Thesis 146

Evaluation of the effects of rebuilt bicycle paths at intersections on arterial streets in Lund
– a case study.

Stefanie König
2006

Lund Institute of Technology
Department of Technology and Society
Traffic and Road

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Examensarbete CODEN:LUTVDG/(TVTT-5113)1-139/2006

Thesis / Lunds Tekniska Högskola, ISSN 1651-1182
Instutionen för Teknik och samhälle,
Trafik och väg, 146

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Keywords:
cycle crossing, elevation / hump, red and grey coloured, intersection, traffic safety, Lund

Abstract:
The safety of cyclists at intersections is tried to be improved by new construction types of cycle crossings. These crossings are elevated and red-grey coloured.
Cyclists' safety is evaluated by literature studies, accident analysis and observational studies such as speed measurements, behaviour studies, conflict studies and interviews. The field observations take place at two pairs of junctions –each pair consisting of one rebuilt and one control junction. The results are speed reductions of cars and a higher number of priority getting cyclists at rebuilt junctions. Moreover, an unconscious interpretation of the reconstructed crossings by cyclists' having priority and a lack of knowledge concerning the right of way regulations are assumed.
The final conclusion is that the total safety seems to be unchanged at both construction types. However, the components of safety differ. There seems to exist more self-confident cyclists and more defensive drivers at the reconstructed junctions.

Citation:
König S., Evaluation of the effects of rebuilt bicycle paths at intersections on arterial streets in Lund – a case study. Lund University, Lund Institute of Technology, Department of Technology and Society, 2006. Thesis. 146

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Preface

After half a year as exchange student at the Lund Institute of Technology, I extended my stay in order to write my thesis about the subject of cyclists' traffic safety at the Department of Technology and Society. This thesis is written within the scope of my academic education in the subject of Traffic and Transports at the Technical University of Berlin. The experiences and knowledge concerning Swedish traffic planning and the different ways of handling problems are an extensive enrichment to my previous studies in Germany.

I want to thank especially my supervisor Prof. András Várhelyi for his excellent help and support during the whole thesis and to David Edman from the municipally of Lund for giving the hint to the subject and useful information about cycle crossings in Lund. Also thanks to Pia Jablonsky from the International Office who finally managed the extension of my stay. Further, thanks to Prof. Richter and Tanja Zimmermann from TU Berlin (Fachgebiet Straßenplanung und Straßenverkehr) for useful advices and support.

Lund, February 2006

Stefanie König

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Summary

Safety is always an important context when dealing with traffic issues like new constructions. In this thesis the traffic safety of cyclists is researched at rebuilt cycle crossing. Characteristic aspects of these crossings are an elevation and their red-grey colour. This thesis considers crossings built on side streets at intersections with arterial streets in Lund / Sweden.

The aim is in general to find an answer to the question: Is the traffic safety of cyclists increased by these cycle paths? In order to answer this question six hypotheses are formed, which are evaluated by several studies. Afterwards the results are combined and discussed under two topics: 1st interactions and undisturbed passages and 2nd objective and subjective safety.

While the literature studies and the accident analysis focus among others on Sweden the field observations –except the interviews– concentrate on four junctions in Lund. These four intersections create two pairs of junctions whereas each consists of one rebuilt and one non-rebuilt intersection. The junctions of a pair are investigated based on comparable traffic volumes, surroundings and traffic compositions but also on similar geometries. For this purpose on-site observations and counts of traffic volumes are made. Further, the comparability of these junctions is underlined by the results of the speed measurements. Both pairs differ from each other in one basic characteristic. Whereas the priority giving line for drivers coming from the side street is after the cycle crossing at the junctions of the 1st pair, this line is before the cycle crossing at the junctions of the 2nd pair.

Within the literature studies it turns out that the influence of red colour is just rarely discussed. However, physical and psychological characteristics are found. Here, it is to point out that red is a colour with a fast recognizable meaning. But the colour itself has to be used under bright lightning conditions in order to be seen. Psychological effects of red are to be activating, aggressive and having a general warning effect on people. Relating to the characteristics of humps it is written that these are usual elements in order to force drivers to slow down –especially before crossings for non-motorized road users. However, especially if humps are combined with such crossings, misunderstandings between road users might be generated. Moreover, the literature study deals with the right of way regulations at cycle crossings, which turn out to be quite confusing. In order to know who has to give way cyclists have to study the intersection carefully. Here, they must check about the presence of squares and triangles on road's surface. Additionally, they have to remember paragraphs in the Swedish traffic law.

From the accident analysis no clear conclusions can be drawn. As a matter of fact it might be supposed that the rebuilt cycle crossings lead neither to an increased nor to a decreased number of accidents between cars and cyclists. The accidents in Lund are checked by the use of STRADA (*S*wedish *TR*affic *A*ccident *D*ata *A*cquisition). Besides the most common kind of cyclist accidents are single accidents and only the second most frequent reason consists of accidents between motorized vehicles and cyclists. Moreover, this analysis shows that the general development of accidents in Lund follows the trends in Sweden and Skåne.

The speed measurements of drivers and cyclists are carried out by the use of radar. These measurements are taken when road users have undisturbed passages. By this observation generally slower speeds of drivers are measured at the cycle crossings of the rebuilt junctions. These speeds differ up to 50%. However, the dimension of retardation stands in context with the position of the priority giving traffic signs. There are less speed changes when these signs are after the crossing compared to the situation when these signs are before the crossing. Further, cyclists' speed behaviour are characterized by less retardation and more acceleration at rebuilt than at non-rebuilt junctions.

The behaviour studies reflect that cyclists get more often priority at the reconstructed (about 2/3) than at non-reconstructed junctions (about 1/2). Within these studies relationships between behaviour and both the position of the priority giving traffic signs and the types of construction are found. One result is that road users' behaviour during an interaction are in general determined by staying in motion as long as possible. However, this behaviour is stronger developed at rebuilt junctions. Further results are: first, priority taking cyclists cross faster during an interaction at rebuilt junctions and second, if cyclists stop before a junction they do it at non-reconstructed intersections. The third aspect is that cars stand rather on the crossing when the traffic sign is before the crossing.

Within standardized interviews 30 cyclists per junction of one pair are asked questions relating to the cycle crossing. The absolute majority of the interviewees are formed by everyday riding cyclists on the according path who are between 18 and 60 years. The distribution between male and female is about fifty-fifty. The results show that cyclists have a lack of knowledge concerning the right of way regulations. About half of them think cars have priority at non-rebuilt junctions whereas it is about a third who think so at rebuilt junctions. In the sum the results lead to the assumption that the uncertainties relating to the handling of give way situations are bigger at the rebuilt junctions. Further, the interviews visualize that most cyclists –independent from the type of construction– think the cycle crossing colour is white after passing it. Moreover, it is discovered that the safety feeling of cyclists does not differ at both kinds of junctions. In general they feel more safe than unsafe.

The conflict studies follow the guideline of the Swedish Conflict Technique. Relating to the aspect of serious conflicts between cyclists and drivers no conclusion can be drawn. However, there are in general more serious conflicts at non-rebuilt junctions than at rebuilt ones.

The final conclusion from theses studies is that the total safety of cyclists is unchanged. However, in detail the relevant participations per road user have moved. Whereas cyclists cross more self-confident reconstructed junctions drivers behave rather defensive at these junctions compared to non-rebuilt intersections. At last the uncertainties relating to the right of way regulations by cyclists, which is combined by their thinking of having priority seem to be causal for this development. This context is generated by a partly unconscious interpretation of the construction with its characteristic elements.

Finally, it is concluded that these kinds of construction have potential to improve cyclists' total traffic safety. For this it might be helpful to visualize the right of way regulation –e.g. by traffic signs at the cycle paths– for approaching cyclists.

Sammanfattning

Säkerhet är alltid viktig om man arbetar med problem som nya konstruktioner i trafikplaneringen. Därför undersöks trafiksäkerheten av cyklister på nya cykelöverfartkonstruktioner i detta examensarbete. Typiska egenskaper av nya cykelöverfarterna är en upphöjning och deras röd-gråa färg. Inom ramen av exjobbet studeras överfarter på sidogator som korsar huvudgator i Lund / Sverige.

Syftet är att hitta ett svar på frågan: Ökar cyklisters trafiksäkerhet med dessa överfarter? För att svara på denna fråga ställdes sex hypoteser, som utvärderas med hjälp av olika studier. Efteråt kombineras resultaten och diskuteras under två ämnen: 1:a interaktioner och ostörda passager och 2:a objektiv och subjektiv säkerhet.

Litteraturstudier och olycksstudier fokuserar på effekterna av åtgärderna allmänt, de empiriska studierna koncentrerar på fyra korsningar i Lund. Dessa fyra korsningar bildar två par, var varje par består av en ombyggd och en icke ombyggd korsning. Korsningarna av ett par har jämförbara trafikmängder, omgivningar och trafiksammansättningar men även likvärdig geometri. Ytterligare jämförbarheten av korsningar betonas med resultatet av hastighetsmätningar. Båda par skiljer sig i en grundläggande egenskap. Medan väjningslinjen för bilister som kommer från sidogata finns efter cykelöverfarten hos korsningar av första paret, ligger väjningslinjen hos korsningar av andra paret framför cykelöverfarten.

Det visade sig i litteraturstudien att effekterna av röd färg diskuteras sällan. Dock hittas fysiska och psykologiska egenskaper. Härmed poängteras att röd är en färg som kan snabbt uppfatts. Men färgen själv måste man använda med bra belysning för att man känner den igen. Psykologiska effekter av röd är att färgen verkar aktiverande, aggressiv och att färgen har en allmän varningseffekt till människor. Beträffande egenskaperna av upphöjningar skrivs att det handlar sig om allmänna möjligheter att tvinga bilister att sakta ner –speciellt framför övergångsställen / överfarter för inte motoriserade trafikanter. Dock när upphöjningar kombineras med sådana övergångsställen / överfarter kan uppvecklas missförstånd mellan trafikanter. Litteraturstudien också handlar om företrädsregleringar vid cykelöverfarter och det visade sig att reglerna är förvirrande. För att veta vem måste ge företräde, måste cyklister noga studera korsningen. Här måste de kolla om det finns kvadrater och trianglar på vägytan. Vidare måste de minnas olika paragrafer i Trafikförordningen.

Från olyckstudien kunde inte dras några tydliga slutsatser. Men det antas att ombyggda cykelöverfarter leder varken till mer eller till mindre antal olyckor mellan cyklister och bilister. Olyckor i Lund analyseras med STRADA (*S*wedish *TR*affic *A*ccident *D*ata *A*cquisition). Dessutom är singelolyckor den vanligaste varianten av cykelolyckor och bara den andra vanligaste varianten är olyckor mellan cyklister och bilister. Vidare reflekterar denna studie att utvecklingen av olyckor i Lund motsvarar trenden i Sverige och Skåne.

Hastighetsmätningar av bilister och cyklister realiseras med hjälp av en radar. Dessa mätningar är gjorda när trafikanter passerar utan störningar. Med denna studie konstateras att det finns i allmänhet lägre bilhastigheter vid ombyggda cykelöverfarter. Hastigheterna skiljer sig ändå till 50%. Fördröjningen har ett samband med positionen av väjningslinjen. Det finns mindre förändringar när väjningslinjen är markerad efter cykelöverfarten jämförd med situationen om den ligger före överfarten. Vidare påverkas hastigheter av cyklister av mindre fördröjning och mer acceleration vid ombyggda än vid icke ombyggda korsningar.

Beteendestudien visar att cyklister oftare erhåller företräde vid ombyggda (ca 2/3) än vid icke ombyggda (ca 1/2) korsningar. Studien visar också samband mellan beteenden och väjningslinjens position så väl som konstruktionstyp. Ett resultat är, att trafikantbeteendet under en interaktion är dominerad av strävan att förbli i rörelse så länge som möjligt. Visserligen utvecklas detta beteende starkare vid ombyggda korsningar. Vidare resultat är: först, cyklister som tar företräde korsar snabbare i en interaktion vid ombyggda korsningar och det andra, om cyklister stannar före en korsning, gör de det vid icke ombyggda korsningar. Tredje resultatet är att bilar stannar oftare på överfarten, om väjningslinjen ligger före överfarten.

30 cyklister per korsning vid ett av paren intervjuades med standardiserade intervjuer om cykelöverfarten. Absolut flertal av cyklister cyklar där varje dag och är mellan 18 och 60 år gamla. Andelar av kvinnor och män är av ungefär lika storlek. Resultat visar att cyklister har kunskapsluckor med företrädsregleringen. Nära hälften av cyklister tror att bilar har företräd vid icke ombyggda korsningar däremot finns det en tredjedel som tror så vid ombyggda korsningar. Om man tittar på alla fakta, så kan man anta att osäkerheten är större vid ombyggda korsningar. Dessutom visar intervjuer att cyklister tror –oavhängig från konstruktionstyp– att cykelöverfarts färg är vit, efter de passerade överfarten. Vidare upptäckas, att säkerhetskänslan av cyklister inte skiljer sig –mer säker än osäker– vid de två korsningstyperna.

Konfliktstudien enligt Swedish Conflict Technique, baserat på svåra konflikter mellan bilister och cyklister kan inte påvisa några skillnad. Dock finns det i allmänhet ett högre antal svåra konflikter vid icke ombyggda än vid ombyggda korsningar.

Totalt sett visar resultaten från dessa studier en oförändrad säkerhet för cyklister. Dock visar detaljstudier att relevanta delar av beteende ändras. Medan cyklister korsar ombyggda korsningar självsäkrare, handlar bilister hellre mer defensivt vid dessa korsningar, jämförts med icke ombyggda korsningar.

Slutligen framstår cyklisters osäkerhet om företrädsrätt kombinerad med deras uppfattning att ha företräde som bakomliggande orsak för utvecklingen. Detta sammanhang bildas på grund av delvis omedveten tolkning av konstruktionen med dess karakteristika elementer.

Zusammenfassung

Die Verkehrssicherheit ist stets ein wichtiger Bestandteil der Verkehrsplanung. Diskussionspunkte hinsichtlich der Verkehrssicherheit ergeben sich z.B. auf Grund neuer Konstruktionen. In dieser Diplomarbeit wird die Verkehrssicherheit von Radfahrern an umgestalteten Radüberfahrten untersucht. Die charakteristischen Eigenschaften dieser Überfahrten sind ihre Erhöhung sowie ihre rot-graue Färbung. Im Rahmen dieser Diplomarbeit werden Überfahrten auf Nebenstraßen berücksichtigt, die sich an Knotenpunkten von Neben- und Hauptstraßen in Lund / Schweden befinden.

Das Ziel ist es, eine generelle Antwort auf folgende Frage zu finden: Wird die Verkehrssicherheit von Radfahrern durch diese Überfahrten gesteigert? Um diese Frage zu beantworten werden sechs Hypothesen aufgestellt. Diese werden mittels unterschiedlicher Maßnahmen untersucht. Anschließend werden die Ergebnisse einander gegenübergestellt und unter den folgenden zwei Aspekten: 1. Interaktion und freie Fahrt und 2. Objektive und subjektive Sicherheit diskutiert.

Während sich die Literaturstudie und die Unfallanalyse u.a. auf ganz Schweden bezieht, konzentrieren sich die Felduntersuchungen –außer den Interviews– auf vier Kreuzungen in Lund. Diese vier Kreuzungen bilden zwei Kreuzungspaare, wobei jedes Paar aus einer umgebauten und einer nicht umgebauten Kreuzung besteht. Die Kreuzungen eines Paares werden auf Grund vergleichbarer Verkehrsstärken, Umfelder und Verkehrsarten sowie Geometrien definiert. Zur Ermittlung dieser Eigenschaften werden Begehungen und Verkehrszählungen durchgeführt. Weiterhin wird die Vergleichbarkeit der Kreuzungen durch die Ergebnisse der Geschwindigkeitsmessungen bekräftigt. Beide Kreuzungspaare unterscheiden sich voneinander in einem grundlegenden Kriterium. Während sich die Wartelinien am ersten Paar aus Sicht des Autofahrers, der aus der Seitenstraße kommt, hinter der Radüberfahrt befinden, sind die Linien an den Kreuzungen des zweiten Paares vor der Radüberfahrt.

Innerhalb der Literaturstudie wird deutlich, daß der Einfluß roter Farbe recht wenig diskutiert ist. Dennoch können physikalische sowie psychologische Einflüsse hier dargestellt werden. Hierbei ist ein Aspekt, daß Rot eine Farbe ist, deren Bedeutung schnell erkannt wird. Allerdings muß die Farbe unter hellen Lichtverhältnissen angewandt werden, damit sie gesehen wird. Des Weiteren sind psychologische Wirkungen von Rot, dass die Farbe aktivierend und aggressiv ist sowie, daß sie einen generellen Warnungseffekt auf Menschen ausübt. Bezüglich der Merkmale von Teilaufpflasterungen zeigt die Literaturstudie, dass es sich hierbei um eine übliche Maßnahmen handelt, um Autofahrer zur Verringerung ihrer Geschwindigkeit zu veranlassen. Diese gilt insbesondere vor Querungsmöglichkeiten für nicht-motorisierte Verkehrsteilnehmer. Allerdings können besonders Kombinationen solcher Querungen mit Teilaufpflasterungen Missverständnisse bzgl. der Vorfahrtsregelung zwischen den Verkehrsteilnehmern erzeugen. Weiterhin befaßt sich die Literaturstudie mit der Vorfahrtsregelung an Radüberfahrten, welche sich als ziemlich verwirrend herausstellt. So müssen Radfahrer, um zu erfahren wer Vorfahrt geben muß, den Kreuzungsbereich sorgfältig studieren. Hierbei müssen sie auf eventuell vorhandene Quadrate und Dreiecke auf der Fahrbahnoberfläche achten. Zusätzlich müssen sie sich an Paragraphen in der Straßenverkehrsordnung erinnern.

Aus der Unfallanalyse können keine deutlichen Schlußfolgerungen gezogen werden. Allerdings wird die Tatsache vermutet, daß die umgebauten Überfahrten weder zu einer größeren noch zu einer geringeren Anzahl an Unfällen zwischen Rad- und Autofahrern führt. Die Unfallanalyse für Lund basiert auf der Datenbasis von STRADA (*S*wedish *TR*affic *A*ccident *D*ata *A*cquisition – Schwedische Verkehrsunfalldatenbank). Nebenbei bemerkt ist die häufigste Unfallursache bei Radfahrern der Einzelunfall und nur die zweithäufigste Ursache sind Unfälle zwischen Rad- und Autofahrern. Weiterhin zeigt die Analyse, daß die Entwicklung der Unfallzahlen in Lund den Trends von Skåne und Schweden entspricht.

Die Geschwindigkeitsmessungen von Auto- und Radfahrern werden mittels eines Handradargerätes durchgeführt. Es werden Verkehrsteilnehmer berücksichtigt, die eine hindernisfreie Fahrt haben. Bei dieser Untersuchung werden generell geringere Geschwindigkeiten von Autofahrern an den Radüberfahrten der umgebauten Kreuzungen gemessen. Diese Geschwindigkeiten unterscheiden sich um bis zu 50%. Jedoch steht der Umfang der Geschwindigkeitsverringerung im Zusammenhang mit der Position der Markierungen für die Vorfahrtsregelung. Ist die Markierung hinter der Radüberfahrt, so findet eine geringe Veränderung der Geschwindigkeiten statt, als wenn die sie vor der Kreuzung ist. Ferner ist das Geschwindigkeitsverhalten der Radfahrer an umgebauten Kreuzungen durch weniger Verlangsamung und mehr Beschleunigung, im Vergleich zu den nicht umgebauten Kreuzungen bestimmt.

Die Verhaltensstudie reflektiert, daß Radfahrer öfter an umgebauten (ca. 2/3 der Fälle) als an nicht umgebauten Kreuzungen (ca. 1/2 der Fälle) Vorfahrt erhalten. Innerhalb dieser Studie werden Zusammenhänge zwischen dem Verhalten und der Position der Vorfahrtsmarkierung sowie der Konstruktionsweise herausgearbeitet. Ein Ergebnis ist, daß während einer Interaktion das Verhalten der Verkehrsteilnehmer dadurch bestimmt ist, daß die so lange wie möglich in Bewegung bleiben. Weitere Ergebnisse sind: 1. vorfahrtnehmende Radfahrer kreuzen während einer Interaktion schneller an umgebauten Kreuzungen und 2. wenn Radfahrer an einer Kreuzung anhalten, dann tun sie dieses an nicht umgebauten Kreuzungen. Der dritte Aspekt ist, daß Autos eher auf Radüberfahrten stehen, wenn sich die vorfahrtsregulierende Markierung vor der Überfahrt befindet.

Mittels standardisierter Interviews werden 30 Radfahrer pro Kreuzung eines Kreuzungspaares bezüglich der Radüberfahrten befragt. Die absolute Mehrheit der Befragten fährt täglich auf diesem Radweg und ist zwischen 18 und 60 Jahre alt. Die geschlechterspezifische Verteilung steht etwa in einem Verhältnis von 1:1. Die Ergebnisse zeigen, daß Radfahrer Wissenslücken bezüglich der Vorfahrtsregelung aufweisen. Allerdings denkt die Hälfte aller Befragten an der nicht umgebauten Kreuzung, daß Autofahrer Vorfahrt hätten, während so nur etwa ein Drittel der Radfahrer an der umgebauten Kreuzung denken. In der Summe führen sie Ergebnisse zu der Vermutung, daß die Unsicherheiten bezüglich der Handhabung von Vorfahrtssituationen größer an den umgebauten Kreuzungen sind. Des Weiteren verdeutlichen die Interviews, daß die meisten Radfahrer -unabhängig vom Konstruktionstyp- denken, nachdem sie die Radüberfahrt genutzt haben, dass die Überfahrt die Farbe Weiß hätte. Weiterhin zeigt sich, dass sich Radfahrer an beiden Kreuzungsarten gleichermaßen eher sicher als unsicher fühlen.

Die Konfliktstudie folgt dem Prinzip der Schwedischen Konflikttechnik. Bezüglich des Schwerpunkts von ernsthaften Konflikten zwischen Rad- und Autofahrern können keine

Schlußfolgerungen gezogen werden. Jedoch gibt es im Allgemeinen mehr ernsthafte Konflikte an nicht umgebauten als an umgebauten Kreuzungen.

Aufgrund der Ergebnisse der Studien wird geschlussfolgert, dass die Verkehrssicherheit als Ganzes betrachtet für Radfahrer unverändert ist. Jedoch im Detail betrachtet stellt man fest, daß sich die Bedeutung beider Parteien der Verkehrsteilnehmer verschoben haben. Während Radfahrer die umgebauten Kreuzungen selbstbewußter passieren, verhalten sich Autofahrer eher defensiver an diesen Kreuzungen verglichen mit nicht umgebauten Kreuzungen. Ursächlich für diese Entwicklung scheint letztendlich seitens der Radfahrer eine Kombination aus der Unsicherheit über die Vorfahrtsregelung und dem Vermuten der Radfahrer Vorfahrt zu haben, zu sein. Dieser Zusammenhang wird erzeugt durch die teilweise unbewußte Interpretation der Konstruktion inklusive ihrer charakteristischen Elemente.

