire.	0.0%	45.0%	35.0%	5.0%	0.0%	15.0%	2.53	20
S10. The 2012 revision of NZBC Clause C Protection from Fire has resulted in a better verification process for a buildings safety in the event of a fire.	0.0%	35.0%	40.0%	5.0%	0.0%	20.0%	2.63	20
S11. The new Acceptable Solutions C/AS1 to C/AS7 are straightforward to apply for non-complex building designs.	10.0%	65.0%	5.0%	10.0%	5.0%	5.0%	2.32	20
							answered question	**20**
							skipped question	**1**

TABLE C.125 QUESTION 22 WITH RESULTS OF EACH STATEMENT FROM FIRE SAFETY CONSULTANTS FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE.

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No opinion	Rating Average	Response Count
S1. The requirements of NZBC Clause C Protection from Fire are clear.	9.8%	70.6 %	5.9%	9.8%	2.0%	2.0%	2.22	51
S2. The requirements of the Acceptable Solutions C/AS1 to C/AS7 are clear.	11.8%	52.9 %	5.9%	21.6%	3.9%	3.9%	2.51	51
S3. The requirements of the Verification Method C/VM2 are clear.	2.0%	51.0 %	23.5%	21.6%	2.0%	0.0%	2.71	51
S4. The requirements of NZBC Clause C Protection from Fire allow for creative building designs.	3.9%	35.3 %	23.5%	19.6%	15.7%	2.0%	3.08	51
S5. The requirements of the Verification Method C/VM2 allow for creative building designs.	3.9%	41.2 %	25.5%	15.7%	13.7%	0.0%	2.94	51

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**No opinion**	**Rating Average**	**Response Count**
S6. The 2012 revision of NZBC Clause C Protection from Fire has resulted in better control that the functional requirements are complied with during the design process of a building.	5.9%	29.4%	31.4%	21.6%	9.8%	2.0%	3.00	51
S7. The 2012 revision of NZBC Clause C Protection from Fire has increased the level of fire safety for buildings.	7.8%	33.3%	25.5%	25.5%	5.9%	2.0%	2.88	51
S8. The 2012 revision has resulted in more consistent interpretations of the requirements within NZBC Clause C Protection from Fire.	0.0%	25.5%	37.3%	25.5%	7.8%	3.9%	3.16	51

Please indicate your opinion for the following statements related to NZBC Clause C Protection from Fire.								
Answer Options	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	No opinion	Rating Average	Response Count
S9. The specific performance criteria, such as visibility, that are now included in NZBC Clause C Protection from Fire has resulted in a better indication if the building is safe or not in the event of a fire.	0.0%	21.6 %	39.2%	21.6%	13.7%	3.9%	3.29	51
S10. The 2012 revision of NZBC Clause C Protection from Fire has resulted in a better verification process for a buildings safety in the event of a fire.	5.9%	39.2 %	29.4%	19.6%	3.9%	2.0%	2.76	51
S11. The new Acceptable Solutions C/AS1 to C/AS7 are straightforward to apply for non-complex building designs.	5.9%	52.9 %	9.8%	17.6%	9.8%	3.9%	2.71	51
							answered question	51
							skipped question	4

Question 23

TABLE C.126 OPEN-ENDED ANSWERS TO THE OPTIONAL QUESTION 23 FROM THE SURVEY ON NZBC CLAUSE C PROTECTION FROM FIRE WHERE RESPONDENTS WERE ASKED TO DESCRIBE PROBLEMS AND RESPECTIVE SOLUTIONS TO NZBC CLAUSE C AND THE CORRESPONDING COMPLIANCE DOCUMENTS.