Abschließend kann man sagen, dass die umgebauten Kreuzungen das Potential haben, die Verkehrssicherheit von Radfahrern zu steigern. Hierfür wäre es allerdings hilfreich bereits den sich nähernden Radfahrern die Vorfahrtsregelung z.B. mittels Verkehrszeichen begleitend zum Radweg zu verdeutlichen.

1 Introduction

The improvement of traffic safety is an important subject and contains several aspects. One of these aspects is the influence of design of traffic constructions. In order to examine the safety aspect of a construction two kinds of risks have to be considered. First, there is the risk that an accident might happen. Second, the risk that accident might lead to a personal injury. The common dominator is to achieve a low risk for personal injury caused by traffic. This fact is extremely closed connected to a demand for self-explanatory traffic surroundings. Based on easy and clearly understandable places road users can understand rules and regulations suggestive and immediately. Finally, the first step for more safety in intersections is the knowledge of priorities and following from this the behaviour of the road users.

In order to achieve more safety Lund's municipality reconstructed intersections with elevated cycle paths. While the first constructed crossings were just grey and consisted of asphalt Lund's municipality designed red-grey passes made of several surfaces in 1997 in order to create more clearness. Today there are about 110 reconstructed red-grey coloured cycle crossings.

Trough these cycle paths Lund's municipality developed a new design for intersections, which are not scientifically analysed. Even elevated cycle paths in junctions are just described in general in "Åtgärdskatalog" (Linderholm, 1996) and in "Lugna gatan!" (Brandberg, 1998) but in both publications it is written that no scientific analysis concerning traffic safety have been done.

In these contexts this thesis examines and discusses the traffic safety effects of rebuilt bicycle paths at intersections of arterial streets and side streets in Lund while these special crossings are always located in the arms of the side streets. The main question to be answered is: Is the traffic safety of cyclists increased by these red-grey coloured cycle paths?

1.1 Background

There are two bases of this thesis. On the one hand is the national Vision Zero program and on the other hand is Agenda 21 as a global direction. Both programs have in common that they have to be discussed and realized in local levels.

The general request for more traffic safety is laid down in a Swedish resolution passed by the Swedish Parliament in 1997. It is called "Vision Zero". It says in the long-term that no one should be injured or killed because of a traffic accident (Persson, 2004, p.24). In 2001 a short-term aim was described additionally. This contains that traffic safety should be increase so that there are 50% less killed people in 2007 than in 1996 (Persson, 2004). Thus this resolution creates the written basis for many safety projects. But the realization of this general idea in specific activities is hand held by the municipalities.

"Lund's Agenda 21" (Lunds Agenda 21, 1997) was passed in 1997 as a response to the global Agenda 21 from 1992. One aim, which is discussed in Lund's Agenda 21, deals with the reduction of carbon dioxide. Although the relationship between Lund's Agenda 21 and cycle traffic is mentioned in this paper, the correlation is more explained in the additional paper "Lunds program för ekologiskt hållbar utveckling" (2005) from 2005. In order to achieve a decrease of 6% less carbon dioxide between 1990 and 2012 Lund's municipality developed several strategies. Within the strategy "Fight Against Global Warming" the traffic program LundMaTs – miljöanpassat transport-system i Lund (English: Environment conform transport system in Lund) deals with five kinds of reforms (Lunds program för ekologiskt hållbar utveckling, 2005, p.12f., 45-48). One of these is Cykelkommunen Lund (English: VeloCity Lund). In this context an increased number of cyclists and a decreased number of drivers shall lead to less carbon dioxide production. To convince drivers to change from car to cycle the quality and comfort of cycle traffic must increase. That is why Cykelkommunen Lund deals, relating to the design of cycle paths, with new and better cycle paths, more safety at junctions and better lightning conditions along the paths.

Although single projects like Cykelkommunen Lund are nowadays parts of Lund's Agenda 21. However, some of these projects or just parts of them existed already before. So, the project to rebuild cycle crossings started already in the middle 1990's. In 1998 the project Cykelkommunen Lund was originated.

1.2 Aim of this thesis

The aim is to evaluate the effects of rebuilt bicycle paths at intersections on arterial streets relating to traffic safety of cyclists. The focus of interest is the influence of construction parts like the elevation and the colour to the behaviour of road users. Here, cyclists and motorised drivers are in the centre of interest.

The conclusions from this work can help to judge in which case these coloured paths are useful and under which circumstances they improve traffic safety for cyclists.

2 Method and Materials

The municipality Lund likes to reach a higher number of cyclists and a lower number of drivers. That is why they try to increase the cycling quality in Lund. Along with the quality of cycling walks also the traffic safety of cyclists, which should be also increased in order to follow Vision Zero.

In this thesis works the main topic of traffic safety is examined and evaluated in three steps. Each step represents one evaluation level (compare
Figure 1). The scope of the thesis is formed by six hypotheses which give a more exact description of the evaluated and examined topic. Theses hypotheses represent the first level.

The second level examines the topic from a general point of view in order to work out general safety problems at cycle paths. At this step the topic is tackled from three points of views. First, there are literature studies, second, there are field observations and the third examined aspect are accidents. The literature studies relate on the one side to design aspects of the cycle path like the hump or rather the elevation and the red colour. On the other side the Swedish priority regulations at cycle crossings are explained. Furthermore, the numbers and reasons especially for cycle accident from the last years in Sweden, Skåne and Lund are evaluated and compared to each other. The field observations contain speed measurements, interviews, behaviour observations, conflict studies and counts at four junctions. Except the counts all examinations are based on the hypotheses and relate directly to the traffic safety aspect. These four junctions are taken from a database of 71 rebuilt and 15 non-rebuilt intersections given by the municipality street office of Lund. They contain two pairs of intersections consisting each of one reconstructed and one control junction. Hereby, the counts and the descriptions of junctions form the basis for establishing comparability of two junctions.

Finally, within the third level the results from all studies are connected, discussed and compared with experiences from Sweden and Finland. By this the traffic safety for cyclists at these intersections is examined and evaluated.

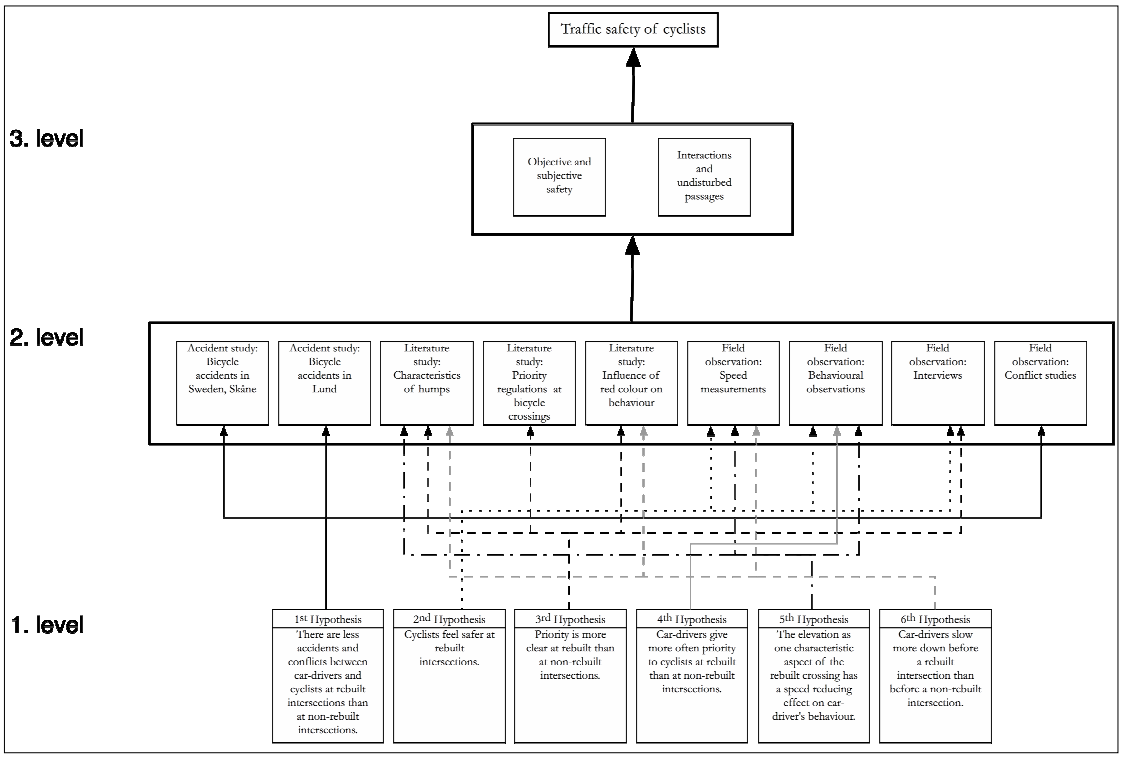


Figure 1: Overview

In order to examine the traffic safety of cyclists at reconstructed intersections following six hypotheses are formed and examined (compare Figure 1).

1. *There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections.*

To find out if the red-grey cycle paths increase the traffic safety the number and kinds of bicycle accidents in Sweden, Skåne and Lund are examined and compared. By this combination these investigations lead to an accident analysis. These more theoretical literature studies are combined with the more practical studies of serious conflicts. During this thesis conflicts mean serious interactions corresponding to the definition from the Swedish Conflict Study. A study of conflicts can be helpful especially if one tries to find out the safety conditions at certain intersections - like in this thesis. Here, conflict studies are done at four junctions in Lund.

Moreover, it is interesting to compare the accidents, which already took place plus these interactions, which nearly ended in accidents, with the safety impressions and feelings of the cyclist. This is done under the topic of objective and subjective safety during the third level.

2. *Cyclists feel safer at rebuilt intersections.*

To deal with the traffic safety is not only a question of numbers but it is also a question of feeling safe. A question concerning a feeling should always be asked the person directly. So, by interviewing cyclists the safety feelings of some cyclists can be evaluated. The interviews are done at one rebuilt and one non-rebuilt junction.

Though it is assumed that there might be a relationship between cyclists' safety feeling and their behaviour. Therefore the behaviour is evaluated by behaviour studies and speed measurements of cyclists. A combination of the results of both observations can lead to knowledge about the runs of cyclists' actions before and while passing a junction with a certain speed. Thus eventual differences or equalities relating safety feeling and behaviour can be compared between reconstructed and non-reconstructed intersections.

The attained knowledge is compared with the number and kinds of accidents under the aspect of objective and subjective safety.

3. *Priority is clearer at rebuilt than at non-rebuilt intersections.*

The priority is the most important regulation in traffic. Every road user has to know about who has priority or at least how to behave in a non-conflict generating way. So, the interaction between drivers and cyclists concerning the priority depends among others on cyclists' knowledge. Therefore some cyclists are interviewed relating to this aspect. In order to judge the answers it is necessary to study the right of way regulations concerning intersections of roads and cycle paths without traffic lights.

Another aspect is the appearance of a junction, which leads road users to suggestions about having or giving priority. That is why significant elements of the cycle crossing might influence their behaviour. Therefore the effects of the red colour and the humps are discussed in this context.

It is assumed that if a cyclist is sure about the regulations his / her safety feeling is influenced. That is why the results of this hypothesis are seen in a context with the results from the behaviour studies, the speed measurements and the accident analysis. This aspect is presented and discussed under both topics of the third level.

4. *Car-drivers give more often priority to cyclists at rebuilt than at non-rebuilt intersections.*

With the help of behaviour studies it is possible to get a more extensive impression whether drivers or cyclists give more often priority. Additionally, the circumstances under which the road users give or take priority can be evaluated. By this it is possible to get a general impression how road users interact.

Especially in comparison with the results from the third hypothesis conclusions can be drawn relating to the issue if cyclists behave corresponding to their knowledge. This context is discussed within the third level.

5. *The elevation as one characteristic aspect of the rebuilt crossing has a speed reducing effect on car-driver's behaviour.*

The speed has several influences on the safety and the safety feeling of road users. It might be that the faster road users enter a junction the more they are sure to have or to get priority. So, even if someone does not know about the priority regulations at an intersection a speed reducing effect of a hump would force one to slow down.

Consequently the traffic safety would be increased, as even if an accident takes place the speed would be less than without a hump.

The characteristics of humps have been described and discussed a lot in literature. Though the results from the literature study are compared with self-done speed measurements during this thesis. These additional field observations are necessary as the standardized humps might have another appearance to drivers since they are narrower than the reconstructed cycle crossings and they are not so coloured. Moreover, the focus of interest in this thesis is a comparison between investigated pairs of reconstructed and control intersections in order to evaluate possible speed differences between both types of junctions. In context with the results from the behaviour studies the speed behaviour and single actions of drivers can be judged. The results are especially discussed under the topic of interactions and undisturbed passages.

6. *Car-drivers slow more down before a rebuilt intersection than before a non-rebuilt intersection.*

In order to assume the dimensions of increased traffic safety at red-grey cycle crossings it is determined how much car drivers slow down before entering a junction or rather the cycle crossing. The results are compared between rebuilt and non-rebuilt intersections. The retarding manoeuvre is evaluated in context to the influence of the red colour and the elevation. Herewith, an indication of the safety effects for cyclists -caused by drivers' speed behaviour- can be evaluated.

Thus this hypothesis deals with the speed behaviour of drivers as well as with the interaction between road users. This context is a part of the discussion *interactions and undisturbed passages*.

2.1 Description of sites and measures

As it is not possible to compare one intersection before and after the reconstruction two pairs each consisting of one reconstructed and one non-reconstructed intersection are defined and examined. Both junctions of one pair must have similar characteristics to be comparable. The obtained data from the field observations at these four junctions are used as examples to evaluate the safety effects of these new cycle crossings.

2.1.1 Description of junctions

Among others the municipality Lund tries to improve the traffic safety and comfort for cyclists based on the background of Agenda 21 and Vision Zero. As one especially dangerous section of roads the municipality pointed out junctions. Therefore some intersections have been redesigned.

The concerned junctions consist of at least one side street and one main street. The direct location of these reconstructed cycle crossings is always in the arm of a side street. Here,

two kinds of positioning exist. First it is so near located to the arterial street that the cars, which like to enter the main street, have to stay before the ramp (A) (compare Figure 2). The second kind is that the distance between the crossing and the main street allows a driver to stay directly at the edge to the main street (B) (compare Figure 2).

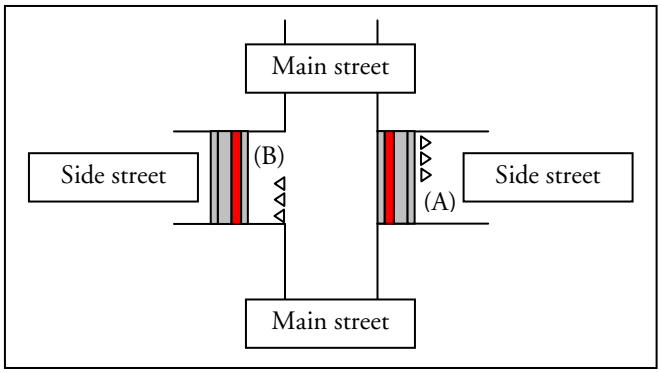


Figure 2: Cycle crossing in junction

Description of red-grey cycle paths

The reconstructed cycle crossings consist of three parts (see Figure 3). These are two ramps and one even part for bicycles and pedestrians. The specific design varies depends on the characteristics of each intersection. The even part is always made of clinker. The part for cyclists is red covered by red coloured stones. The part for pedestrians is grey. The ramps consist sometimes of the same grey clinker like the pedestrian part and sometimes they are made of natural stone cobbles.

The orientation of the clinker in the grey parts is mostly vertical to the kerbstone while the red stones orientation varies between parallel and vertical to the kerbstone. The parallel-directed paths have a higher rolling friction –opposed to the vertical-directed surfaces– connected to higher effort and a lower comfort but consequently also a higher safety influence especially in icy winter times or downhill. But according to information from Lund's municipality there have not been any interviews with cyclists concerning this aspect.

The passages where a cycle crossing is connected with the following cycle paths are designed in several ways. The last clinker lines are orientated vertically, parallel or in an angle of 45° to the kerbstone. Moreover, the passages between the different kinds of stones on the crossing are manifold. In some cases the different stones are just lying next to each other but sometimes there are lines of red or grey stones, which are orientated in an angle of 90° to the other stones of the same kind.

According to the road width these cycle paths are sometimes combined with refuges. In one case there is also a traffic light on a refuge. The placing of the refuges is likewise variable. Normally they are divided into two parts. Both parts are combined with the ramps. Sometimes just one part is located in the construction and the other part's position is before the ramp. Another design variation is that each part of the refuge lies before a ramp. One thing in common is that a refuge never goes into the red crossing part, which is used by cyclists.

At some junctions the reconstructed cycle paths are combined with a guiding system for blind people by designing the entry to these crossings with special surfaces.

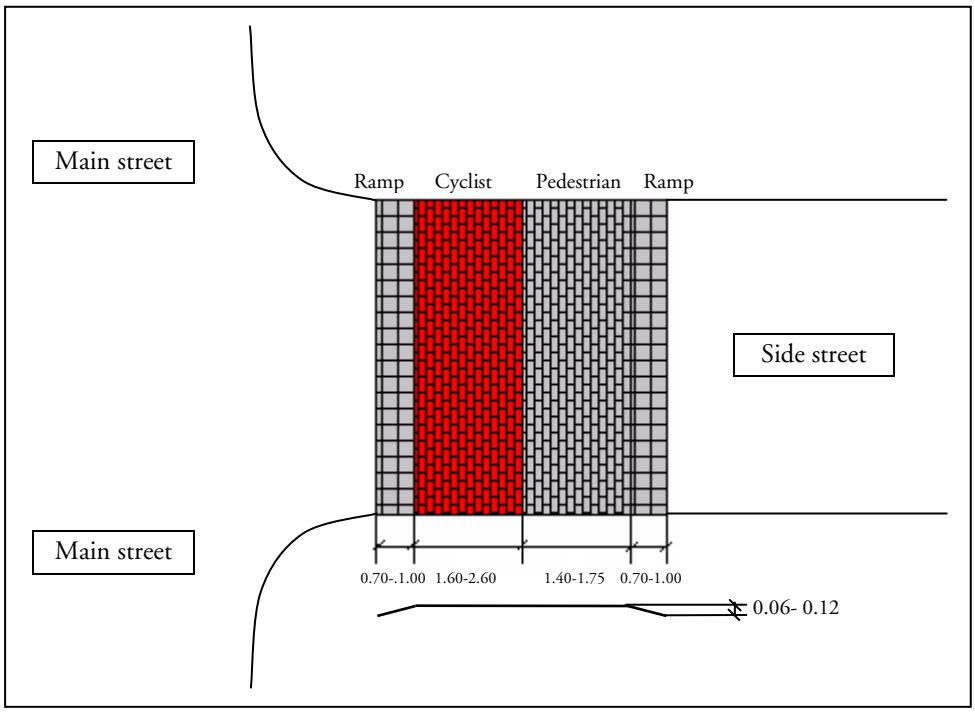


Figure 3: Parts of a cycle crossing

Comparison of intersections

To define the influence on traffic safety for cyclists a comparison of the traffic actions before and after a reconstruction is necessary. Lund's municipality declared to rebuild the remaining junctions in 2006. Consequently there are no opportunities to examine the effects on one intersection by a before / after study in the beginning of this thesis. Thus cross section evaluations are done at pairs of intersections. Two pairs of comparable junctions could be identified. Lund's municipality street office gave the basic data of relevant intersections. This is a pool of 71 reconstructed intersections with red-grey coloured cycle crossings and 15 junctions, which will be rebuilt next.

The basic idea for comparability is that the junctions of one pair should have similar numbers of motorized vehicles and cyclists, comparable surroundings and traffic compositions and finally, similar geometry. Moreover, there should be a minimum number of road users in the peak hours. The comparison is done by an on-site inspection of all 86 junctions given by the municipality and an analysis of all surroundings with a map. An overview of criteria is presented in Figure 4. The gained information from literature and observations of all junctions are summarized in a table. With the help of this table (see Appendix Y) and taken pictures pairs of junctions are identified.

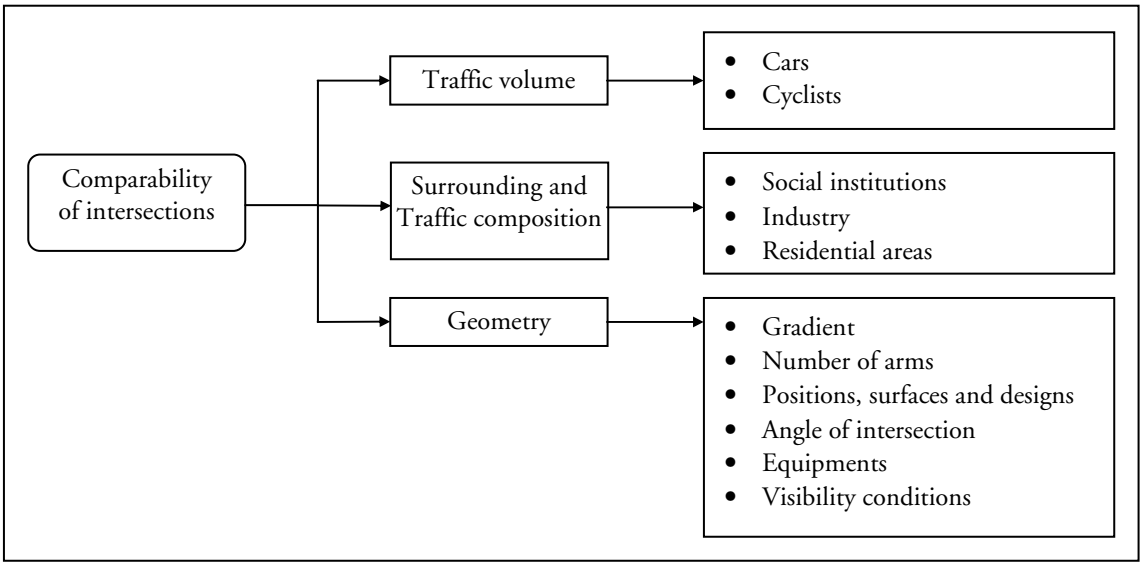


Figure 4: Comparability of junctions

In order to select pairs of intersections the traffic volume of Lund's roads are evaluated and compared. The municipality of Lund counts the traffic volume on arterial streets. The amount of traffic in the side streets and the number of cyclists were examined in the present work.

Moreover, the surrounding is checked. This fact deals with the questions if there is any heavy traffic generating companies or industries or if there is public transport. Furthermore, it has to be considered if there are built up areas, schools, parks etc.. These conditions are compared as e.g. the age of road users has an influence on their behaviour. If one compares two junctions where one intersection is nearby a primary school and another one has a short distance to a retirement home it might be difficult to compare the behaviour of pupils and seniors since they have different reasons for their behaviour like slow locomotion.

Concerning the geometry it is in mind that the degree of severity of an injury depends among others on the speed of motorized vehicles. Thus it is important that the gradient of the cycle path is comparable. It is to remark that the gradient's sign depends on the direction the path is cycled. Moreover, the number of arms and lanes, the kind of surfaces and the angle of both roads meeting at an intersection should be the same since the more arms exist the more kind for turning vehicles exist. Therefore more attention has to be paid by the road user on the whole junction. By this there is a higher possibility that too less attention is paid to single actions like e.g. a turning car. Another fact is the number, design and deviation of junction's equipment like e.g. traffic lights, refuges and zebras. All of these create helpful hints concerning the priorities. Therefore these design elements influence the traffic safety at a junction. Attention is also paid to the exact position of the cycle crossing. In one case drivers from the side street turning into the arterial road have priority signs before and in another case after passing the cycle crossing. These conditions could influence the car driver's intensity of attention concerning the activities near the crossing. Besides the location, the design and lead of the cycle path are important. So, the distance between the cycle path and the road is required to have the same visibility conditions between road users. This fact influences their behaviour as they see each other e.g. earlier when the distance is small. Furthermore, the entry of a cycle path to a crossing can be designed in

two ways. It can be straight or skewed. That is one reason why the field of view is in focus. One behaves another way having a wide view than having a short one e.g. interrupted by vegetation. The visibility is influenced by several aspects like e.g. the building developments of the surrounding and if the junction is placed in curve.

Selected intersections

The first selected pair consists of the junctions Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen (1b). The second pair is Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b) (compare Figure 5). All streets have a speed limit of 50km/h.

Sources: www.assistancekaren.se/station/search.asp and www.map24.de

Figure 5: Locations of compared junctions

Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen (1b)

The junctions are placed next to each other at the same cycle path accompanying the arterial road Rudeboksvägen. Rudeboksvägen is located in the northwest of Lund. The distance between the junctions amounts 230m. Rudeboksvägen / Gunnesbovägen is a non-reconstructed and Rudeboksvägen / Dösvägen a reconstructed junction (see Figure 6). The cycle path including the junctions belongs to a signposted cycle course called “Cykelrunda till Nöbbelöv – Gunnesbo” founded by Lund’s municipality within the project “Cykelkommuen Lund”.

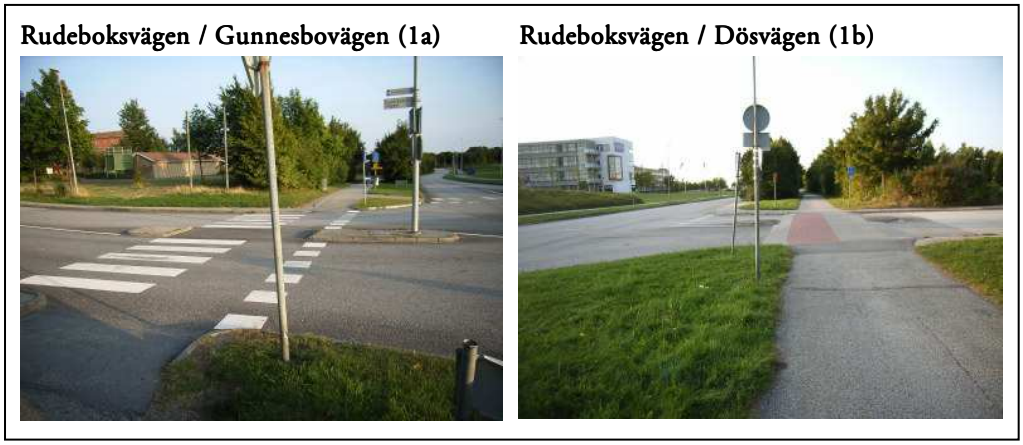


Figure 6: Junctions of 1st pair

The traffic volume on Rudeboksvägen at theses intersections is about 7,800 motorized vehicles per day (Lunds kommun, 2004, p.35). The evaluation of self-done counts at both junctions shows a comparability of them even if there are normally a slightly higher number of vehicles and cyclists at Rudeboksvägen / Dösvägen (1b) than at Rudeboksvägen / Gunnesbovägen (1a) (compare Chapter 2.1.2).

Rudeboksvägen demarcates the residential area Gunnesbo from an industrial area. Cyclists on these paths mostly cycle between these areas and Lund's city. There are all ages of cyclists from cycling pupils to seniors. Heavy traffic exists at both junctions and is determined by public bus transport on Rudeboksvägen. However, during the evaluation it has to be considered that this kind of traffic exists in Gunnesbovägen, too.

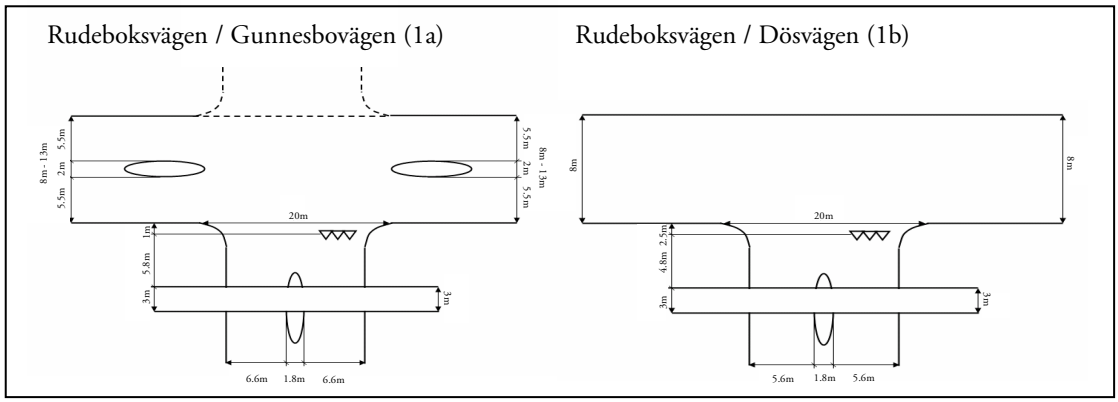


Figure 7: Dimensions of 1st pair

Both junctions have in general three arms each with one asphalted lane per direction. At Rudeboksvägen / Gunnesbovägen (2a) the width of the main street enlarges from ca. 8m to ca. 13m while at Rudeboksvägen / Dösvägen (2b) the width of the arterial street is constant ca. 8m (see Figure 7). As there are at Rudeboksvägen / Gunnesbovägen (2a) in both arms refuges of ca. 2m width a lane is ca. 5.5m wide while a lane at Rudeboksvägen / Dösvägen is 4m wide. Unfortunately there is an entrance to a parking place at the intersection Rudeboksvägen / Gunnesbovägen (1a). This entrance is considered in the evaluations like a fourth arm of the junction. However, the counts at this intersection show that the entrance

is mostly in use during the peak times. Furthermore, both junctions are located in east turning curves. The radians are so big that the junctions are visible from more than 50m. While Dösvägen follows a straight line Gunnesbovägen enters the junction in a curve. But the intersection is visible over a distance of 50m.The cycle paths are combined duplex traffic cycle path and footpath without any marks on the surface. The whole path is 3m wide. The paths are separated from the road by a green area of several meters width.

At both junctions according traffic signs indicate drivers from each direction to the crossings. The priority giving symbolising triangles marked on side streets' surfaces are positioned at both junctions for drivers after the cycle crossings. Between cycle crossings and triangles are in Dösvägen 4.8m and in Gunnesbovägen 5.8m. Between the line of sight and the triangles are in Dösvägen 2.5m and in Gunnesbovägen 1m. If one sum the measures for each side street one get the result that there is just a difference of 0.5m between the line of sight and the cycle crossing. But even a difference of 1m between the cycle crossings and the triangles can be judged as small since in both cases the distance is big enough for one standard private car. At the levels of the lines of sights both side streets have a width of ca. 20m. It means that the gateway of the side streets have nearly the same size.

To cross Gunnesbovägen as a non-motorized road user there is a zebra and a cycle crossing marked on Gunnesbovägen's surface. At Dösvägen an elevated red-grey coloured crossing for cyclists and pedestrians exist. Moreover, ca. 1.80m wide refuges are centrally located in both side streets. The cycle crossings differ in the length in 2m as Dösvägen is at this position ca. 13m and Gunnesbovägen is ca. 15m wide. So, for each lane it differs in one meter. Considering an available safety stop on a refuge one meter is an acceptable difference. Moreover, a small gradient from the south to the north exist at both junctions. This fact should be considered especially while evaluating the speed measurements of cyclists.

To summarize the characteristics it is to say that both junctions are very similar concerning the side streets. But relating to the main streets it has to be considered during the evaluation that the non-reconstructed junction Rudeboksvägen / Gunnesbovägen (2a) might make a more open and wide impression than the reconstructed intersection Rudeboksvägen / Dösvägen (2b).

Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b)

The non-rebuilt junction Baravägen / Margaretavägen (2a) is located in northern Lund whereas the rebuilt intersection Fjelievägen / Bokbindaregatan is in the southwest of the town. The arterial streets are Baravägen and Fjelievägen and the side streets are Margaretavägen and Bokbindaregatan (see Figure 8). All streets have a speed limit of 50km/h.

At the level of Margaretavägen Lund's municipality counted on Baravägen 3,100 vehicles per day and on Fjelievägen at the level of Bokbindaregatan there are 3,500 vehicles per day (Trafikräkningar och trafikolyckor, 2004, p.33). This small difference of 400 vehicles per day makes both junctions comparable from this point of view. However, it is interesting to compare these volumes with the results from the self-taken counts as this show a higher

volume on Fjelievägen than on Baravägen. On the one hand when the counts had been done no special events like e.g. accidents or road works took place and on the other hand if one compares the results of municipality's counts with the last four years this volumes are mostly constant. An explanation for the difference could be that on Fjelievägen is higher traffic volume off-peak than at Baravägen. In general my counts present a comparability of both junctions but there are two restrictions. First, there is more traffic in Margaretavägen than in Bokbindaregatan and second, on Fjelievägen is more cycle traffic than on Baravägen.

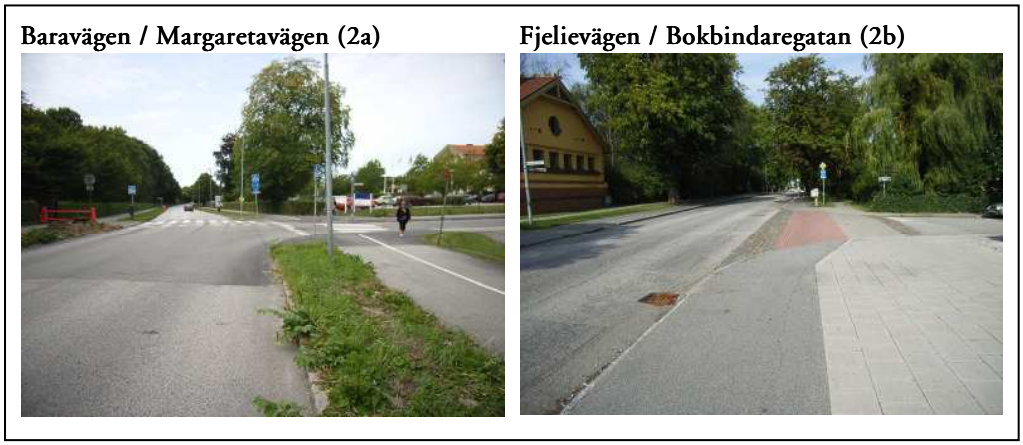


Figure 8: Junctions of 2nd pair

Built up areas dominate the surrounding of both junctions. The arterial roads connect the city centre with different areas of suburbs. At Fjelievägen / Bokbindaregatan (2b) are mostly detached houses, but there are also nearby social institutions like a police station and a sports ground. Around Baravägen / Margaretavägen (2a) are multiple dwellings. In the direct surrounding social institutions like a cemetery and a school exist. That is why at both intersections cyclists of every age are using the crossings. Furthermore, there are public bus transports on Fjelievägen and turning bus transports between Margaretavägen and Baravägen.

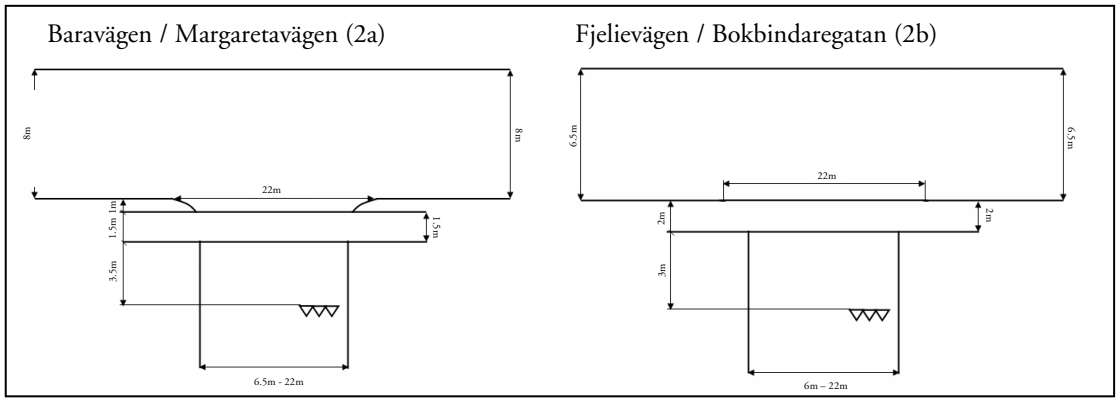


Figure 9: Dimensions of 2nd pair

Both intersections have three arms with always one lane per direction and an asphalted surface. The gateways of the side streets are in both cases ca. 22m wide (see Figure 9). Margaretavägen expends from ca. 6.5m and Bokbindaregatan from ca. 6m to this width.

The width of the main streets differs in ca. 1.5m, as Baravägen is about 8m and Fjelievägen about 6.5m wide. Consequently it is 0.75m per lane. Moreover, Baravägen / Margaretavägen (2a) is located in a long stretched s-curve of Baravägen. Here, it is possible recognizing the junction of more then 50m range from both sides. Margaretavägen enters the junction straight. Fjelievägen is straight ongoing at the level of Bokbindaregatan. Bokbindaregatan enters not exactly right-angled the junction. However, the side street widens up several meters before the junction. Thus it is possible for drivers to enter the intersection as if there would be a straight run of Bokbindaregatan.

At Margaretavägen is a zebra marked on the surface and signalled by signs to road users whereas at Bokbindaregatan is a red-grey, elevated cycle crossing. The priority regulating triangles – also marked on the surface – are at both junctions for drivers coming from the side streets before the crossings. While Bokbindaregatan's crossing is placed directly at the line of sight there is a distance of ca. 1m at Margaretavägen. Thus it is for sure if a car waits at the line of sight it stays on the cycle crossing.

At both junctions cycle traffic takes place in a one-way direction. Furthermore, the cycle path at Baravägen / Margaretavägen (2a) is separated from the arterial road by a one-meter wide vegetation consisting of grass. The footpath at this junction is next to the cycle path. A white stripe separates both paths. At Fjelievägen / Bokbindaregatan the entering cycle path and footpath are separated by different surfaces. The cycle path consists of asphalt mix and the footpath of flagstones. These different kinds of surface are also used on the leading paths while here trees separate the footpath and the cycle path. Moreover, it is to mention that both intersections have a gradient by which the cyclist cycles a bit downhill towards the crossings.

Looking at both junctions not in detail but in general they are comparable concerning surroundings, geometry and traffic volumes. But there are some points, which have to be reminded when evaluating all data. Even if their deviations have just small differences in total it has to be said that Fjelievägen has parking lots nearby the junction which Margaretavägen has not. Moreover, there are differences in traffic volume concerning the side streets and cycle traffics. So, at Baravägen / Margaretavägen (2a) are fewer cyclists but more drivers than at Fjelievägen / Bokbindaregatan. Hereby, it is a kind of neutralization. However finally, there is enough traffic at both places in order to evaluate situations between cyclists and drivers.

2.1.2 Traffic volumes

It is to remark that the counts are done in order to define comparability of two intersections. Thus counts stand unlike the other observations in no direct contact with the traffic safety examinations. Counts aim at test, prove and work out limits of comparability of a reconstructed and a non-reconstructed intersection of one pair. The aim of a two-hour count is to be able to follow the traffic volume at both intersections of a pair within a longer period. To compare junctions of a suggested pair the counts should be done simultaneously. If this procedure is not possible an additional second count is done. This count takes two times ten minutes in succession alternatively at both junctions of a pair. Thus the ten-minute counts are done almost simultaneously.

By comparing the results of a two-hour from two different days with the results of ten-minute counts done in succession, the comparability of data taken on different days is able to be judged. The two-hour counts include one hour of a Swedish peak time. As this is the time where the traffic volume increases and thus especially in the side streets traffic actions takes place. It is paid attention to this point as it is characteristically for side roads having a very low traffic volume during the rest of a day out of peak hours. All original data are added in the appendix (see Appendix U-Appendix W).

While evaluating counts' data a scheme showing in Figure 10 is used to summarize the traffic volumes and define traffic flows. The intersections consist of three arms while arm no. 1 and arm no. 2 belong to the arterial street and arm no. 3 is the side street. Additionally, information concerning junction's name and general geographic directions of the arterial street are presented.

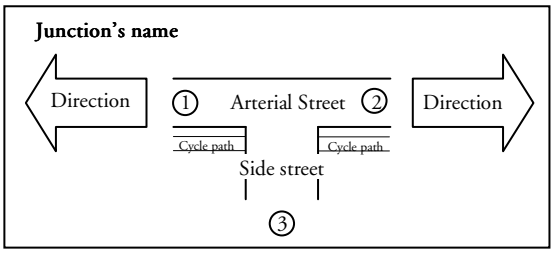


Figure 10: Sketch of junction

Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen(1b)

These junctions are located next to each other while Rudeboksvägen / Dösvägen (1a) is southern of Rudeboksvägen / Gunnesbovägen (1b). Both three armed junctions differ in their geometry as there is a gateway to a parking place directly in the junction Rudeboksvägen / Gunnesbovägen (1b). This entrance is considered during the evaluation like a fourth arm of the junction.

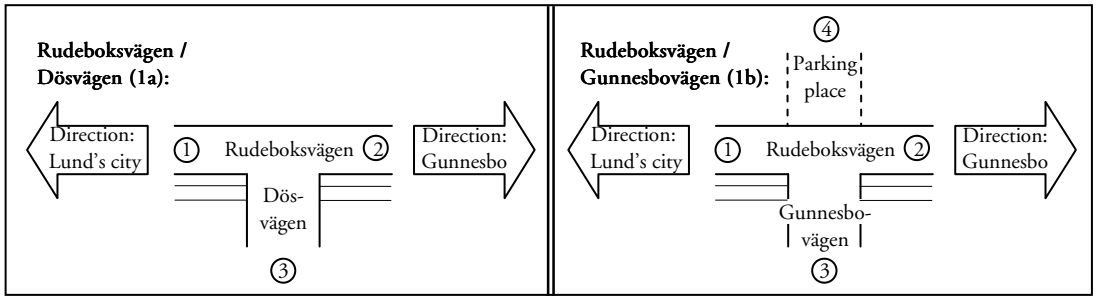


Figure 11: First pair of junctions

At Rudeboksvägen the two-hour counts include one hour of a Swedish peak time in the morning between 07:30 and 08:30 and one hour, which is not during peak times. The second one is between 08:30 and 09:30. At another day between 07:00 and 07:46 the 10 minutes counts have been done. Figure 12, Figure 13 and Figure 14describe the examined

data of the two hours counts. Table 1 and Table 2 represent the data from the 10 minutes counts.

Figure 12 shows that the number of motorized vehicles is normally higher at Rudeboksvägen / Dösvägen (1b) than at Rudeboksvägen / Gunnesbovägen (1a). The difference is between 5 vehicles (08:31 – 08:45) and 44 vehicles (09:00 – 09:45). In average the difference is 25 vehicles in 15 minutes between 07:30 and 09:30. This deviation is judged for two reasons as small. First, it contains less than one car per minute and second, it is to consider that the junctions are counted at two morrows (compare Appendix X). This picture shows also a comparable characteristic flow at both intersections while the morning peak hour between 07:30 and 08.30 can be seen in the curve. Its turning point and peak is in both cases between 07:46 and 08:00. After this point a tendency of a decreasing number of vehicles can been read from this figure.

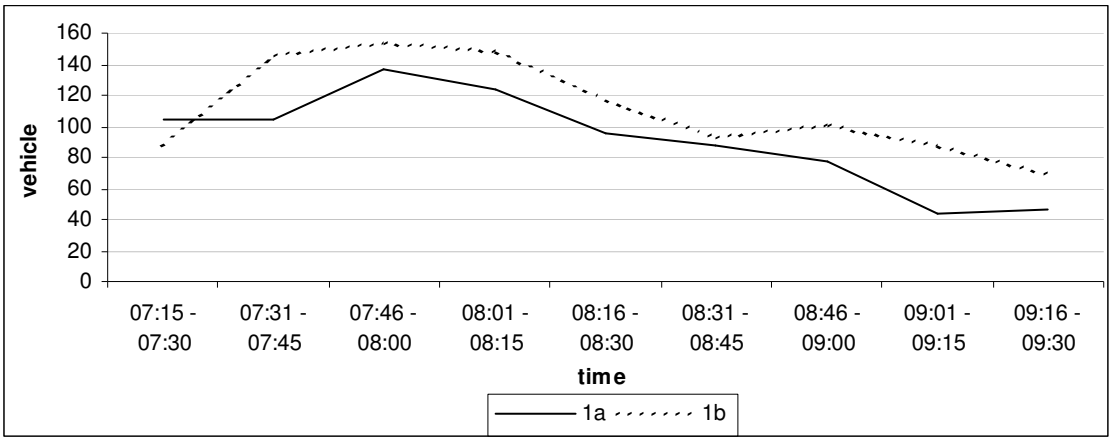


Figure 12: Motorised vehicle at first pair

From Figure 13 it can be read that the higher number of vehicles at Rudeboksvägen / Dösvägen to Rudeboksvägen / Gunnesbovägen is caused by the directions following the arterial street independently if it is a peak time or not. This means the relationships between arm no. 1 and arm no. 2. It is also visible that the relationship between the side streets and arms no. 1 is stronger developed than between the side road and arms no. 2. So, the motorized traffic volume develops pithy more in direction to Lund's city than to Gunnesbo.

A theoretic forth arm exist just at one junction. That is why there are no numbers of vehicles given for Rudeboksvägen / Dösvägen. Referring to this fourth arm it is readable from the figure that vehicles mostly turn in peak hours from Lund's city into the parking place. However, this junction looks like having four arms, its characteristic flows outsides the peak hours –between 8:30-9:30– are comparable to a junction with three arms like Rudeboksvägen / Dösvägen (1b).