Response Text

Response Text
This would require several pages. The most important change that could be made is to have an Interpretations Working Group that could respond to queries of application and interpretation nationally, for more consistent application for all BCAs across the country.
Too numerous to include my comments on what needs clarification, rewording, or completely re-writing! The C Clauses I think are generally fairly clear. C/VM2 has many issues (from small clarifications of wording through to significant differences in design outcome depending on interpretation) that ought to be either corrected or additional explanation included in the Commentary. My comments, concerns and suggestions are noted either directly or indirectly to MBIE.
Problems are with the alteration to existing buildings. Add new 'section' to allow for gap analysis against the acceptable solution.
MBIE should be dedicated to tidying up the ambiguities. They need to spend serious money to get serious results rather than rely on volunteer time (or partly subsidised) input to slowly develop answers/updates. A mechanism of commentary or similar which does not necessitate legislation changes could help clarify intent by use of examples of application.
Determine the Maximum occupancy of a building
The acceptable solutions appear to be from a mind reader with a crystal ball as the possible future use of some buildings makes the originasl or altered compliance severely onerous. The cost of compliance, particularly, through CVM2 and alternatives designs will stymie most if not all future building work.
Application of C/VM2 to minor fitout work is far too time consuming where FEBs are required to be reviewed by BCA, NZFS and then the design be peer reviewed. Fitout work to C'VM2, where the parameters have been established by a base building design to C/VM2, should be configured in such a way that they can be reviewed in-house by the BCA.
More worked examples in the document, more information regarding subdivisions (section 116A of the building act), specialised buildings to be given a separate risk group - residential care homes for example (people with illness having respite care with similar others in a residential house setting).
There needs to be a defined threshold for the verification method where the effect on the fire safety provisions are minor (alternative solutions). The use of a gap analysis would be more appropriate in this instance. The proposal to get the NZFS involved pre lodgement of consent is a better use of time and resources and will enable a more timely consent to be issued.
passive fire protection requires more detail or explainations
The major problem with the introduction of new Fire code is the lack of Consultation - the consultation may have been there but the reviewers I do not believe listened to what the fire engineering community suggested. I do not believe that the additional cost incurred have provided value for money - only a sharp increase in design costs. The change of fire codes in 1992 was a good step the pendulum has gone to far and needs to be brought back to an acceptable level.

Response Text
1) As Clause C refs to F6 you should have included F6 as there are areas of misunderstanding in Clause F6 & F6/AS1 2) C/AS Docs: Single external safe path separation/fire rating from the 'same firecell' when escape distance increase in length is not required. 3) C/AS Docs: Open path length example is rediculous 4) C/AS Docs some FRR property ratings seem 'over the top' 5) C/AS Docs 'Passing into adjacent firecell' should expalin what if not needing to recommence as a new open path 6) C/AS Docs suppriot functions in Exitways should be better desribed. 7) C/AS Docs Final exit separations required to achieve 5m for all occupancies...many clubs etc might struggle with that! 50 occ single escape and door can open inwards! but 51 two measns of escape and both doors must open outwards and be 5+m apart! 8) C/AS Docs Intermediate floors restriction to 'one' is rediculous as mutiple int. floors that comply with the floor area percentage rules are often shorter in escape path length. 9) C/AS Docs fig 4.16: Fire doors required for escape from below...but from above? Fig is confusing. 10) C/AS Docs re External Fire Spread Tables: Closest distance of firecell is rediculous when a firecell might step a long way back from the boundary yet still present a significan length to that boundary. Enough...gotta go home
Scrap the current C Doc's and reinstate the older version , the current version is worst than the old 1900 chapter 5.
Sledge hammer to crack a nut. Some relatively minor alterations default to C/VM2 meaning the cost of design far out weighs the value of the work
A building is proposed for the sale of bulk rural produce to rural people. The building has 2 offices and a 600m2 sales area. The building is deemed to be CA by the applicant, but WB by the BCA. The consent stalled due to refusal of BCA to accept that PGG Wrightson's Rural Store is a Selling Place, ie SHOP. Audit BCA's closer and more often.
More examples of buildings that can fit within the Risk Groups of the acceptable solutions e.g Alzheimers day care centre could be SI or CA. For the BCA risk adverse approach this would most probably be SI as opposed to CA. Ditto as above but apply to providing more examples of buildings with features that limit storage height. e.g. suspended lighting grid systems etc.
A better communication process between MBIE and the industry. Did not know that the errata 2 was released. No official notification. Perhaps, a more formal communication link tie-up with SFPE NZ Chapter?
The new Acceptable solutions are dumber and HARDER for applicants and much much more expensive. many people contemplating building consents are not getting consents or doing the work illegally due to the requirements of the Acceptable Solutions. At the same time the costs for a CPENG engineer to assess a building are prohibitive and fire engineers are both swamped and can't do any actual design as they push numbers around to provide sterile consideration of VM2. The new code is actively preventing development and is resulting in less safe buildings as people do work without consent. I think that they are a reprehensible attempt to create an industry that only drains money from the economy and stifles development. I have been doing fire design for 13 years from both sides of the fence and have never seen such an appalling cock-up as this.
Too much peer review. C/VM2 should be possible for submission without peer review if by cpeng. If not, then preparation should be allowed by non cpeng and possibly a peer review, depending on the complexity of design.