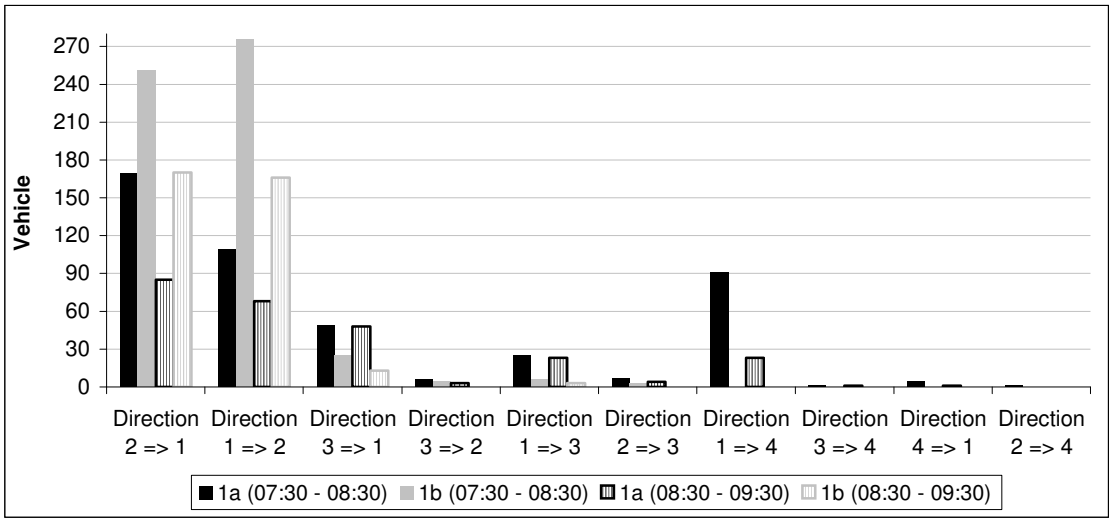


Figure 13: Comparison of vehicle per direction at first pair

In order to prove comparability of both junctions Table 1 contains data from the 10-minute counts. The total numbers of counted vehicles at the first count (07:00 – 07:10) at Rudeboksvägen / Dösvägen (1b) and the second one at Rudeboksvägen / Gunnesbovägen (1a) (07:12 – 07:22) differs in three vehicles. It is the same difference when both intersections are checked the same way again in succession. In comparison to the two hours counts the total numbers of vehicles reflect here a higher number of vehicles at Rudeboksvägen / Dösvägen (1b) than at Rudeboksvägen / Gunnesbovägen (1a). Thus each kind of count proves credibility of the other count.

Finally, the traffic flows between both intersections are seen in a context as an example. The direction from Dösvägen to Gunnesbovägen at Rudeboksvägen / Dösvägen (1b) includes all flows going to arm no. 2. It means a sum of all vehicles turning from the side street into arm no. 2 plus straight on going vehicles coming from Lund's City. At Rudeboksvägen / Gunnesbovägen (1a) includes this direction all traffic flows coming from Lund's City or rather arm no. 1. If one compares the results for the counts between 07:00 and 07:22 and the second pair between 07:23 and 07:46 it can be seen that there are differences of one times four vehicles and one time of three vehicles. The direction Gunnesbovägen to Dösvägen is just the other way around. At Rudeboksvägen / Dösvägen (1b) all flows are coming from arm no. 2 summed up and at Rudeboksvägen / Gunnesbovägen (1a) are all flows summed going to arm no. 1. Here, are also differences of three vehicles during the first two counts and four vehicles during the second two counts. All these differences are judged as small.

Table 1: 10-minute counts at first pair - vehicles

Intersection	Time	Total [vehicle]*		Direction			
		Total numbers	Dif-ferences	Dösvägen to Gunnesbovägen [vehicle]**	Dif-ferences	Gunnesbovägen to Dösvägen [vehicle]***	Dif-ferences
Rudeboksvägen / Dösvägen	07:00 - 07:10	57	3	27	4	27	3
Rudeboksvägen / Gunnesbovägen	07:12 - 07:22	54		23		30	
Rudeboksvägen / Gunnesbovägen	07:23 - 07:33	82	3	33	3	47	3
Rudeboksvägen / Dösvägen	07:36 - 07:46	85		36		44	

* Sum of all counted motorised vehicles
** Sum of all vehicles in the flows coming from Rudeboksvägen / Dösvägen (1b) and driving to Rudeboksvägen / Gunnesbovägen (1a)
*** Sum of all vehicles in the flows coming from Rudeboksvägen / Gunnesbovägen (1a)and driving to Rudeboksvägen / Dösvägen (1b)

Additionally, to the motorized road users also non-motorized road users like cyclists and pedestrians have been counted. Figure 14 shows that the flow of the number of cyclists over the time is comparable to the flow of the motorized vehicles. The number of cyclists increases till a peak between 07:46 and 08:00 and after there is a decreasing tendency until 09:15. Between 07:30 and 09:00 are there more cyclists at Rudeboksvägen / Dösvägen (1b) than at Rudeboksvägen / Gunnesbovägen (1a). This course runs comparable to the motorized vehicle. During this time the number of cyclists varies between one (08:16 – 08:30, 08:31 – 8:45) and seven (07:31 – 07:45). A difference of seven cyclists has to be evaluated as big since this means that at one intersection half number of cyclists is counted compared to the other intersection. But under the circumstances of different days and at all a comparable run of both courses with less differences between the number of cyclists this distance between 07:31 and 07:45 is acceptable.

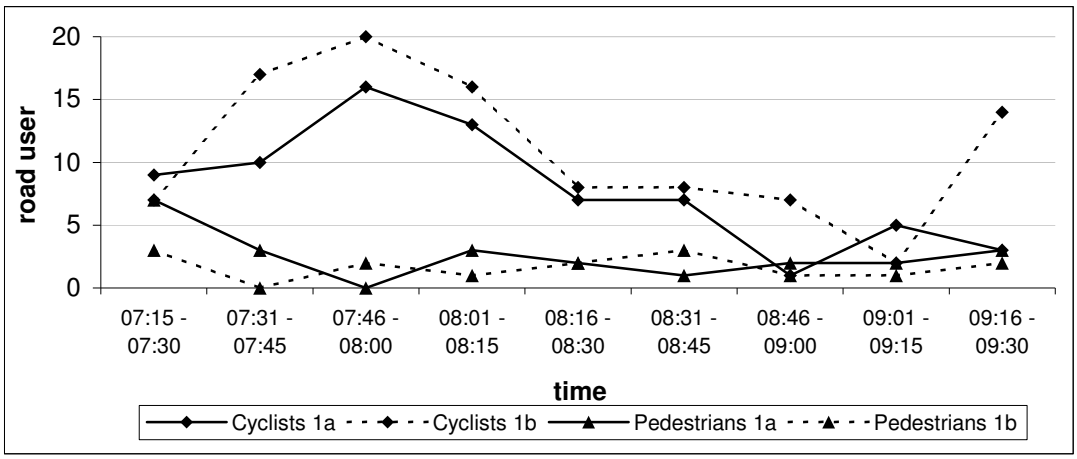


Figure 14: Non-motorised road user at first pair

Figure 14 also reflects the numbers of pedestrians. From the course no characteristic tendency is readable. It seems that there are in general fewer pedestrians than cyclists. A significant difference between either intersections or related to the time is not recognizable.

Within the 10-minute counts cyclists have been counted, too. The total number of cyclists in succession at both junctions differs in each case in three cyclists. In consideration of total numbers less than ten cyclists per a ten-minute period this amount is judged as big. But if one compares the flow of cyclists between both intersections it is recognizable that the values correspond well with each other. It is also readable that the total number of counted cyclists during the first count is equal to the sum of both directions. Within the second and the forth count the sum of the directions and the total number differ in two cyclists. During the third count the difference amounts one cyclist. Consequently it seems that the main flows of cyclists follow the directions of the main street. Moreover, just a small number of cyclists turn from or into the side streets or rather the parking place.

Finally, the conclusion can be drawn that both intersections at Rudeboksvägen are comparable from the point of traffic flows and volumes.

Table 2: 10-minute counts at first pair – cyclists

Intersection	Time	Total [cyclist]*		Direction			
		Total numbers	Dif-ferences	Dösvägen to Gunnesbovägen [cyclist]**	Dif-ferences	Gunnesbovägen to Dösvägen [cyclist]***	Dif-ferences
Rudeboksvägen / Dösvägen	07:00 - 07:10	2	3	1	1	1	0
Rudeboksvägen / Gunnesbovägen	07:12 - 07:22	5		2		1	
Rudeboksvägen / Gunnesbovägen	07:23 - 07:33	6	3	2	0	3	2
Rudeboksvägen / Dösvägen	07:36 - 07:46	9		2		5	

* Sum of all counted cyclists
** Sum of all cyclists cycling from Rudeboksvägen / Dösvägen (1b) to Rudeboksvägen / Gunnesbovägen (1a)
*** Sum of all cyclists cycling from Rudeboksvägen / Gunnesbovägen (1a)to Rudeboksvägen / Dösvägen (1b)

Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b)

The second pair of junctions consists of Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b). Figure 15 explains the correlation between used names and junctions' geometry. These intersections are not located next to each other. While Baravägen / Margaretavägen (2a) is located in the west of Lund and Fjelievägen / Bokbindaregatan (2b) in the south- west both have in common to be at arterial roads connecting Lund's periphery and its centre .

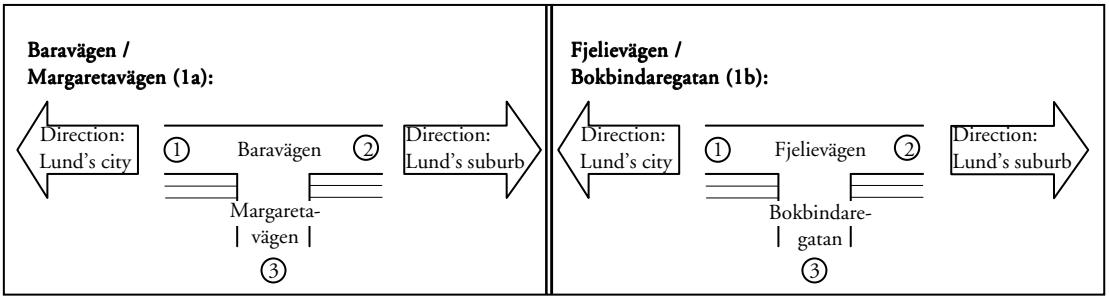


Figure 15: Second pair of junction

The two-hour counts are done simultaneously that is why no ten-minute counts are necessary as a direct comparison of the results is possible. Figure 16 and Figure 17 visualize the results for motorized vehicles while Figure 18 and Figure 19 present them for cyclists. The Swedish afternoon peak is between 16:30 and 17:30. It was counted between 16:00 and 18:00.

Figure 16's diagram courses run comparable. The number of vehicles is at both junctions mostly stable with a little decreasing tendency. So, the typical course caused by a peak hour is not recognizable in this counts. The number of counted vehicles at Baravägen / Margaretavägen (2a) is always higher than at Fjelievägen / Bokbindaregatan (2b). The difference is between 16 vehicles (16:31 – 16:45) and 34 vehicles (17:01 – 17:15). In deviation it is about 24 vehicles per 15 minutes. This means about two cars per minute. This context is judged as small. Consequently both junctions are relating to the general motorized traffic volume comparable.

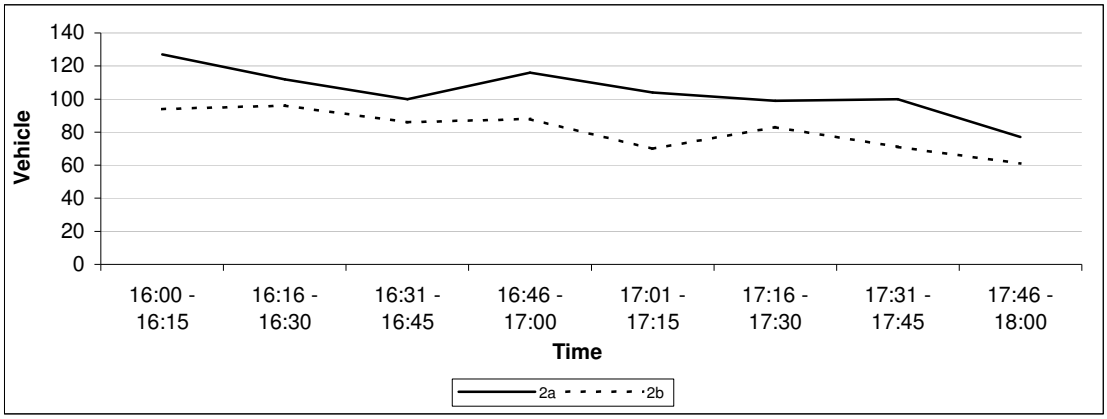


Figure 16: Motorised vehicles at second pair

Figure 17 presents a closer look to the flows of vehicles. In the figure it is distinguished between the whole peak hour and one times 30 minutes before and one times 30 minutes after the peak hour. Checking this table it becomes obvious that the motorized traffic going straight on the arterial roads has highest number of vehicles. Moreover, this context is independent from the time. At Baravägen / Margaretavägen (2a) are except turning direction from arm no. 1 to arm no. 3 -more vehicles during the first half hour than the second one. At Fjelievägen / Bokbindaregatan it is at all a comparable course. Here, are the excepted flows coming from the side street turning into the arterial street. But at all one can say that there is more motorized traffic before than after the peak hour.
Relating to the traffic flows of the side streets it comes clear that there is always a higher volume at Baravägen / Margaretavägen (2a) than at Fjelievägen / Bokbindaregatan (2b). This conclusion relates especially to the flows between arm no. 1 and no. 3 at Fjelievägen / Margaretavägen (2b). Since there is nearly no traffic in the side street out of the peak hour. Moreover, there are also differences relating to the flows between arm no. 2 and arm no. 3. Here, is even during the peak hour just some little traffic. The deviation concerning the volume of the side street traffic between both junctions has to be considered while evaluating the other field observations.

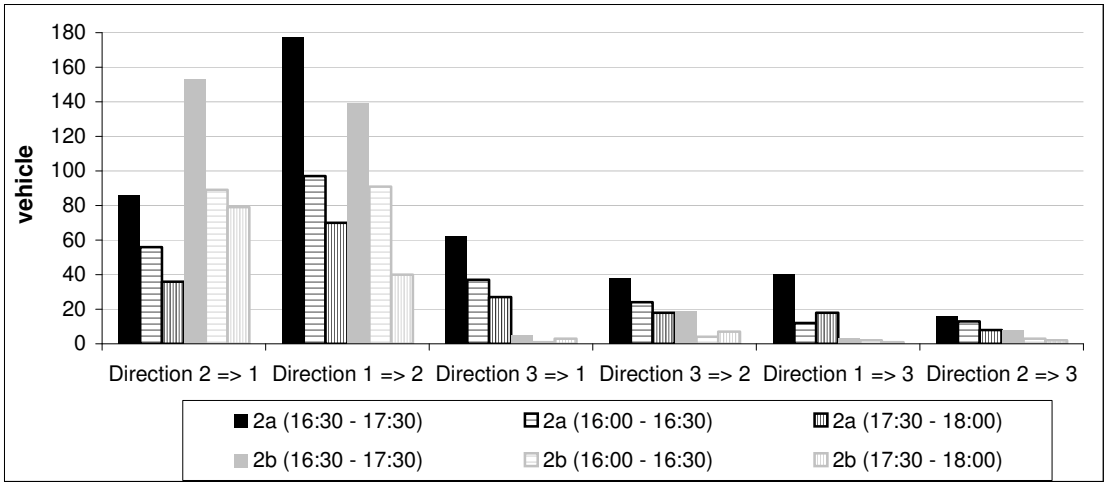


Figure 17: Comparison of vehicle per direction at second pair

In contrast to the number of motorized vehicles which is higher at Baravägen / Margaretavägen (2a) than at Fjelievägen / Bokbindaregatan (2b) the number of cyclists is higher at Fjelievägen / Bokbindaregatan (2b) than at Baravägen / Margaretavägen (2a) (see Figure 18). However, both courses run similar to each other. For instance there is a peak between 16:31 and 16:45 in both cases.

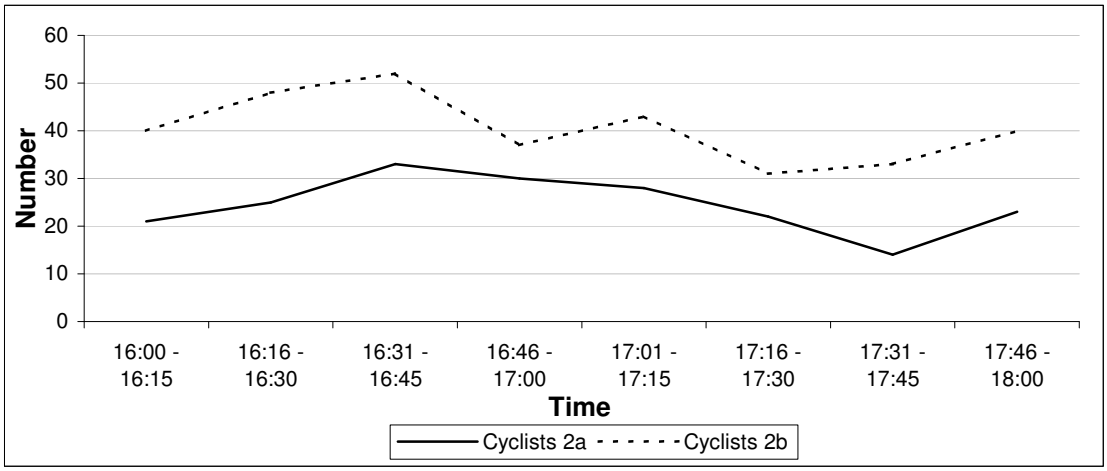


Figure 18: Cyclists at second pair

Figure 19 shows that at both junctions most cyclists follow the main streets from arm no. 1 to arm no. 2. This context is independent from the examined time. The difference of numbers of cyclists to opposite direction from arm no.2 to arm no. 1 might be caused by the daytime. Since in direction of arm no. 1 is at both intersections the city centre and university located. That is why it is suggested that the number of cyclists following the flow from arm no. 1 to arm no. 2 in the afternoon cycle in the opposite direction in the morning. Furthermore, it is visible that there are cyclists following the flows concerning the side streets. However, this takes place especially at Baravägen / Margaretavägen (2a). At Fjelievägen / Bokbindaregatan is just little cycle traffic volume coming from or cycling into the side street.

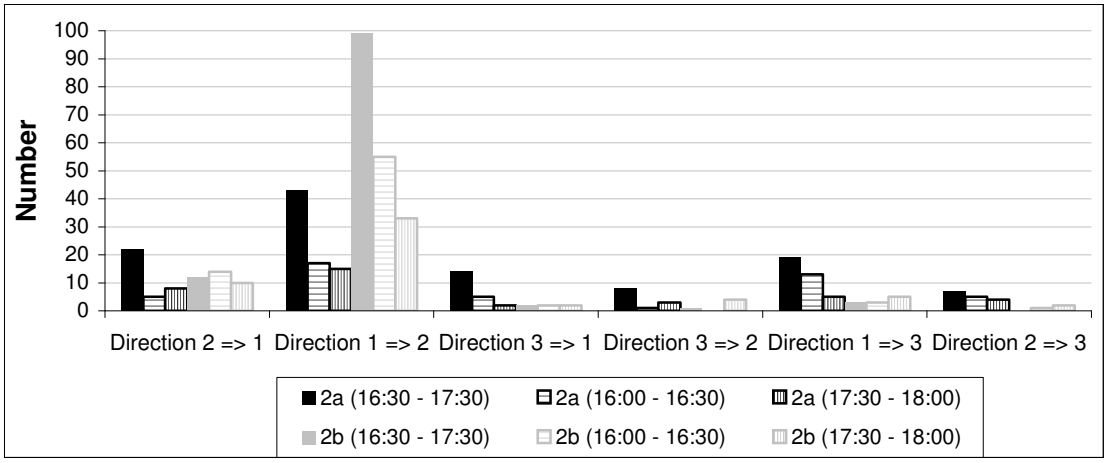


Figure 19: Cyclists per direction at second pair

The second pair of junctions consisting of Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b) has comparable courses of vehicles and cyclists numbers running over the two hours. But while there are more cyclists at Fjelievägen / Bokbindaregatan (2b) at than Baravägen / Margaretavägen (2a) there are more motorized vehicles at Baravägen / Margaretavägen (2a) than at Fjelievägen / Bokbindaregatan (2b). Moreover, the side street of Baravägen / Margaretavägen (2a) has more motorized and non-motorized traffic volume than the side street of Fjelievägen / Bokbindaregatan (2b). If these circumstances are considered while judging the behavioural and conflict studies both junctions can be compared.

2.2 Literature studies

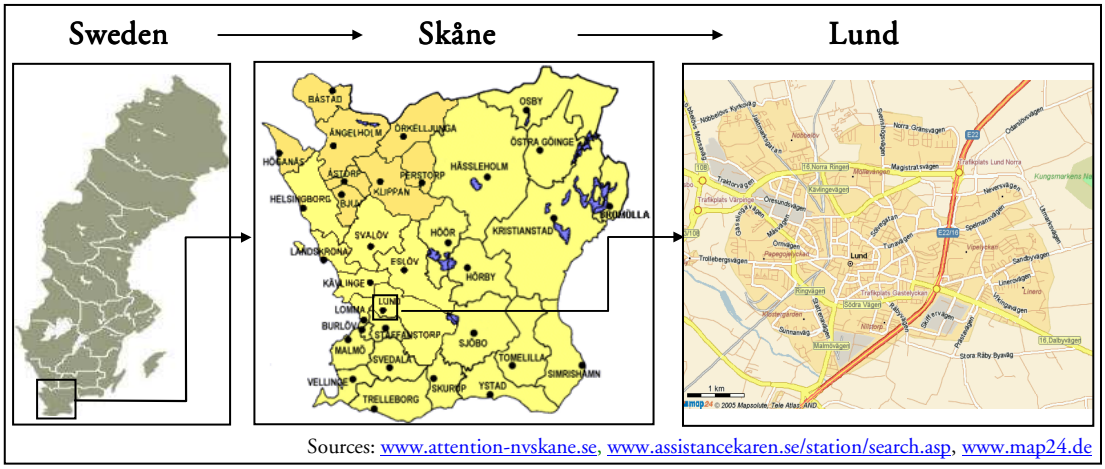
The aim of the literature studies is to study the basics elements of cycle crossings' constructions and edge conditions of influences on behaviour. It is suggested that the behaviour of a road user at an intersection is based on knowledge of traffic regulations, actual impression of a situation and former experiences. During the literature study there is a closer look into the subject of knowledge while describing the right of way regulations at bicycle crossings. Actual impressions of a situation are reflected while dealing with special characteristics of the crossings. The defined basic characteristics of reconstructed cycle crossings are the red colour and the elevation. Finally, former experiences are considered while discussing number and kinds of accidents. However, this part is evaluated by analysing accidents which is done in another chapter.
Due to these contents a direct context is created to following hypotheses: 1st hypothesis *There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections*, 3rd hypothesis *Priority is more clear at rebuilt than at non-rebuilt intersections*, 5th hypothesis *The hump as one characteristic aspect of the rebuilt crossing has a speed reducing effect on car-drivers' behaviour* and 6th hypothesis *Car-drivers slow more down before a rebuilt intersection than before a non-rebuilt intersection*. Indirect incorporates the literature study into all evaluations of all examined results.

Sources used in the literature study include both physically presented materials like books and electronic publications like papers and articles. All sources are available for everyone. The research concentrates mostly on information from Sweden and Finland. These information are found in LTH's library and on or rather by web sites.

2.3 Accidents in Sweden, Skåne and Lund

The basic idea is that knowledge of traffic regulations, actual impression of a situation as well as former experiences influence the safety feeling. While the first two steps are treated during the literature studies, with the fact of former experiences is dealt with by an accident analysis. So, there are traffic safety numbers of accidents and reasons for cycle accidents during the last years researched.

The accident analysis concentrates on three political levels: national, regional and municipality. The geographical relationship between these levels is shown in Figure 20. The research in the municipality level contains among other a detailed examination of cycle accidents with STRADA at 86 relevant intersections given by the municipality of Lund.



Sources: www.attention-nvskane.se, www.assistancekaren.se/station/search.asp, www.map24.de

Figure 20: Sweden, Skåne, Lund

The *S*wedish *TR*affic *A*ccident *D*ata *A*cquisition (STRADA) is a traffic accident registration program. The input data are given by police stations and hospitals, especially the casualty departments. So, one advantage of STRADA is that beside police recorded accidents also non-police recorded accidents like single accidents are registered. The data are valid for whole Sweden. For Skåne data are available since 1999. Time precision for accidents is possible from one minute. Furthermore, it is possible to focus on selected kinds of road users. Moreover, it allows a graphical concentration while zooming on a map down on single metres. The access to read and work with these data is given to authorized persons and offices.

Relating to the hypothesis stands the examination and evaluation of accidents in a direct context to the first hypotheses: *There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections.*

2.4 Field observations

These field observations are realized by behaviour and conflict studies, speed measurements of motorised traffic and cyclists and finally by interviews with cyclists. The field observations took place between 11th October 2005 and 9th November 2005 in Lund at two pairs junctions while each pair consists of one rebuilt and one non-rebuilt intersection. The comparability of two junctions of one pair is proved in chapters before. Finally, all field observations consist of more than 77 hours in about one month. The evaluations are all done under daylight inclusive dawn and dusk. The weather was always dry and sunny till overcasted. The surfaces of roads and cycle paths were dry.

2.4.1 Speed measurements of cars and cyclists

Speed measurements are carried out to examine safety effects of rebuilt junctions based on speed behaviour of road users relating to the second, fifth and the sixth hypothesis (see Figure 21). Herewith, it is possible to answer the question if a hump under these conditions leads to a changing speed behaviour and consequently to a changed safety effect for cyclists at intersections. There are already experiences and scientific researches of speed behaviour at humps in general but not concerning the theme of this thesis, which concentrates on special red-grey coloured, elevated cycle crossings in Lund. But under the suggestion that there might be a context between former and this researches both results are compared and evaluated.

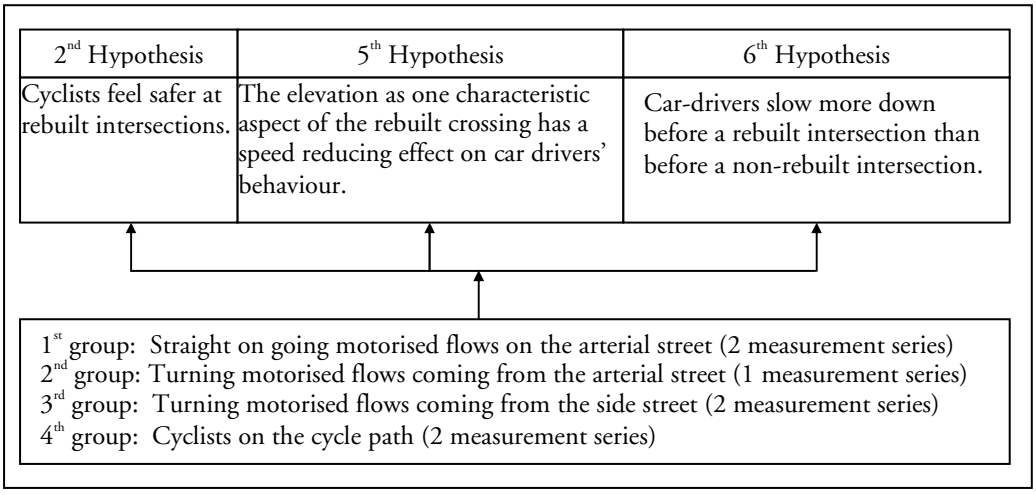


Figure 21: Description of speed measurements

The measurements have been realized with mobile hand radar called Speedcontrol. Characteristics of Speedcontrol are: a possible distance up to one kilometre, repeat rates of 0.8s, a measurement time of 22.34ms, an operable temperature range of -20°C to 60°C and finally an operable angle of 0° (Heier, 2005). Conclusions from these specifications are first, the outputs represent the current speed of cars, second, the temperature range has to be kept and finally, one has to measure in a small angle and correct these values using vector analysis as it is rarely possible to measure in an angle of 0°. For this purpose distances

are measured with a surveying wheel. Times of measurements and measured speeds can be read in Appendix Q - Appendix T and Appendix X.

Measured cars and cyclists could always pass the junction without any obstacles. It means both kinds of road users have free rides without e.g. already waiting cars in front of them or already waiting cyclists at kerbstones. Before recording values the position of radar is checked. This has to be done to find a position first, in a small angle and second, where the radar is as bad visible as possible for road users. Especially drivers change their speed seeing radar. As this behaviour would distort evaluated results the position of radar has to be chosen carefully. All cars and cyclists that fulfil these boundaries are measured. At each junction six motorised traffic flows are measured. The number of measured cycle traffic flows is whether one or two. It depends on the permitted number of directions on the cycle path. The measured speeds are finally noted by pencil and paper.

First group of measured relations are the straight on going motorized flows on the main streets. Here, are 100 measurements per flow aimed. These cars are measured first, at a distance to the junction of about 40m to 50m and second, at the level of the junction. Herewith, it is possible to get an impression of speed behaviour of non-turning cars, which is to be considered while comparing junctions of a pair. The results give an impression if car drivers slow down in general seeing one of these junctions or if they drive on without any speed change and additionally how much they slow down – if they do.

The second measured group consists of traffic flows of turning cars coming from the arterial street. Under consideration of small traffic volumes of some flows it might be hard to get a sufficient number of cars at these flows. The aim is 100 measurements per flow but at least 30 measurements. Less than 100 measurements are enough if the standard deviation or rather the sample standard deviation is small. These measurements are examined when the car is just before entering the hump at rebuilt junctions and at non-rebuilt junctions when it starts crossing the zebra marking.

The third group consists of these flows turning from the side street into the arterial street. Its characterization is equal to the second groups' distinguishing marks. Additionally, the speed of cars is also measured at a distance of 40m till 50m. Thus a changing speed is ascertainable. The general basic suggestion for the choice of these distances is that ca. 40m before the crossing car drivers recognize it, so until this point they might have their normal speed but just before the hump they might have minimized their velocity.

Last group are measured cyclists. Comparable to group two and three the number of needed measured cyclists is 100 but at least 30 depending on the standard deviation. As at Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen (1b) the cycle path can be cycled in both directions, so for both are at least 30 measurements needed. At Baravägen is a one-way cycle path which is also used in wrong direction. However, cyclists on wrong way are not measured since most of these cyclists change the roadside before entering the intersection Baravägen / Margaretavägen (2a). So less wrong way cyclists are at Fjelievägen / Bokbindaregatan (2b) that these are not measured. In general cyclists are measured two times. First measurement is taken ca. 40m before the kerbstone and second one at the kerbstone. Thus these both measurements changing speed behaviour is again ascertainable.

2.4.2 Behaviour studies

The results of this study are evaluated based on 2nd hypothesis: "Cyclists feel safer at rebuilt intersections", 4th hypothesis: "Car-drivers give more often priority to cyclists at rebuilt than at non-rebuilt intersections" and 5th hypothesis: "The hump as one characteristic aspect of the rebuilt crossing has a speed reducing effect on car-drivers' behaviour".

In preparation a pre-test was realized. Its results lead to a changed layout, which was tested again and in succession as good accepted. The final sheet of paper can be seen in Appendix A. In order to get a realistic impression of road user's behaviour no information concerning an observation has been given to them before. During observation all cyclists and car-drivers are examined independent from e.g. gender and age. Hereby, a general transferability to all cyclists and car-drivers at this junction is possible. Before the data an evaluated with the help of a computer the results have been checked concerning their usability. Finally, there are at least 30 interactions per junction recognized during daytime.

The primary aim of these observations is to study interactions and behaviour of cyclists and drivers at rebuilt and non-rebuilt intersections. By this it is possible to draw conclusions concerning the influence of changed junction's appearance caused by reconstructed cycle crossings to road users. Here, the centre of interest is the handling of priority and road users estimated speed behaviour before and when entering the junction. During the observation it was noted who gives priority including its traffic flow, a description of behaviour of both road users, the distance to the kerbstone or zebra marking when the reaction of the priority giving road user starts and finally the estimated speed of the priority taking road user.

Threshold distances for priority giving cyclists are 4m and 10m for priority giving drivers. These values are about double as long as a standard vehicle. These distances symbolize up to which point avoiding actions take place without putting the other road user under pressure by reacting almost too late within an interaction. The estimated speeds for cyclists orientate on 15km/h and for drivers on 20km/h. The speed value for drivers refers to the characteristics of humps. By these drivers are forced to slow down to 20km/h - 25km/h (compare chapter 3.1.1). That is why these values can be used to evaluate the influence of humps at reconstructed junctions compared to non-reconstructed ones. The speed value for cyclists bases on the lower level of usually cycled speeds which are between 15km/h and 20km/h (Schnabel, 1997, p.423). It is assumed to get a better speed differentiation taking 15km/h as the border line than taking 20km/h. The reason is that there might be cyclists who ride slower as well as faster than 15km/h. If one would take 20km/h it might be that most of the estimated speeds are max 20km/h and just a small number of cyclists rides faster. However, this would be caused by a generally rare number of cyclists riding faster than 20km/h.

Information relating the handling are e.g. if a cyclists enters the junction without watching to the side or behind, braking, retarding, accelerating, getting off the bike, eye contacts and waving. The beginning of studying behaviour does not depend on a certain distance to the junction. Road users are observed from the first time of noticing. Hereby, a lot more information concerning the behaviour is noticed and the results of this observation are not to abstract or simple, through which the evaluation gives a realistic insight.

The contrast to the speed measurements consist in the fact that speed measurements are realized when a road user has a free way, the behavioural study treats with situations when cyclists and drivers approach the intersection in the same time.

2.4.3 Interviews with cyclists

The 2nd hypothesis is "Cyclists feel safer at rebuilt intersections". The best way to prove this hypothesis is to ask cyclists. By interviewing these road users one can get an impression how safe they feel at a junction. The basic idea here is that there is a difference between feel safe and be safe. The results from the interviews are seen in context to researched numbers and reasons of accidents. Moreover, the results are evaluated concerning 3rd hypothesis: "Priority is more clearly at rebuilt than at non-rebuilt intersections". To get to know about the trueness of this hypothesis one has to ask cyclists concerning their knowledge to right of ways regulations. Herewith, it can be evaluated how far the interactions between cyclists and drivers are influenced by cyclists' knowledge relating to traffic regulations. Furthermore, conclusions can be drawn concerning a possibly changed comfort standard based on safety feeling and caused by these red-grey coloured and elevated cycle crossings.

Within a scope of preparation a pre-test showed weak points of the first version of the interviews – especially concerning plausibility. After changing mainly the layout the interviews had been tested again. This final layout can be seen in Appendix I.

The interviews are done at one pair of junctions. These intersections are Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen (1b). This pair is chosen as these junctions are located next to each other and consequently the kind of cyclists are comparable concerning their age, reasons for cycling and frequency.

For the evaluation are 30 interviews per junction available. To be a part of this computerized evaluation all questions have to be answered and the cyclists had not turned around before answering the first question. In order to get a representative sample of cyclists at these junctions every cyclists was spoken to. The questions are standardized. Every cyclist was asked the same question in the same way. As there have not been any pre-information that these junctions are observed, some standardized interviews extended after the interview to an informal interview, whereby additional information have been noted.

During this field interview five questions are asked – one open question and four questions with given answer alternatives. Additional information concerning age, gender and time have been noted by the field interviewer. An interview took between two and ten minutes. The interviews are done in Swedish. While the questions are here explained in English the appendix contains the original questions in Swedish. In Table 3 standardized questions and answer alternatives are short presented.

Cyclists are stopped after passing the crossing. The first question: "Which colour has the crossing you passed right now?" is asked to find out if they remember the crossing or if they just cycle without paying attention to this fact. Six answer alternatives are possible: yellow, blue, white, red, grey and no idea. Yellow, blue and red are presented, as there are in general cycle crossings in these colours in Sweden. Grey and white are the colours of a

zebra. Moreover, grey is to evaluate like no colour as it is the colour of asphalt the surface is made of at the non-rebuilt junction Rudeboksvägen / Gunnesbovägen (2a).

Table 3: Description of interviews

Interview questions	Interview answer alternatives
Which colour has the crossing you passed right now?	Yellow, blue, white, red, grey, no idea
Do you think that cyclists or cars have priority at the crossing you passed right now?	Cyclists, cars, no idea
Why do you think that someone has priority?	Free text
How safe do you feel in the intersection?	Cross on a scale with the end points: very safe and very unsafe.
How often are you cycling this way?	Every day, several times a week, several times a month

The second question: "Do you think that cyclists or cars have priority at the crossing you passed right now?" has the three possible answer alternatives: cyclists, cars and no idea. This question aims at checking their knowledge. This question might be instinctively answered so one can suggest if the reconstructed crossings lead to an opinion.

The third question: "Why do you think that someone has priority?" is an open question. By this cyclists' exact knowledge is checked. In comparison to the second question the influence of rebuilt junctions' characteristics can be suggested.

The forth question is: "How safe do you feel in the intersection?". The answer is a cross, which is to make on a scale. The endpoints of this scale are "very unsafe" and "very safe". The result from this question is set into a context with numbers of accidents.

The fifth question: "How often are you cycling this way?" is asked to characterize interviewed cyclists. Possible answer alternatives are: every day, several times a week and several times a month.

2.4.4 Conflict studies

Related to the first hypothesis "There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections" the term *conflict* has to be defined. Here, it is based on the Swedish Traffic Conflict Technique developed at Lund Institute of Technology (The Swedish Traffic Conflict Technique, 1992 and 2005). According to this there are three kinds of conflicts between an undisturbed passage and an accident. The possibility to end in an accident and by this the degree of danger increases from a potential conflict over a slight conflict to a serious conflict.

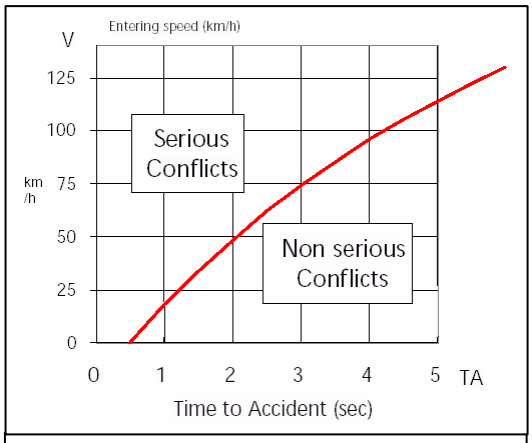
In order to evaluate traffic safety serious conflicts are important. These serious conflicts are demarcated to slight conflicts by the speed and a so-called *Time to Accident – Value (TA)*

(compare Figure 22). The needed data to calculate this value is first, the estimated distance to the potential point of collision and second, the estimated speed when the evasive action is taken (The Swedish Traffic Conflict Technique, 1992, p.6-9).

In order to examine serious conflicts the trained observer spent per junction at least eight hours doing the conflict study. As the rate of conflicts increases with the number of road users at least five hours of observation are done during traffic peak times. The usual peak times are: 07:30 to 8:30, 12:00-13:00 and 16:30-17:30. For this research the morning hour and the afternoon hour are prolonged by a half-hour before and after the original peak hours. The times of observation are added in the appendix.

While studying conflicts often other field studies had been done simultaneously. The studies could be combined as the observed traffic flows have not such a big traffic volume.

Conflicts between cyclists on the path or crossing and cars turning between the arterial street and the side street are the focus of interest. However, all recognized conflicts concerning the observed junctions independent from kind of road user, gender, age etc. are noted. By this the results are transferable to a general conclusion concerning the junctions.



(The Swedish Traffic Conflict Technique, http://www.tft.lth.se/rapporter/Conflict1.pdf, 2005)

Figure 22: Swedish Conflict Technique

3 Results

3.1 Results from literature studies

3.1.1 Characteristics of humps

One general principle in Sweden to increase traffic safety is to achieve a speed of less than 30km/h of motorized vehicles before a crossing. Humps are one possibility to reach this limit (Brandberg, 1998, p.61). These constructions are used to reduce the speed of motorised vehicles to 20-25km/h (Linderholm, 1996 and Lundberg, 2002, p.5-8). In this context the number of accidents decreases between 35% and 70% and consequently the traffic safety increases by humps. Their increasing safety effect is used in a lot of different kinds of dangerous places. So, they are constructed before junctions as well as on mid-block sections since the higher the speed the higher is its reduction. Consequently humps create a loss of time for drivers but combined with a crossing non-motorised road users win time and safety feeling. These combined crossings are elevated to the level of adjacent cycle paths or footpaths through which the comfort for pedestrians and cyclists is increased. The combined humps and crossings are usually placed in side streets nearby intersections with main streets.

Beside the speed reducing effect exists sometimes a displacement effect of motorised traffic to other roads. Here, the traffic volume decreases and the traffic safety is supported once more.

Disadvantages of humps are also mentioned in literature. There are problems when heavy traffic or motorized vehicles with two wheels like mopeds have to pass a hump. Moreover, constructed humps can generate vibration when a vehicle passes. This vibrations can cause damages e.g. on buildings. Furthermore, humps passing vehicles produce often noise while retarding and accelerating. Further, it is mentioned that the combined humps and crossings might cause problems referring to the right of way regulation.

Some general information is given in literature, too. It is written that a hump is to renew normally every 10 years. Moreover, if a hump is placed on a road, which is drivable with 50km/h, there should be a traffic sign which points to the hump. Furthermore, its recognizability should be emphasized by terms of colours. Its height is suggested with 0.08m to 0.12m. Besides literature mentioned that until this time no studies concerning traffic safety at combined humps and crossings had been done (Linderholm, 1996, p.20f. and p.65-67).

3.1.2 Characteristics of red colour

Each colour has its own meaning. The recognition of this meaning can be unconscious as well as learned. Red is here one of these colours children learn often first (Löhndorf, 2003, p.20). The recognition of colours is used to underline certain aspects during everyday lives. An unconscious recognition includes here an understanding something just by recognising a colour (Sandblad, 2005). Concerning to the topic of this thesis the question is: "Which influence might have the red colour of the reconstructed cycle paths to the behaviour of road user?"

Psychology

Relating to traffic situations red has three main characteristics. These are that the colour has a warning effect, it is activating and aggressive.

The basic for the warning character is suggested to be derived from an evolutional context with *fire*, which is often equated with *danger* (Seilnacht, 2005).

Moreover, red has a big signalling and therefore activating effect. That is why it is clear and fast recognisable and understandable. So, this colour can be used to point on a needed activity in order to prevent a dangerous situation e.g. on a traffic sign. In such a case the colour is used to underline something really important. That is why it should be used carefully and not under long periods. On the one hand people can get used to it and on the other hand they can get excited and restless while watching a long term at this colour (Sandblad, 2005 and Tümpling, 2005).

The foundation for an aggressive behaviour caused by red is suggested to be an evolutional context since this is the colour of blood. Peoples had to face *blood* it e.g. during offensive and defence during the evolution (Seilnacht, 2005).

The sum of these three effects on human beings might be the reason why we are getting excited while watching at this colour.

Physics

While traffic lights emit red, green and yellow light, the rebuilt cycle crossings just reflect it. It means that the surface of a crossing absorbs all coloured lights but red. These reflected light rays are recognised by receptors on the human retina and transmitted to the brain. Here, the personal colour sensation is created.

Red light's wavelength ranges between 625-740nm. The spectrum, which is discernible by human eyes, is between 380-760nm. Consequently red is at a transition to the lights which are not recognisable by human eyes. Because of this long wavelength red light is also visible under bad lightning conditions like fog or rain when other colours are no longer visible.

Red is characterised as a strong colour. In the figurative sense means this description that human beings recognise red as especially bright. The reason for this is that there are special receptors on the human retina concerning long waved lights like red light. But unfortunately has red from all colours, which are visible by human eyes, the lowest energy per photon value. Therefore it is a lot more energy necessary so that red appears as bright as other colours. (Darum ist die Ampel rot, gelb, grün, 2005)

Summarized can be said that the psychological aspect of red is very important as it works often unconscious. However, there is the problem that this colour needs to be recognisable by human eyes bright daylight conditions. In conclusion the lightning through the night should be as bright as possible.

3.1.3 Priority regulations at bicycle crossings without traffic lights

During this thesis two pairs of junctions are studied. Each pair consists of one intersection with a rebuilt cycle crossing and one control junction with a non-rebuilt cycle crossing. The reconstructed cycle crossings are elevated and red-grey coloured. The classic crossings are combined crossings for cyclists and pedestrians. Here, is the crossing of pedestrians organized with a zebra. The bicycle crossing has borders of white squared markings on one side and zebra markings on other side. Itself it is not marked in any colour.

At both kinds of junctions are on the cycle paths – in direction of allowed motion after the crossings – traffic signs, which symbolize a cycle path. Moreover, traffic signs for drivers are at both non-rebuilt junctions and one rebuilt junction, which point to the zebra crossings positioned. The point of this traffic sign is just to indicate to drivers that they are approaching a crossing for pedestrians (VMF, §15).

The pairs of junctions differ relating to the position of the priority giving triangles. These are for drivers coming from the side street before the crossings at one pair of junctions and after the cycle crossings at the other pair. According to the Vägmärkesförordning are these triangles on the surface equal the corresponding vertical triangular traffic sign at the roadside. Therefore these triangles demand to give priority to all crossing vehicles (VMF, §52). This context includes bicycles, too.

The traffic regulations differ between the different kinds of non-motorised road users like cyclists and pedestrians. However, cyclists become pedestrians when they wheel their bikes. In this case apply for former cyclists the same regulations like for pedestrians (TrF 1:4).

Figure 23 and Figure 24 show a simplified description of the priority regulations at both kinds of junctions depending on the priority giving triangles.

Regulations at non-reconstructed cycle crossings

The “Trafikförordning” says that drivers have to slow down so that they can stop before a zebra if a pedestrian is on the zebra or stays at the beginning of the zebra (TrF 3:41). Further, it is written that a driver who approaches a cycle crossing has to adapt its speed so

that there is no danger for cyclists who are on the crossing (TrF 3:61, TrF 3:41). Concluded drivers have to stop for pedestrians at zebras (TrF 3:61) but they just have to slow down for cyclists. Moreover, if cyclists want to use a zebra they have to get off their bikes and wait at the kerbstone. Finally, they should get priority from drivers. The problem here is that drivers have to give way at a zebra. However, a cycle crossing is not included in a zebra. That is why if cyclists get off their bikes and wait at the cycle crossing they have no priority, instead they have always to give way (Ahlström, 2004, p.59).