Response Text
New acceptable solutions C/AS1 to C/AS7 should be binned. The previous C/AS1 document should be resurrected but altered by a panel of Fire Engineers to fix the broken bits and to incorporate the fire safety precautions by the annex to the older C2/AS1,C3/AS1 and C4/AS1 Compliance Documents. C/VM2 needs definitions, needs to allow staff to close doors in resthomes, and needs a review of potential solutions that allows people to escape through smoke logged escape route(s). The Building Code should not have prescriptive requirements. The whole saga on Surface Finishes is an example that severly restricts ability to provide finishes desired and also should not have been rushed through without building suppliers undertaking the appropriate testing.
I believe the fire design of new buildings has been covered well by the new Acceptable Solutions C/AS1-7 and the new Verification Method C/VM2. How to apply these new documents to existing buildings (ie alterations, change of use, and subdivisions) is not adequately covered at this stage.
There are a number of basic problems associated with the above documents, all of which have been referred to MBIE, and none of which have been responded to. 1) The person responsible at MBIE is not a practicing fire safety engineer, nor has he ever worked as one. There is no statistical basis for any of the clauses in the NZBC C clauses. 3) The AS documents are comparatively simple to use, but again have no statistical basis for any of the statements. 4) The NZ Fire Service are still permitted to have an input from the sidelines, but have no responsibility for that input. 5) The prime reason for VM2 being produced was to lessen the arguments that were previously caused by the MBIE using the Acceptable Solutions as the benchmark for any determination process. With the lack of expertise in the MBIE, and no statistical basis for the Acceptable Solutions, we ended up with some very peculiar determinations. 6) On the face of it, the new fire code clauses are a step in the right direction, but in reality the VM2 documents are leading fire safety engineering back in to the wilderness. Any alternative design offered in compliance with the fire code clauses will be compared to the VM2 clauses, which have little (if any) factual basis. VM2 was produced for the MBIE benefit, not fire safety engineering.
The simplification of the Acceptable Solutions and the either/or approach to the VM has resulted in the majority of the ordinary commercial buildings which fit the Acceptable Solutions having a significantly higher level of fire safety and hence higher cost. But no upgrade to fire safety in private residences where most fire deaths occur. Despite the avowed philosphy of the code to protect life rather than property, this upgrade is centred on property protection rather than on life safety.
The issue of a minor or single aspect variation to the c/AS documentation triggering the full requirements of C/VM2 results in huge increase in costs. Typically a C/VM2 costs $20-30,000.Often half of this in getting the BCA and the FS to agree what is to be modelled
There are 'issues' that arise on almost every C/VM2 job from poor specification of fire chemistry, unrealistic requirements for design fires, inadequate calculation techniques, inappropriate specifications for detection, unrealistic provisions for storage height, ...

Response Text
C/VM2 should be optional not compulsory. Entire C/VM2 assessment should not be required for minor alterations to existing buildings. Fire fighting operational requirements need to be revised to make them applicable to FDS modelling and real life fire fighting requirements. FEB process for C/VM2 should be optional. MBIE should not be providing advice to indidual consultants. Industry need to be involved in feedback process, not just those who wrote the codes (who are also involved in determinations). The standard even of CPEng engineers varies greatly. Fire service add cost, no value, and often operate outside regulatory framework.
I would suggest that the old CAS1 were very good documents and the only people that struggled with these were fire engineers who wanted to push the boundaries. The alternative solution route was always there for innovation the biggest problem was the governmet allowed the NZ Fire Service too much say, there reports castigated many of the fire engineers, and rather than deal to these issues they allowed another group to make changes and try and get around involving the fire service. The Fire service should be involved at the start as part of the FEB process , everything is recored in the a form of a memo which is circulated to all involved with the FEB and all parties who were involved should review design and all parties provide PS2's on completion which includes the fire service as they are the ones that deal with the building from the time it is completed. Good luck its a mess. The fire engineers will think its a great success as there practices have probably increased markedly with there output and had to increase staffing levels and they can basically charge what they like. Some of the fees are very high for jobs which would have been simple jobs under CAS1. The time to process these are in some cases trebling etc. I think they should be reviewing the fire engineering designs being presented around the country, possibly a central register to have these all on file, so these cannot be lost as has happened in other disasters etc. I would suggest an easy solution is too simple modify the old CAS1 documents a little etc and go back to the old system which worked fine for most.
Section 1.3 of C/ASx should be altered so that it should say, 'Where compliance with the requirements of the Building Act for alterations and changes of use us not fully demonstrated through using this Acceptable Solution, Verification Method C/VM2 'could' be used to demonstrate compliance.
There are often no options to provide a 'higher' level of safety under acceptable soultions without going VM2 - eg sprinklers for small retail buildings still need smoke detection according to MoBIE advice.

Response Text
FEB process with BCA and NZFS is cumbersome and often has no value and significant cost for simple projects (especially new buildings), and adds extensive delays (1.5-2 months). Should be optional,and there needs to be a timeframe for replies where NZFS /BCA have aggreed if no reply.Needs to be process if no agreement can be reached. C/ASx fire spread tables are to conservative (C/AS4 assuems all buildings 6m high) - needs 0-3m hight table and 3m+, and a wing wall single value for length, as wing walls need to be FRR full length irrespective of length of wall as currently written. Requirement for the entire building to be sprinklered if one floor (eg basement carpark) or have same alarm everywere in all firecells is not preacticable and expensive. Automatic alarm system in firecells >life rating would be adequate - consider a kitchen in a firecell, would need smoke detection due to the restaurant upstairs,which is not a suitable detection method. Requirement to sprinkler spraypainting shops (eg every panelbeater in the country) is unrealistic, uncosted and does not reflect the risk, which is more to do with HSNO storage, and sprinkler systems usually need foam and NFPA 30 protection for thinners fires. Requirement to use VM if C/AS not 100% means every resthome in NZ isa VM project due to 30min vs 60min ward firewalls,and no sprinkler tank. A sprinkelr tank is $250k - $500k (underground with vertical turbine pump) and does not appear justified by the risk based on fire stats, C/ASx should allow unsprinklered buildings over 5m storage / coolstores over 3m up to an area limit e.g. 1200sqm to allow most industrial buildings. Requiement for burnout in excess of 4hrs for unsprinklered buildings with light metal roof is not backed up by fires where boudnary walls have collapsed even if the fire has been burning for a long period. Getting over 4 hours is difficult as no systems have been tested and ratings are not additive (look at radiation received over ISO834 curve). Occuapnt density has increased in some cases (e.g. shops) without justification. Occupacny in industrial uses (workshops and process) is often much higher than realistic and there is no ability in the VM to set occupancy to suit the actual use of the industrial building e.g highly automated factory. Finally, the issue with fire safety is often not design, but post construction maintenance and use, isolated systems, poorly or non comisioned systmes, or one that have changed over the life of the building to be incorrrect, faulty fire doors or penetrations,e tc
Building occupant densities are highly conservative and frequently produce unrealistic occupant numbers to the detriment of the project. A solution is to allow variation from the published criteria providing certain factors are addressed - eg legal unconsented changes in the building over the lifetime of the building. The NZ Fire Service appears to be able to hold projects to ransom by not providing hard data to justify their stance in applying building code C5.6. Exposure to radiation from a window, C/VM2 3.6.3, assumes that the building flashes over as the occupant departs the building and that post flashover radiation from windows is experienced immediately. This over conservative result can produce harsh design results that are totally inconsistent with the allowances in the acceptable solutions. Some cognisance should be given to time to flashover.
No cost benefit analysis was undertaken prior to implementing the changes. No formal forum that issues interpretations of the documents. The MBIE could provide a formal channel that lists and publishes interpretations and determinations. At present an email is sent to an MBIE representative and is replied, the wider members of the industry is not notified unless privy to the communcation.
The documents need to be written in a more logical and clear manner, to avoid the need for interpretation. C/VM2 is apparently supposed to be a framework, however the document portrays itself as a perscriptive method.