The more general situation is that cyclists like to continue to cycle and not to get off before each junction. Cyclists who want to use a cycle crossing are just allowed to cross if there is no danger considering to approaching motorised vehicles (TrF 6:6). It means that cyclists coming from a cycle path, where they have priority (TrF 3:59) and then enter a junction have to give way (TrF 3:18). However, on the road the priority regulations change once more. It is written that drivers who after they turned into an intersection pass a cycle crossing have to give way to cyclists who are on the crossing or just before entering the crossing (TrF 3:61). To turn the argument on its head, drivers have priority when the cycle crossing is before they turn. Besides cyclists who are already on the crossing can continue. They need not to stop.

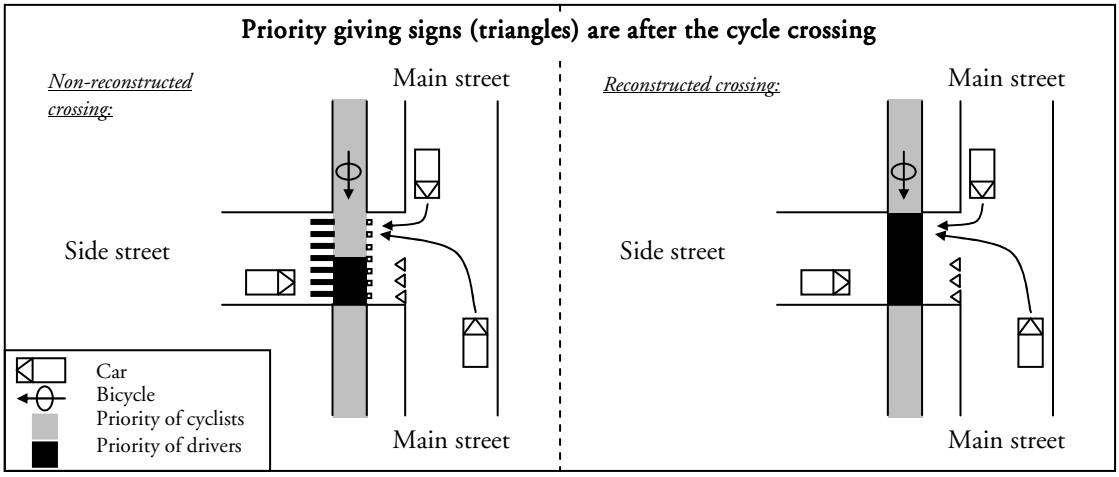


Figure 23: Priority regulations if a cyclist and driver come simultaneously I

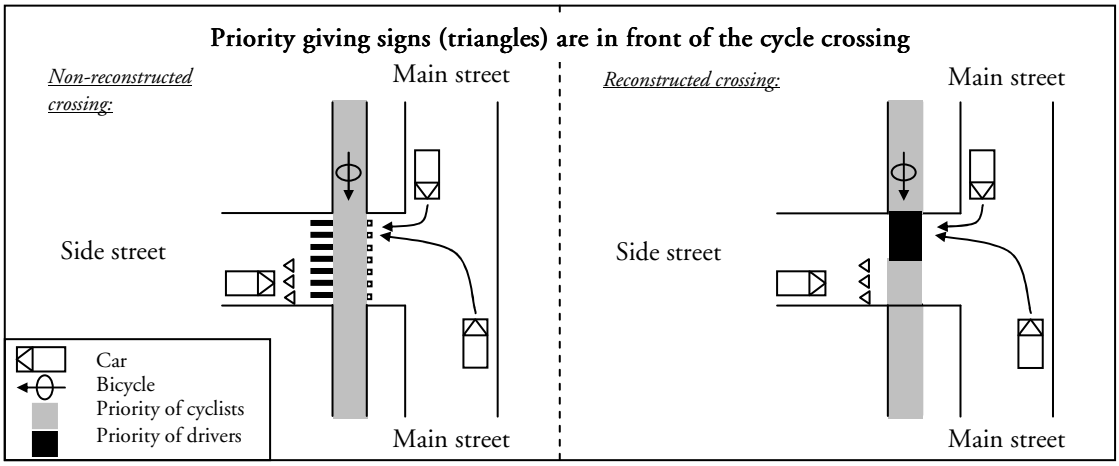


Figure 24: Priority regulations if a cyclist and driver come simultaneously II

Regulations at reconstructed cycle crossings

In the "Vägmärkesförordning" it is defined that a cycle crossing has to be marked with squares on the surface (VMF, §52). To turn the argument on its head, it means if there are not such marks there is no official cycle crossing. Here, the situation is regulated so that cyclists have to give way (TrF 2:21 and Övergångställen och Cykelöverfarter, 2004, p.18). For drivers there are no special regulations (Övergångställen och Cykelöverfarter, 2004, p.19).

In "Övergångsställen och Cykelöverfarter" it is noted that both cases of cycle crossing can be elevated. However, the priority regulations are unchanged (Övergångställen och Cykelöverfarter, 2004, p.12-13, 19). In contrast it is written in the "Åtgärdskatalog" from 1996 that elevated crossings lead to a change of the regulations so that drivers have to give way to cyclists. Thus it might be possible that these elevated cycle crossings are developed under regulations, which have changed.

3.2 Results of accident analysis

Numbers of accidents

In Figure 25 the courses of numbers of killed road users in Sweden and Skåne is shown between 1956 and 2004. Both courses run in general comparable. There are an increasing number of dead road users from 1956 followed by a discontinuously decreasing trend until today. In difference to the course for whole Sweden is Skåne's course not so smooth. Here, the run is often interrupted by single years with clear higher numbers. While the numbers of killed road users in whole Sweden stagnates since 1996, an upward tendency seems to be in Skåne. In *Olycksrapport 2004* Skåne's course is judged as critical since – according to Vision Zero – Skåne's number of killed road users should decrease to 29 until 2007 (Ekman, 2005, p.3). However, there have been 71 killed road users in 2004.

In Figure 25 it is also a general tendency of killed plus severe injured road users in Lund's municipality presented. Lund's course shows an increasing tendency from 2002 to 2003. Although 2004 the number of killed and severe injured road users is lower than in 2003 the total number is again higher than 2002. This run is comparable to Skåne's course since 2002.

The aim of Lund's municipality relating to Vision Zero is that there will be together 33 severe injured and killed road user in 2007. A line in the picture shows the actual tendency and it seems that the number of 33 (Trafikräkningar och trafikolyckor, 2004, p.19) is reachable in Lund while Skåne's development is unsure.

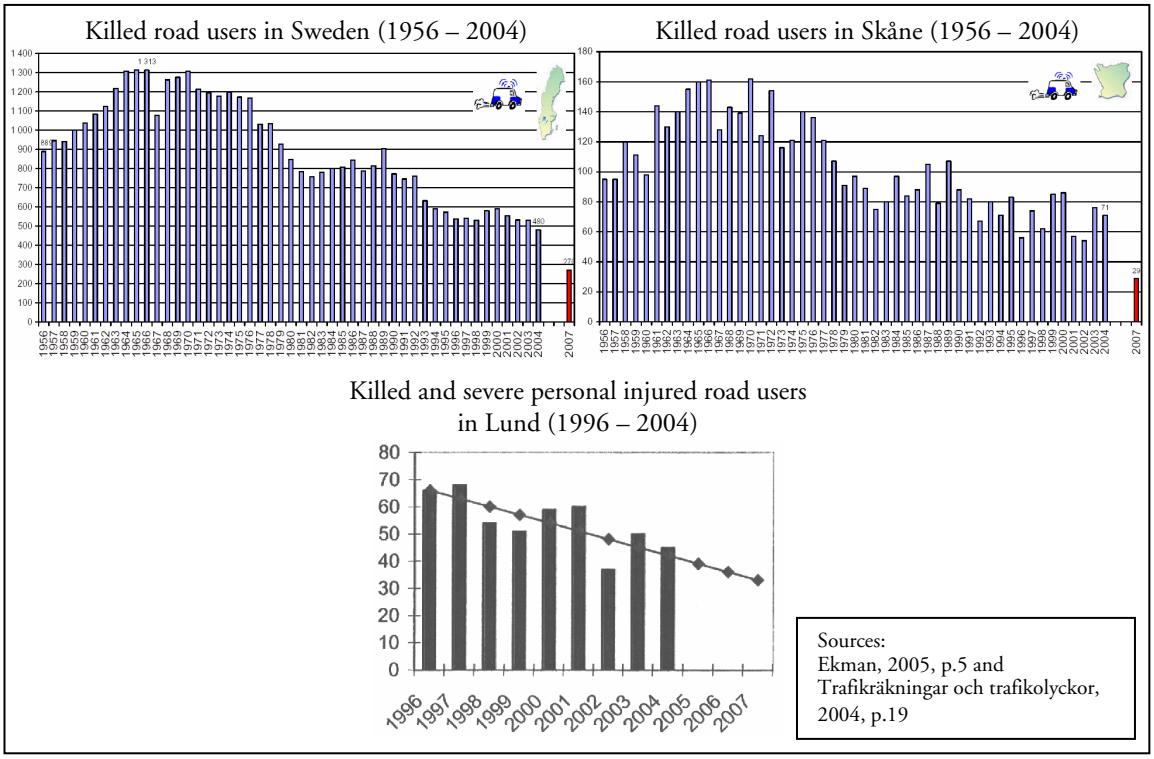


Figure 25: Numbers of accidents in Sweden

Numbers of cycle accidents

Concerning killed or severe injured cyclists *Vägtrafikskador 2004* presents a general downward tendency in Sweden since 1985. In 1985 are ca. 900 cyclists noted as killed or severe injured. In 2004 this number is more than halved since there are 392 cyclists registered. Furthermore, it is described that most of these accidents happen in built up areas. Moreover, 28 accidents leads to cyclists' death in Sweden in 2004 (Vägtrafikskador 2004, 2005, p.22ff) while four of them have been killed in Skåne (Ekman, 2005, p.9). However, none of them occurred in the municipality of Lund. Here, the police registered 40 road users who have been severely injured in the municipality, 10 of them were cyclists. Slight injured have been 58 cyclists of 244 road users. Thus 25% of all injured road users noted by the police were cyclists (Trafikräkningar och trafikolyckor, 2004, p.20f.). Noted data from hospitals show for severe injured cyclists 33% and for slight injured 45% (Trafikräkningar och trafikolyckor, 2004, p.22) relating to all injured road users. Some of the described numbers are presented in Table 4.

Table 4: Numbers of accidents 2004 at selected intersections

	Killed road users	Killed cyclists	Severe injured cyclists	Slight injured cyclists
Sweden	480	28	Not available	Not available
Skåne	71	4	66	Not available
Municipality Lund	5	0	Police: 10 Emergency room: 5	Police : 58 Emergency room: 170

Reasons for cycle accidents

The main kind of cycle accidents is a single accident. In the municipality Lund are these about 50% of all cycle accidents. Technical problems with the bikes, objects coming between spokes and icy surfaces cause often single accidents.

The second frequently reason is a collision with a motorised vehicle except mopeds. It is one third of all cycle accidents. Reasons for about a fifth of the cycle accidents are collisions with cyclists or moped drivers (12%), collisions with pedestrian (1%) and unknown reasons (5%) (Ekman, 2005, p.27ff and Trafikräkningar och Trafikolyckor i Lunds kommun, 2004, p.23f.).

Results from STRADA

With the help of STRADA a course of accident numbers at reconstructed junctions is done. The years of reconstruction are given by Lund's municipality and can be seen in Appendix Y. In STRADA numbers of accidents are available for Skåne and so also for Lund since 1999. In order to get a meaningful result the intersections should be checked four years before and four years after the reconstruction. By this the earliest junctions that could be checked have been reconstructed in 2003. However, in this case are no four years after reconstruction available. Moreover, the year 2005 is not included in the evaluation as it is the actual year. Therefore this program presents today either data from time before or time after the reconstruction per junction.

Still STRADA can be used to give a general overview to cycle accidents at these intersections. So, cycle accidents at all 71 reconstructed and 15 non-reconstructed junctions are evaluated. Finally, there are three accidents before and four accidents after a reconstruction noted in the program (compare Table 5). The small number of registered accidents does not allow a scientific evaluation. The six intersections in Table 5 are the only junctions where cycle accidents according to this thesis have been registered. It means that at 80 intersections of the relevant junctions no accidents according to this aspect happened.

Table 5: Numbers of relevant accidents at 86 intersections in Lund

	Time before reconstruction	Year of reconstruction	Time after reconstruction
Intersection	2000-01-01 2003-12-31	2004-01-01 2004-12-31	-
Sölvegatan / Helgonavägen	1	1	-
Thulemsvägen / Katedervägen	1	0	-
Intersection	1999-01-01 1999-12-31	2000-01-01 2000-12-31	2001-01-01 2004-12-31
Tornavägen / Nikolovinsväg	1	0	0
Fjelievägen / Starvägen	0	0	1
Trollebergsvägen / Lärkvägen	0	0	2
Hjälmar Gullbergs väg / Fritjofsväg	0	0	1

However, it is possible to compare the descriptions of accidents' circumstances. Two accidents, which happened after the reconstruction, are descript this way that the driver slowed down but then continued driving. In both cases the cyclists thought they would get

priority. Two more descriptions explain that the drivers did not wait until the cyclists left the crossing. One driver touched the back wheel of a cycle.

Two accidents -which happened before the reconstructions- are described by priority taking drivers. In one case the car crashed on the bike and in the other case the cyclist crashed on the car.

The descriptions of the two accidents left – one before the reconstruction and one in the year of reconstruction – are very unclear and so thus they are not reflected here.

3.3 Results from field observations

During the following chapters the results of the speed measurements, behaviour studies, interviews and conflict studies are described in detail. Hereby, possible uncertainties and eventualities relating to the use of evaluation of data are discussed.

In the course of this thesis one more kind of field observation was made. These field observations are counts of traffic volumes. The evaluations of these results are presented in chapter 2.1.2 and lead to the proof of comparability of junctions. Here, the results of the counts are seen in a context with the results of all other field observations, which are done in order to evaluate safety effects for cyclists at rebuilt and non-rebuilt junctions.

To sum up the results of the counts it can be said about both pairs that the total numbers of traffic volumes of motorized vehicles and cyclists are comparable within each pair. Further, there is less traffic at each junction in the side street than in the arterial street. However, there are small differences concerning the traffic flows. One of these differences is that both junctions of the first pair –Rudeboksvägen / Gunnesbovägen and Rudeboksvägen / Dösvägen– have in general three arms. However, there is a gateway to a parking place which works like a fourth arm at Rudeboksvägen / Gunnesbovägen during the peak hours. Moreover, there is just a few traffic in one of two flows coming from the side street at both junctions. At the second pair of junctions *Baravägen / Margaretavägen and Fjelievägen / Bokbindaregatan* the traffic volumes differ obviously in the flows relating to the side streets between both junctions.

3.3.1 Results from the speed measurements

According to the hypotheses (compare Figure 1) several speed measurements were made (compare chapter 2.4.1). The aim is to check if the speed behaviour of car-drivers and cyclists varies at non-rebuilt junctions and rebuilt junctions. The realized speed measurements are spot measurements (Trafikundersökningar, p.28). The results of the speed measurements are first, described for each pair of junction -according to the groups from chapter 2.4.1. Second, these results of one pair are compared with the results of the second pair of intersections.

In order to control the usability of the examined data the mean, the sample standard deviation, the confidence interval and the median are determined and presented in tables. These factors are needed since usually data from speed measurements are distributed normally (Trafikundersökningar, p.37). However, sometimes one cannot be sure about if this context really exists e.g. because of too less data. In order to determine the existence of a normal distribution, it is looked at the distribution of speed values and numbers of vehicles, the median and mean are compared and the course of the empiric distribution is evaluated.

The difference between the *median* and the *mean* is that the *median* is stable against single extreme values while the *mean* is not. So, if there would be a big difference between *median* and *mean* it might be that there is no normal distribution. The *standard deviation* reflects how much the examined values spread out around the average. The standard deviation bases on long time examinations. Since the available number of examined speeds represents data just for a short time the results of speed measurements are checked by the *sample standard deviation*. With the help of the *confidence interval* the validity of the results can be quantified. Here, a confidence level of 95% is used. Based on the fact that this speed measurement reflects a sample it means that e.g. the average of the statistical population of all vehicles is with a probability of 95% in the computed interval around e.g. the average. That is why the smaller the *sample standard deviation* and the more values are available the narrower is the *confidence interval*.

In addition to the statistical factors the traffic factor v_{85} is determined from figures with the empiric distributions. V_{85} describes this speed which 85% of all unhindered driving vehicles do not exceed. In the same figures additionally the *median* can be read at 50%.

Rudeboksvägen / Gunnesbovägen (1a) and Rudeboksvägen / Dösvägen (1b)

The designations *1a* and *1b* refer to Figure 5. Here, the exact location of the junctions in Lund can be seen. Both intersections are described and compared in chapter 2.1.1.
Figure 26 presents the sum of all examined values at this pair of junctions. The significance of the statistical values according to the usability of the data depends on the achieved numbers of data per flow.

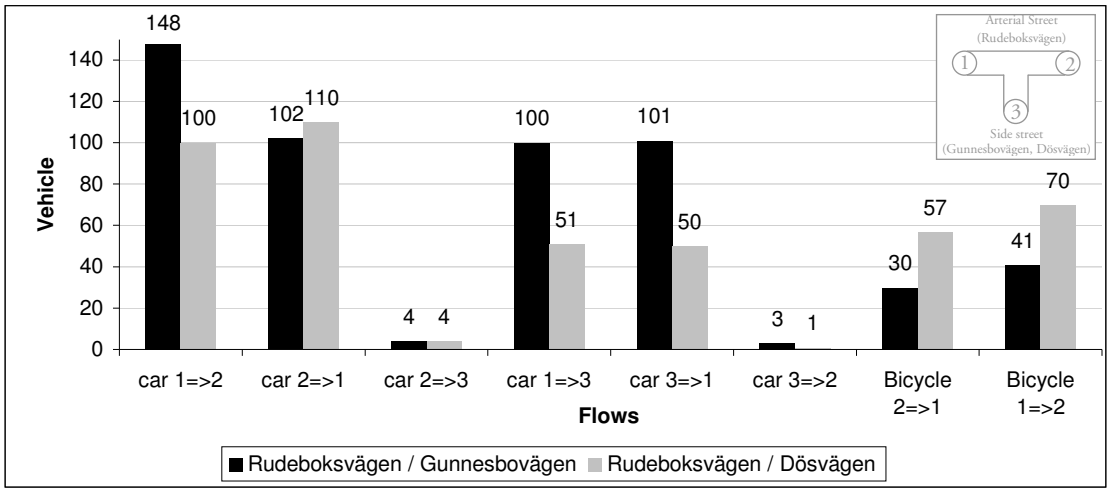


Figure 26: Numbers of speed measured vehicles (1st pair of junctions)

It is visible that there are sufficient numbers of data of at least 100 cars following the arterial streets. Moreover, it becomes clear that there are definitely too few vehicles for a scientific analysis at both junctions in the flows between the side street and the right arm of the main street. Here, are less than 5 cars measured in each flow. However, such small numbers were expected since the results from the traffic volume counts show a comparable weak relationship between these arms. Caused by the low number of data these flows are not included in the following descriptions. Furthermore, cars in the flows between arms no. 1 and no. 3 are measured. Here, the final achieved number of data at Rudeboksvägen / Gunnesbovägen is about twice as much as at Rudeboksvägen / Dösvägen. This difference between the finally available values of data was expected, too, based on the results from the counts (see Figure 13). Finally, there are the speed values of cyclists. Since the aimed numbers of 100 measurements were not achieved it is absolutely necessary to check the standard deviation. The difference between the numbers of both junctions results on the one hand from a general slightly higher number of cyclists at Rudeboksvägen / Dösvägen than at Rudeboksvägen / Gunnesbovägen (see Figure 14) and on the other hand from the measured time. At Rudeboksvägen / Dösvägen cyclists were measured for five hours while at Rudeboksvägen / Gunnesbovägen there was measured for four hours. Moreover, three of the four hours of speed measurement of cyclists at Rudeboksvägen / Gunnesbovägen took place on a Sunday while the main time of cyclists measurement at Rudeboksvägen / Dösvägen was on a Monday (see Appendix Q, Appendix R and Appendix X). The examined cycle crossing is a part of a cycle track which is first, mostly used by cyclists to get from a residential area to the city and thus e.g. to their working place. Second, the track is used by many pupils to and from a nearby located schools (compare chapter 2.1.1). Consequently the cycle traffic volume on Sundays is lower than on Mondays.

1st group: Straight on going motorised flows on the arterial street

Having a look at Figure 27 and Figure 28 a normal distribution seems to exist at both junctions by distance per direction and flow. The turning points –of the abstractly seen normally distributed curves– are approximately between speeds of 45km/h and 50km/h. Further, the means and the medians are identical except in one case (see Table 6). Just in the flow from arm no. 2 to arm no. 1 at a distance of 40m to 50m before the junction at Rudeboksvägen / Dösvägen the median is 1km/h less than the mean. This is just a small difference. The standard deviation of the data from Rudeboksvägen / Gunnesbovägen is between 5.6 and 6.8. At Rudeboksvägen / Dösvägen this statistical element is between 7.2 and 8.3 by which it is a bit higher compared to the other junction. However, these spreads are low. The confidence interval at Rudeboksvägen / Gunnesbovägen is ±1.1km/h or ±1.2km/h respectively. So, the real averages are in an interval of ±1.1km/h or ±1.2km/h around the computed averages. The confidential intervals for Rudeboksvägen / Dösvägen are a bit higher. Here, values between ±1.4km/h and ±1.6km/h are calculated. Therefore the computed means spread less than 2km/h up- or downwards.

The flow 1=>2 passes the junction on the side of the side street. This might be a reason why the average of the speeds –independent of the distance– is generally a bit lower than in the opposite direction. Moreover the average at Rudeboksvägen / Dösvägen is in both distances identical or differ just about 1km/h. At Rudeboksvägen / Gunnesbovägen the difference between the distances in flow 1=>2 is 2km/h and in the opposite direction it is 4km/h (compare Table 6). All these differences are judged as small.

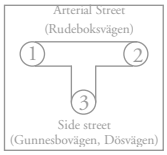
The empiric distributions shown in Figure 29 for the flows from arm no. 1 to arm no. 2 present quite smooth courses. Therefore it might be said that the examined speed values reflect the real speeds. The measurements at the level of the junction at Rudeboksvägen / Dösvägen refer a bit rougher course especially in the area of v_{85}. By this v_{85} differs about 5km/h while otherwise the courses of both junctions in this distance are really close to each other. The measurements at the level of junction show at Rudeboksvägen / Gunnesbovägen a v_{85} of about 51km/h and at Rudeboksvägen / Dösvägen of about 56km/h. At a distance of 40m to 50m the courses of both junctions are so close that there is almost no difference between their v_{85}. Here, it is about 55km/h. Also the ranges of driven speeds at both junctions and distances are comparable. The ranges are between ca. 35km/h and ca. 65km/h.