Response Text
Sorry, not in 15 minutes! I have made regular submissions to MBIE/DBH and SFPE and it seems that it does not make an iota of difference
1) I believe the process by which the documents were born was too dominated by academics and regulators and would have been far better served with the involvement of more people with consulting backgrounds. 2) The Verification Method approach is a good one to 'regulate' fire engineering design. It is not without its shortcomings but has given a good tool that benchmarks buildings quantitatively when the Acceptable Solutions do not apply. 3) The narrowing of the scope of the acceptable solutions mow makes it much clearer as to what does and does not comply with the Acceptable Solutions. Previously the Acc Solns were vague and called for interpretation and many projects were deemed to be Acc Soln with 'minor' amendments. That has now effectively stopped...which is a good thing. 4) I believe in today's world where all Codes are predominantly issued electronically the regulators should act rapidly to iterate the documents to eliminate ambiguity with a rapid revision cycle. Docs could be reissued every month for the first year to eliminate simple issues relating to interpretation and wording of clauses without major disruption. This would need to be done with significant input from consulting engineers and as such would be somewhat costly but benefits would outweigh the costs significantly.
1) Nationalised Building Consent process as there are still too many variances between Local Authorities, 2) Registration & Licensing of Fire Engineers
Couple of quick points: - Change section 112 of the Building Act to only require the level of fire safety to be maintained if a building is altered (albeit with new building works complying fully with the NZBC). - BCA should fully rely on a third party peer reviewer to determine compliance or the BCA should have in-house CPEng fire engineer. - NZFS Engineering Unit to 'sign-off' all non-Acceptable Solution designs i.e. more of a regulatory role than they currently provide (the reason for this is that the NZFS have the expertise, i.e. CPEng engineers, to undertake this role whereas the BCAs typically do not). - Anybody submitting a non- Acceptable Solution design should be a CPEng fire engineer.
Tha main issues are that C/AS1-7 compliant building designs cannot be demonstrated as meeting the building Code when the same geometry is put through the C/VM2 process. this is not acceptible. In the instances where a minor non-compliance with a clause in C/AS1-7 is found, the design should be able to drop into C/VM2 and pass - it doesnt happen in reality. The C/VM2 and building code revision were not tested far enough before being released. asa aresult every time we undertake a C/VM2 design, we find issues which really were easy to find BEFORE the code changed. The C/VM2 design we are undertaking are demonstrably resulting in a higher level of fire safety in buildings due to increased systems required (for example we no longer seem to come across heat detection systems). This is despite the MBIE line being that the code change would not (this was said before the change) and has not (this is still being said after the change) reusult in an increase or decrease in the required level of safety.
The problems with the changes are far too great and complex to describe here. Holistically the new code and basis is flawed. It was a requirement of the changes to ensure that the new code and associated documents did not increase the level of safety or cost associated with buildings from that previously in place. This was a flawed approach and assumed that the existing documents were achieving and acceptable level of safety. In summary the MBIE have replaced a broken system with a flawed one which does nothing for fire engineering and little for public safety. The long term outlook of fire engineering in New Zealand is not good and I hope the rest of the world looks at New Zealand, sees what a failure it has been and steers another course to achieving our goal – which is safe buildings.
rationalization between NZBC codes and NZS - for example escape route widths and door widths - consideration regarding sprinkler installation (where are the deaths from fire generally occurring) Bring back passive smoke and heat release (it has been demonstrated in real fire situations to have provided relief to flashover etc)

Response Text
There needs to be solid guidance from MBIE as to who can undertake VM2 designs, which should be in the form of a national register. When dealing with existing buildings, the new MBIE draft guidance goes to the point of conducting a C/ASx gap-analysis on a specifically designed building. Specific design using the VM2 and C/ASx are not comparable, and should not be treated as such. Some buildings designed to C/ASx dont comply with the VM2, the two methods of assessment dont align well. Finally under the verification method it is often benificial to have as few fire/smoke separations as possible, which completely contradicts engineering judgement and historical fire evidence. VM2 promotes the use of large spaces with no fire walls.
Suggest FDS chemistry is fixed in VM2, HRRPUA also should be stated.
The VM2 process needs a little more flexibility or not quite so strict parameters for alterations to existing buildings, it sometimes results in over-engineered buildings when compared to the Acceptable Solutions.
Don't put the prescriptive requirements within the NZBC clauses. Allow use of sensitivity assessment of the input variable to determine where in the statistical range the proposed solution is sitting. The safety of a building is not black and white, pass and fail. All buildings are different and the safe of a building must be considered in context.