The courses of the empiric distributions in flow 2=>1 differ a bit more than the described courses of the opposite direction. Comparable to the opposite direction are here also the courses of the speeds measured at a distance of 40m to 50m before the junction closer than the measurements taken at the level of the junctions. It is also the same context that there are more higher speeds at the level of Rudeboksvägen / Dösvägen measured than at Rudeboksvägen / Gunnesbovägen. The difference between v_{85} is again at the level of junction about 5km/h. At Rudeboksvägen / Gunnesbovägen is a v_{85} of ca. 53km/h and at Rudeboksvägen / Dösvägen of ca. 58km/h computed for the values taken at the level of intersections (compare Figure 29). At a distance of 40m to 50m before the junction v_{85} is nearly the same with a value of about 57km/h. The range of speeds in these flows is a bit wider. It ranges from about 30km/h to ca. 70km/h.

The cars have been measured two times -one time per distance-. Thus speed differences between both distances can be calculated. The distribution of these differences can be read in Figure 30. The differences are computed that way that the first taken measurement -at a distance of 40m to 50m before junction- is subtracted from the second measurement -at the level of the junction. Therefore negative values represent acceleration, zero km/h is an unchanged speed and positive values reflect retardation. A conclusion from this point of view can be said that there are almost no speed changes at Rudeboksvägen / Dösvägen. The measured changes are about an acceleration of 1km/h or no speed changes in flow 1=>2. In flow 2=>1 there is a range between a retardation of 1km/h and an acceleration of 1km/h. So, at this intersection nearly no speed changes take place. At Rudeboksvägen / Gunnesbovägen speeds are reduced between 1km/h and 4km/h in flow 1=>2 and between 2km/h to 6km/h in flow 2=>1.

To sum it up the speed behaviour of these flows is almost equal at both intersections. Furthermore, retarding speed behaviour seems to exist at the non-reconstructed junction Rudeboksvägen / Gunnesbovägen.

Table 6: Statistic elements of group 1 (1st pair of junctions)



		Flow 1=>2		Flow 2=>1	
		40m - 50m before junction	level of junction	40m - 50m before junction	level of junction
Numbers	Rudeboksvägen / Gunnesbovägen	148		102	
	Rudeboksvägen / Dösvägen	100		110	
Mean [km/h]	Rudeboksvägen / Gunnesbovägen	49	47	52	48
	Rudeboksvägen / Dösvägen	48	48	52	51
Standard deviation	Rudeboksvägen / Gunnesbovägen	6.8	6.7	6.1	5.6
	Rudeboksvägen / Dösvägen	7.2	7.2	8.3	8.0
Confidence interval [km/h]	Rudeboksvägen / Gunnesbovägen	±1.1	±1.1	±1.2	±1.1
	Rudeboksvägen / Dösvägen	±1.4	±1.4	±1.6	±1.5
Median [km/h]	Rudeboksvägen / Gunnesbovägen	49	47	52	48
	Rudeboksvägen / Dösvägen	48	48	51	51

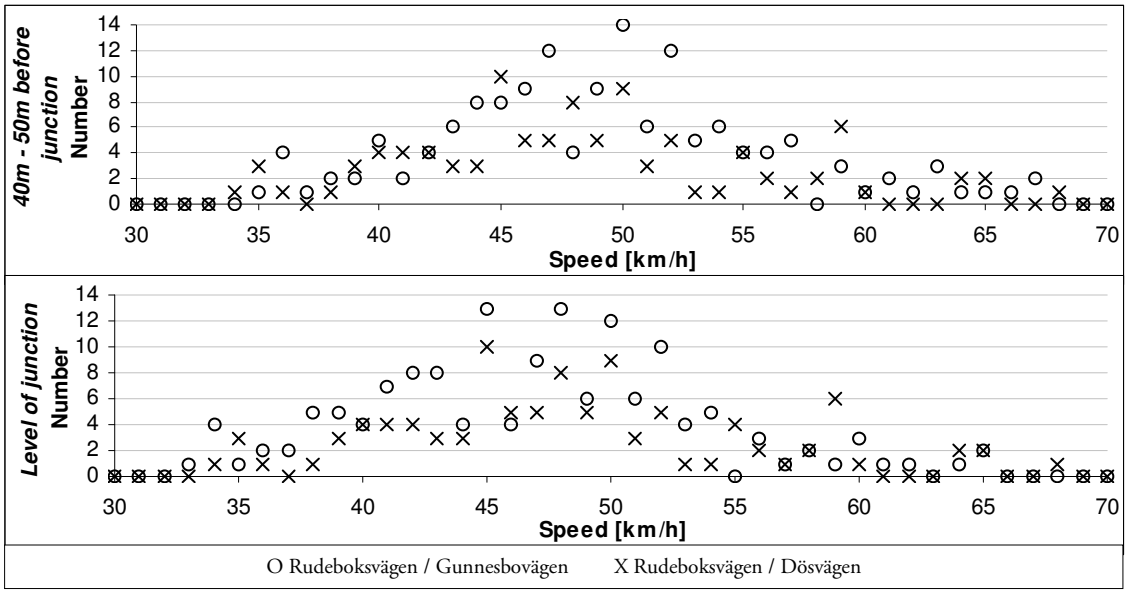


Figure 27: Measured motorised vehicles in flow 1=>2 (1st pair of junctions)

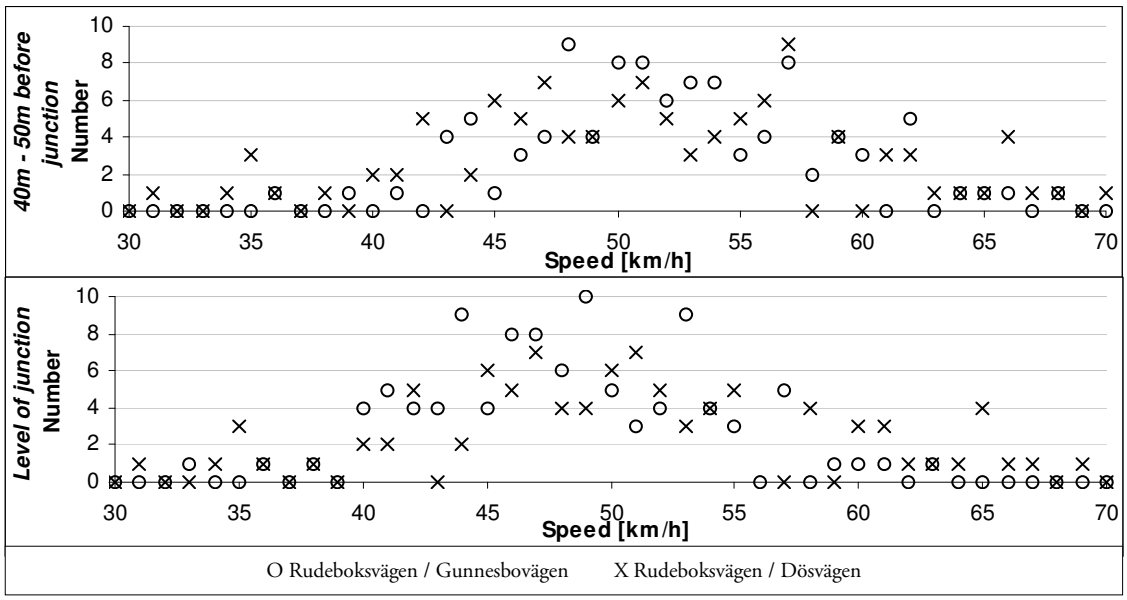


Figure 28: Measured motorised vehicles in flow 2=>1 (1st pair of junctions)

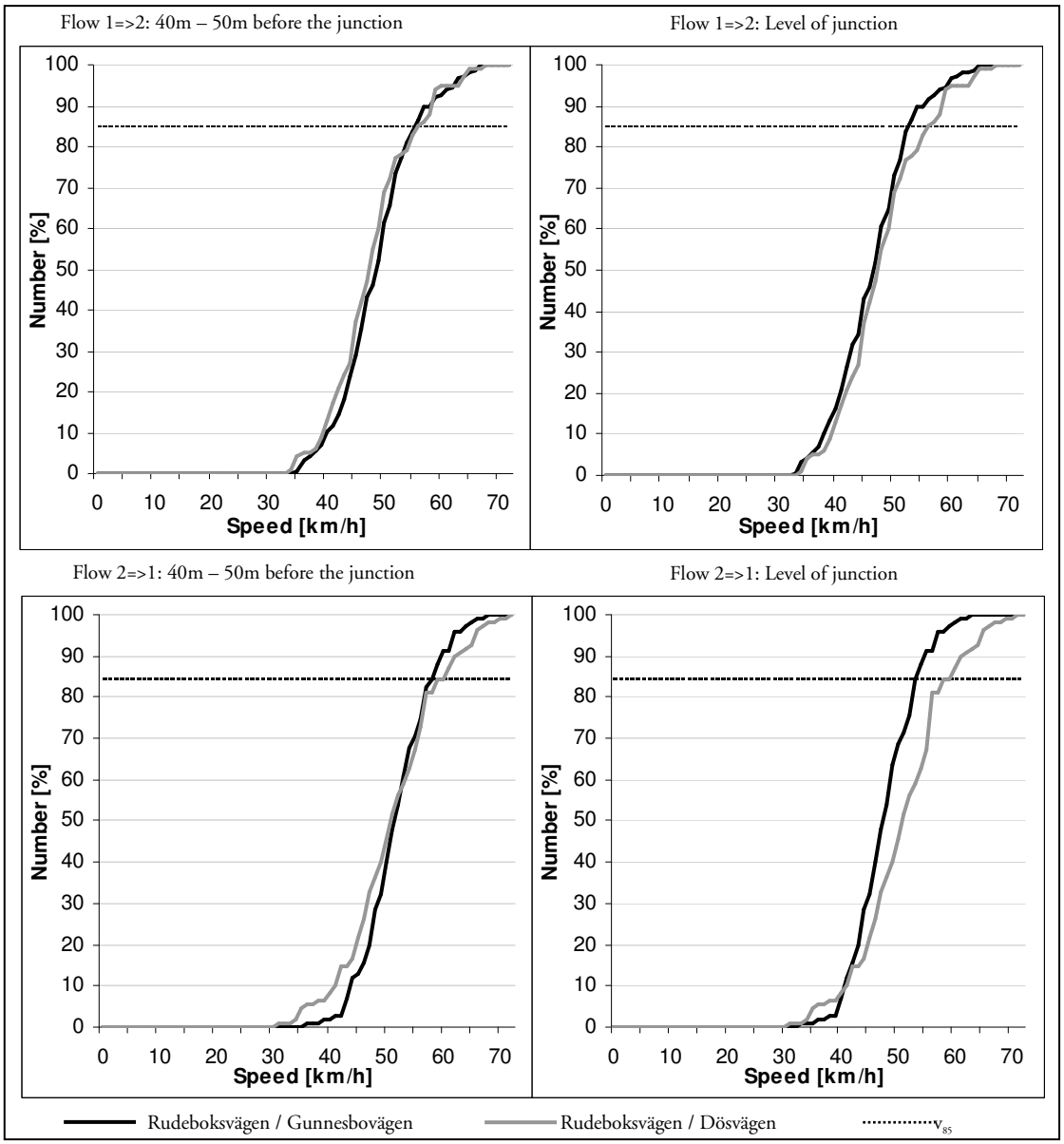


Figure 29: Empiric distribution group 1 (1st pair of junctions)

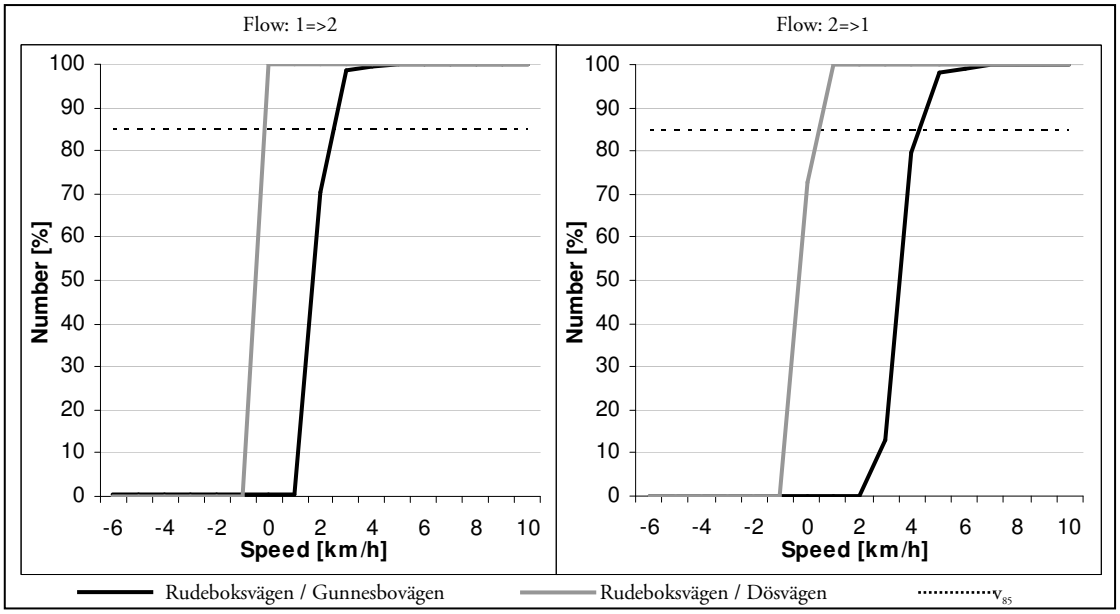


Figure 30: Speed differences in group 1 (1st pair of junctions)

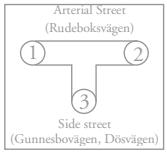
2nd group: Turning motorised flows coming from the arterial street

Theoretically there are two possible flows fulfilling the characteristic of this group. However, during the measured period only four cars turned left in flow 2=>3 (see Figure 26). Therefore this flow is not described any further. Though the statistical values are shown additionally for both flows in Table 7.

In this table can be also read that the mean and the median of flow 1=>3 are identical for both junctions. The average at Rudeboksvägen / Gunnesbovägen is 11km/h. So, it is 3km/h higher than at Rudeboksvägen / Dösvägen. Further, Figure 31 shows a comprehensible normal distribution. The data can be analyzed scientifically since the standard deviation is with 2.6 and 2.2 judged as little. Also the intervals with a range of ±0.5km/h and ±0.6km/h are extreme low. Especially interesting are these statistical data for the measured speed values at Rudeboksvägen / Dösvägen since there are with 51 measurements less than 100 measurements available. Finally, it can be said that the computed averages reflect the real average very well. In Figure 32 mostly parallel runs of courses of the empiric distributions are shown. Here, lower speeds are reflected at the rebuilt junction Rudeboksvägen / Dösvägen. The difference to the non-rebuilt intersection is about 2km/h to 5km/h. Furthermore, v_{85} is about 9km/h at Rudeboksvägen / Dösvägen and about 13km/h at Rudeboksvägen / Gunnesbovägen. Both Figure 31 and Figure 32 show a tendency of slightly higher speeds at the non-rebuilt junction than at the rebuilt one. While at Rudeboksvägen / Gunnesbovägen speeds between 5km/h and 20km/h are driven, the reconstructed junction is driven between 3km/h and 13km/h.

Table 7: Statistic elements of group 2 (1st pair of junctions)

		Flow 1=>3 just before crossing / hump	*Flow 2=>3 just before crossing / hump*
Number	Rudeboksvägen / Gunnesbovägen	100	*4*
	Rudeboksvägen / Dösvägen	51	*4*
Mean [km/h]	Rudeboksvägen / Gunnesbovägen	11	*21*
	Rudeboksvägen / Dösvägen	8	*18*
Standard deviation	Rudeboksvägen / Gunnesbovägen	2.6	*1.9*
	Rudeboksvägen / Dösvägen	2.2	*2.8*
Confidence interval [km/h]	Rudeboksvägen / Gunnesbovägen	±0.5	*±1.9*
	Rudeboksvägen / Dösvägen	±0.6	*±2.7*
Median [km/h]	Rudeboksvägen / Gunnesbovägen	11	*21*
	Rudeboksvägen / Dösvägen	8	*19*



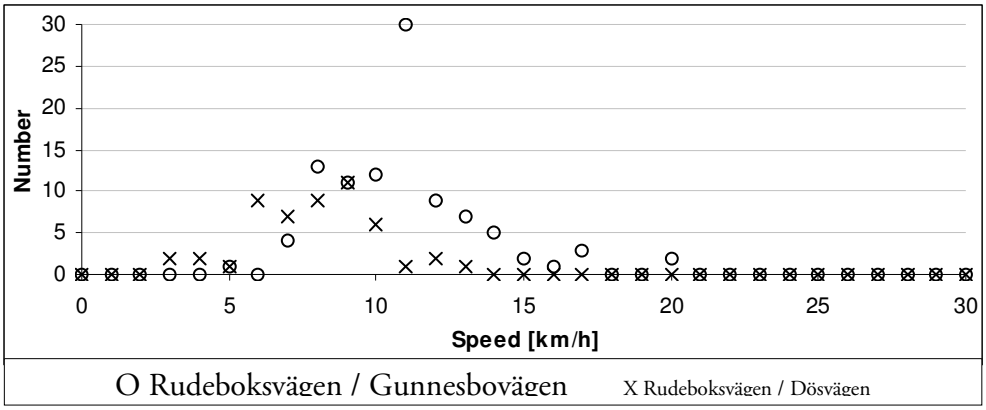


Figure 31: Measured motorised vehicles in flow 1 => 3 (1st pair of junctions)

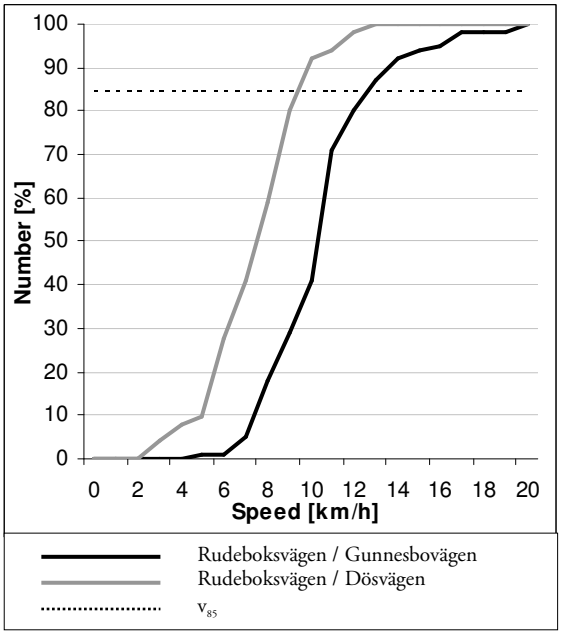


Figure 32: Empiric distribution group 2 (1st pair of junctions)

3rd group: Turning motorised flows coming from the side street

The relations between the side streets and the arterial streets are in one of two flows used so rarely that there are too few measurements for a scientifically useful evaluation. Therefore only flow 3=>1 is described in the following. But for reason of completeness statistical data are presented for both flows in Table 8. There are no values for the sample standard deviation and the confidence interval for the flow 3=>2 at Rudeboksvägen / Dösvägen as there is just one measurement available (see Figure 26). Therefore it is not possible to calculate one of these values.

The sample standard deviation in the flows 3=>1 is high, especially at Rudeboksvägen / Dösvägen at a distance of 40m to 50m. According one can have a general view to the runs of the empiric distribution of this flow (see Figure 34). Hereby, it becomes obvious that the course of Rudeboksvägen / Dösvägen is particularly not so smooth. Moreover, Figure 33

shows just abstract kinds of normal distributions for this flow. So, it is suggested that 50 measurements for Rudeboksvägen / Dösvägen just represent a general insight (see Figure 26). For a detailed analysis more data are necessary. At Rudeboksvägen / Gunnesbovägen are 101 measurements available. This higher number of data refers to smoother courses in all figures for this intersection than for Rudeboksvägen / Dösvägen. However, an evaluation of the data allows statements to the general driven speeds at both junctions.

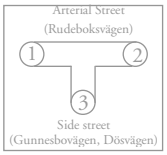
The mean and the median are in two cases identical and in two other cases they differ in just 1km/h. So, under this aspect there are no big differences. Further, the computed confidence intervals are between ±0.9km/h and ±2.3km/h. These amounts are judged as small. A confidence interval of ±2.3km/h is computed for Rudeboksvägen / Dösvägen for the measured data at a distance of 40m to 50m. These are the same data, which lead to the highest standard deviation. However, the differences between the means of both junctions are bigger than 10km/h for each distance. Consequently an interval of ±2.3km/h does not change the tendency of speeds. Furthermore, Figure 33 visualizes a distribution of higher speeds at Rudeboksvägen / Gunnesbovägen than at Rudeboksvägen / Dösvägen. This distribution is underlined by the calculated means which are 33km/h or 19km/h respectively at Rudeboksvägen / Gunnesbovägen and at the other junction 16km/h or 8km/h respectively (see Table 8). Figure 33 and Figure 34 show also that there is one car measured, which stopped at the reconstructed junction just before the hump. This fact is especially to point out since all measured cars could drive freely. So, there was no other road user who caused a stop of this car. In contrast to this the lowest measured speed at the non-reconstructed junction is 5km/h. The highest speed here is 33km/h while it is 17km/h at the reconstructed junction. Moreover, Figure 34 presents different values of v_{85} at both junctions in each distance. This difference is more than 10km/h. At a distance of 40m to 50m before the crossing / hump the measured values at Rudeboksvägen / Dösvägen lead to a v_{85} of about 25km/h and at Rudeboksvägen / Gunnesbovägen v_{85} is about 37km/h. The measurements taken just before the crossings / humps lead to a v_{85} of ca. 10km/h at the reconstructed junction and to v_{85} ca 24km/h at the other intersection.

Since the cars have been measured two times speed changes can be computed. The results are presented in Table 8Figure . Considering the non-smooth courses of the empiric distributions and the high sample standard deviation of Rudeboksvägen / Dösvägen both curves in this figure are unexpectedly parallel to each other. One can see that the speed changes are smaller at Rudeboksvägen / Dösvägen than at Rudeboksvägen / Gunnesbovägen. Furthermore, there are in general no accelerating cars. At both junctions drivers slow down. This fact stands in a clear context to the geometry of the junctions as the cars coming from the side street have to turn into the arterial street whereas the arterial street goes straight on.

To sum it up it can be said that drivers approach to and pass reconstructed junctions slower than non-reconstructed junctions. The difference of speeds of approaching cars is so big that in addition with a lower speed change, cars enter a reconstructed junction slower than a non-reconstructed intersection.

Table 8: Statistic elements of group 3 (1st pair of junctions)

		Flow 3=>1		*Flow 3=>2*	
		40m - 50m before crossing	just before crossing	*40m - 50m before crossing*	*just before hump*
Number	Rudeboksvägen / Gunnesbovägen	101		*3*	
	Rudeboksvägen / Dösvägen	50		*1*	
Mean [km/h]	Rudeboksvägen / Gunnesbovägen	33	19	*25*	*19*
	Rudeboksvägen / Dösvägen	16	8	*10*	*5*
Standard deviation	Rudeboksvägen / Gunnesbovägen	6.4	5.5	*3.2*	*2.6*
	Rudeboksvägen / Dösvägen	8.1	3.1	-	-
Confidence interval [km/h]	Rudeboksvägen / Gunnesbovägen	±1.2	±1.1	*±3.6*	*±2.9*
	Rudeboksvägen / Dösvägen	±2.3	±0.9	-	-
Median [km/h]	Rudeboksvägen / Gunnesbovägen	33	20	*24*	*18*
	Rudeboksvägen / Dösvägen	15	8	*10*	*5*



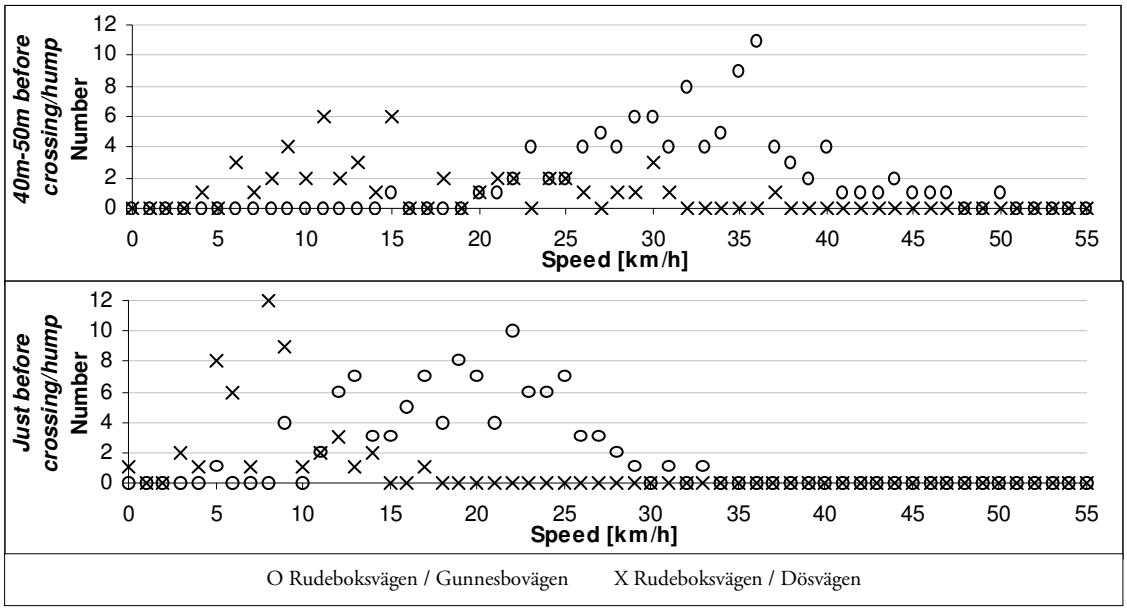


Figure 33: Measured motorised vehicles in flow 3 => 1 (1st pair of junctions)

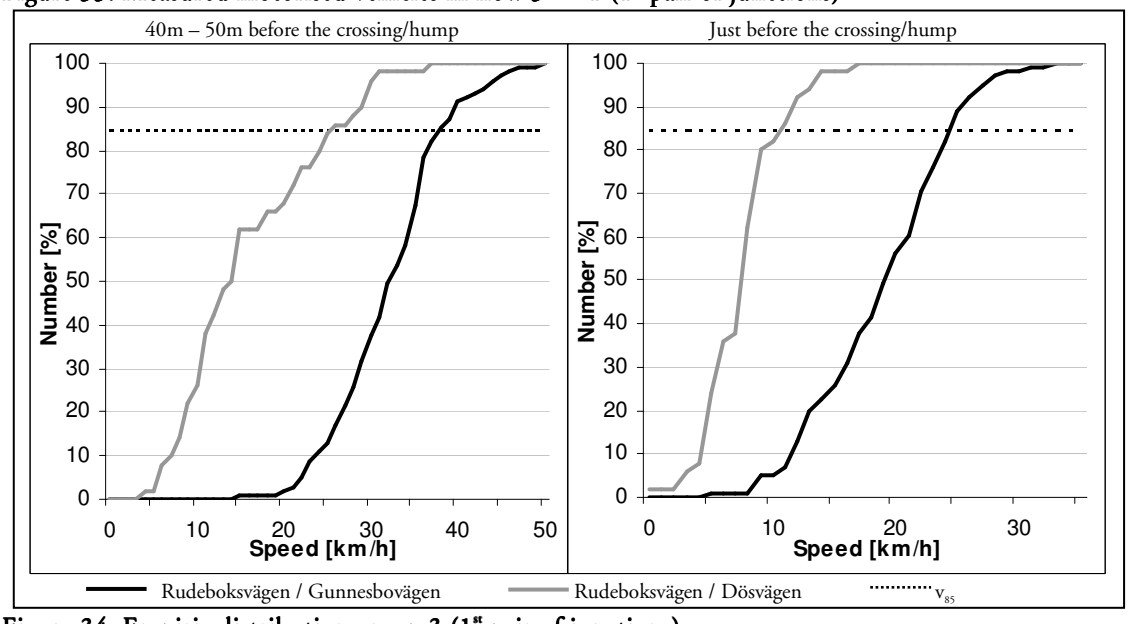


Figure 34: Empiric distribution group 3 (1st pair of junctions)

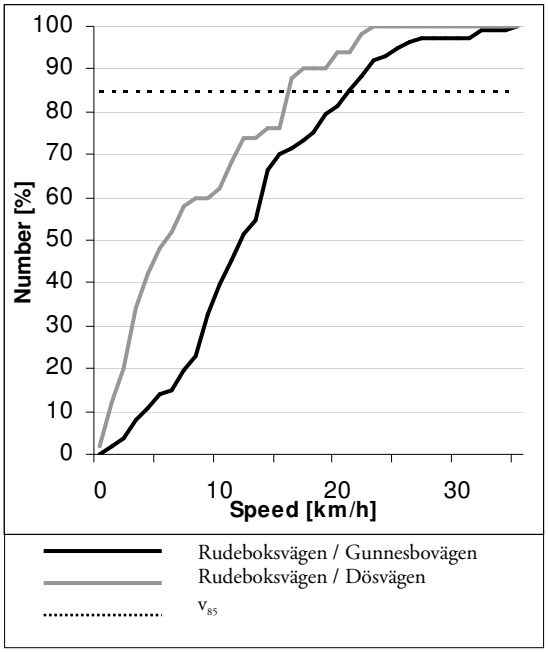


Figure 35: Speed differences in group 3 (1st pair of junctions)

4th group: Cyclists on the cycle track

For both flows at both junctions less than 100 measurements are available (compare Figure 26). Therefore the sample standard deviation is decisive for a scientific evaluation. Since the standard deviation is between 2.3 and 3.5 (see Table 9) the examined data can be used. The means and medians are identical in five of eight cases. In two cases both values differ in 1km/h and in another case in 2km/h. The difference of 2km/h exists at Rudeboksvägen / Gunnesbovägen and is computed from the data measured at the kerbstone in flow 2=>1. Moreover, the data lead –reflected in Figure 3634 and Figure 3735– to suggest a normal distribution. But there is one exception. The graphs, presented in Figure 3634 for the measurements at a distance of 40m to 50m, show a well understandable normal distribution. Compared to the empiric distributions in Figure 3836 these are the only data, which reflect a smoother than a rough course. In conclusion all courses but these two lead to a need of more input data in order to achieve smoother runs. Though it is to underline that the confidence intervals are mostly smaller than 1km/h (compare Table 9). Just in one case it is exactly 1km/h and in one more it is 1.2km/h. Herewith, it becomes clear that the calculated averages are very well comparable with the assumed real averages. Having a look at the means it can be realized that the averages in flow 1=>2 are smaller than in flow 2=>1. The differences are 2km/h at a distance of 40m to 50m before the crossing and 3km/h for the measurements done at the kerbstone. The falling gradient from arm no.2 to arm no.1 might be causal for these differences. Furthermore, the means at the non-reconstructed junction at a distance of 40m to 50m before the crossing are in both flows 2km/h slower. At the kerbstone they are 5km/h slower than the means at the rebuilt junction. So, the average of cyclists enters the non-reconstructed junction with 10km/h or 13km/h respectively and a reconstructed junction with 15km/h or 18km/h respectively. But also the courses in Figure 3836 show that the cycled speeds at Rudeboksvägen/ Dösvägen are faster than at Rudeboksvägen / Gunnesbovägen. Consequently the values for v_{85} are higher at the rebuilt junction than at the non-rebuilt intersection, too. Compared to the means also the

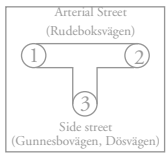
graphs of the 40m to 50m distance measurements are closer to each other than the means and graphs computed from the data taken at the kerbstones. The read v_{85} from Figure 3836 are about 17km/h (flow 1=>2) and about 19km/h (flow 2=>1) at a distance of 40m to 50m for Rudeboksvägen / Gunnesbovägen and about 20km/h (flow 1=>2) and ca. 22km/h (flow 2=>1) for Rudeboksvägen / Dösvägen. Due to the low number of available measurements the runs of the graphs should not be analyzed in detail. However, as a result of the low confidence intervals the ranges of examined data can be compared. Therefore one can see that the measured speeds cover 11km/h or 12km/h respectively at Rudeboksvägen / Gunnesbovägen. At the other junction the range is a bit higher since it is, depending on the flow, between 13km/h and 16km/h (compare Figure 3634 to Figure 3836). These small differences might be caused by different times of measurement and thus different kinds of cyclists relating to their age, gender etc. (compare Appendix Q, Appendix R and Appendix X).

Since the cyclists have been measured two times possible changes in their speed behaviour can be computed. Figure 3937 shows the results belonging to this aspect. Here, one can see that three of four graphs rise nearly with the same gradient. In contrast the flow 1=>2 at Rudeboksvägen / Dösvägen rises more steeply. Although the cycled speeds are faster at the rebuilt junction the change of speeds amounts here less than at the non-rebuilt junction. The graphs of the opposite flows run more in parallel. Thus it might be that with higher cycling speed -caused by the general falling gradient of the surface in this direction- the speed differences between a rebuilt and a non-rebuilt junction match a bit more than with lower speeds. Furthermore, in this figure can be seen that in some individual cases cyclists accelerated before entering the junctions. But even continuing of the cycled speed occurs sometimes. The clearly more general behaviour is retarding. Cyclists slow down by up to ca. 10km/h in both flows at Rudeboksvägen / Gunnesbovägen whereas at Rudeboksvägen / Dösvägen between max. 8km/h in flow 2=>1 and 4km/h in flow 1=>2.

Finally, it seems that road users cycle faster before a rebuilt junction and cross it faster compared to a non-rebuilt intersection. Moreover, cyclists retard less before a reconstructed junction than before a non-reconstructed one.

Table 9: Statistic elements of group 4 (1st pair of junctions)

		Flow 1=>2		Flow 2=>1	
		40m - 50m before crossing	at kerbstone	40m - 50m before crossing	at kerbstone
Number	Rudeboksvägen / Gunnesbovägen	41		30	
	Rudeboksvägen / Dösvägen	70		57	
Mean [km/h]	Rudeboksvägen / Gunnesbovägen	15	10	17	13
	Rudeboksvägen / Dösvägen	17	15	19	18
Standard deviation	Rudeboksvägen / Gunnesbovägen	2.3	2.9	2.7	3.5
	Rudeboksvägen / Dösvägen	2.7	3.3	3.0	2.9
Confidence interval [km/h]	Rudeboksvägen / Gunnesbovägen	±0.7	±0.9	±1.0	±1.2
	Rudeboksvägen / Dösvägen	±0.6	±0.8	±0.8	±0.8
Median [km/h]	Rudeboksvägen / Gunnesbovägen	15	11	17	15
	Rudeboksvägen / Dösvägen	17	15	18	18



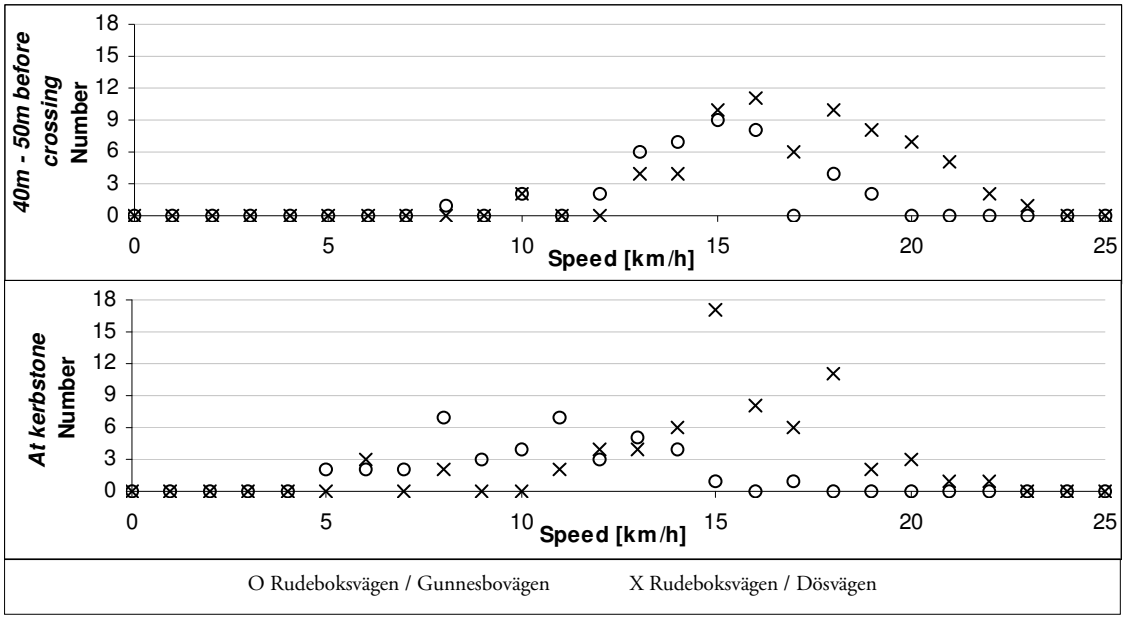


Figure 36: Measured cycles in flow 1 => 2 (1st pair of junctions)

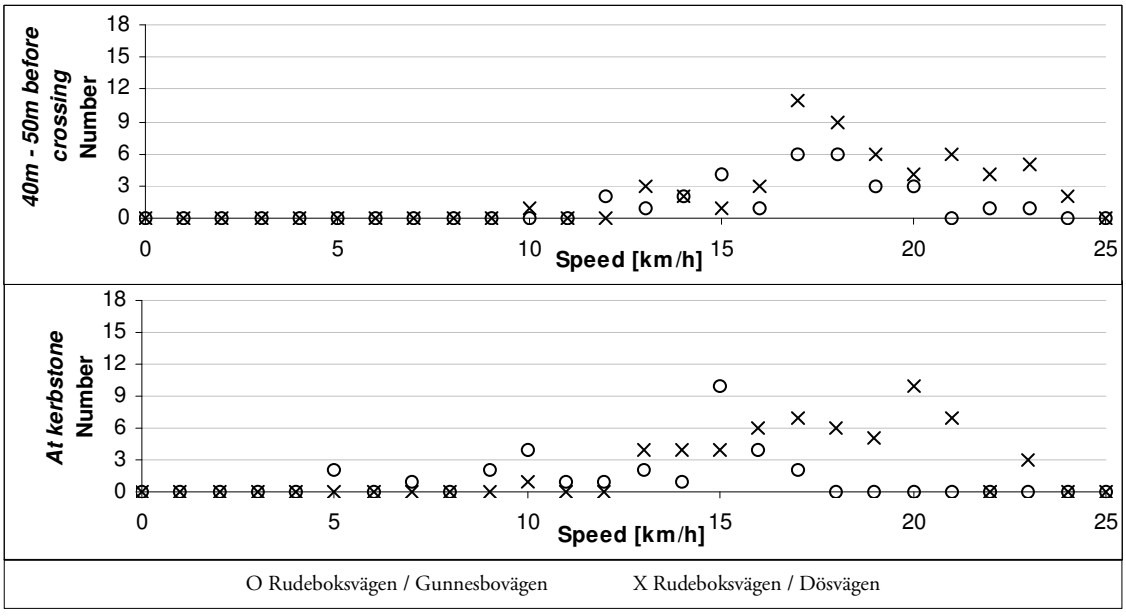


Figure 37: Measured cycles in flow 2 => 1 (1st pair of junctions)

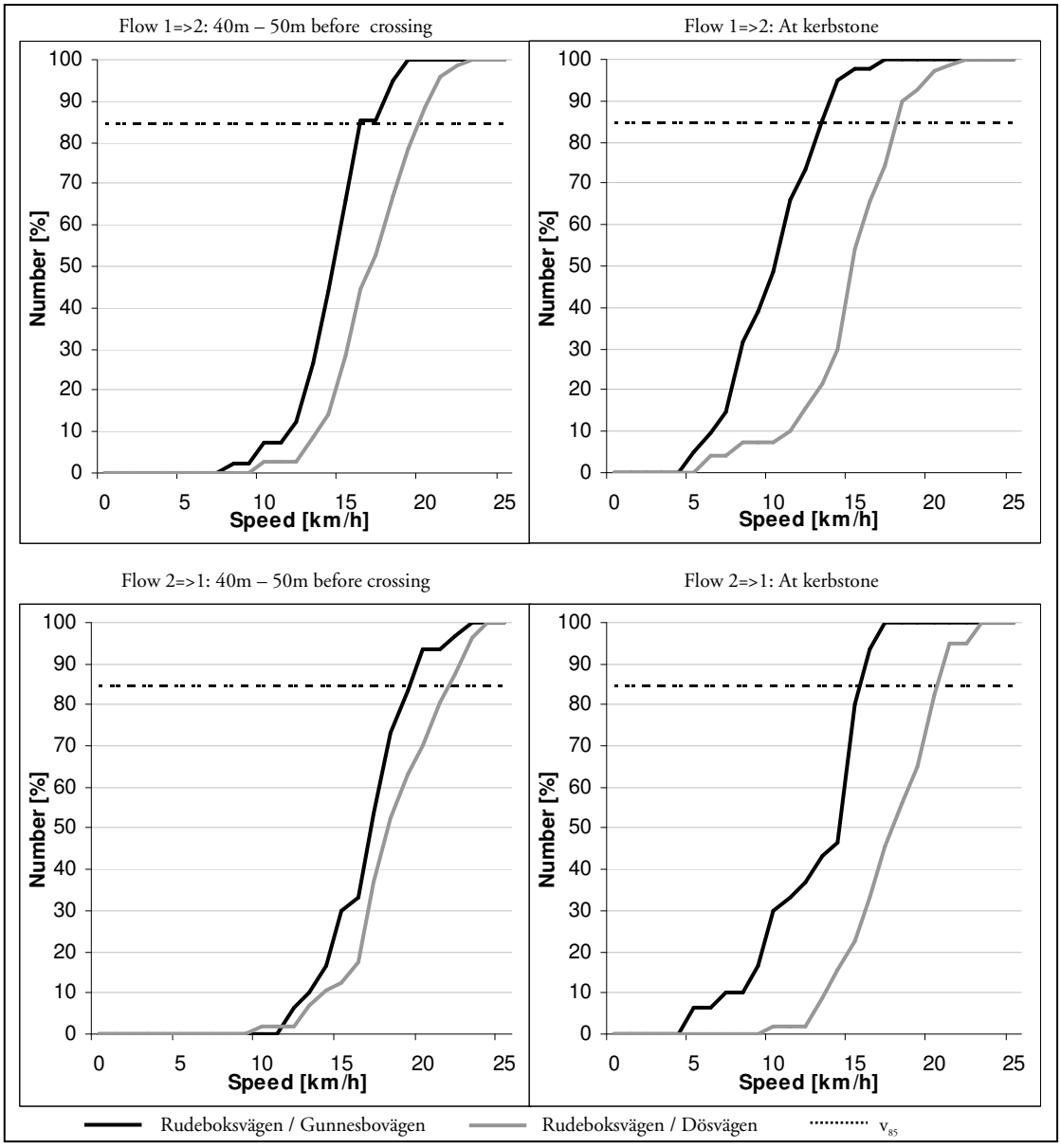


Figure 38: Empiric distribution group 4 (1st pair of junctions)

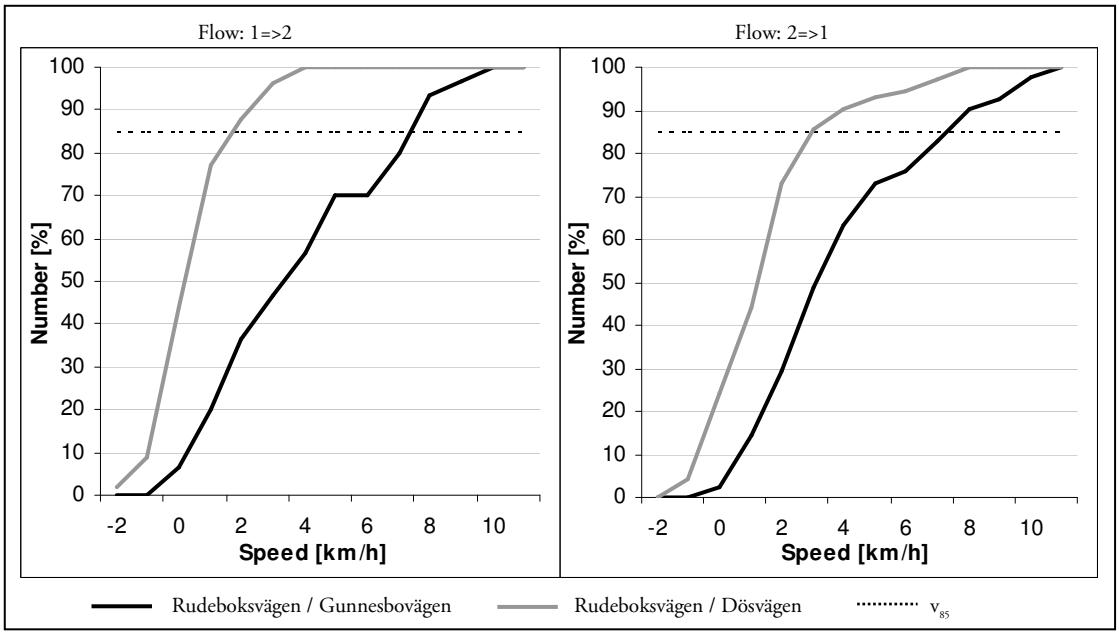


Figure 39: Speed differences group 4 (1st pair of junctions)

Baravägen / Margaretavägen (2a) and Fjelievägen / Bokbindaregatan (2b)

The names *2a* and *2b* refer to Figure 5 where the position of both junctions in Lund is shown. The comparability of these intersections is discussed in chapter 2.1. In order to research scientifically first the total number of available speed data is checked. These results are presented in Figure 4038. After this an exact description of the data according to groups (see chapter 2.4.1 and Figure 21) follows.

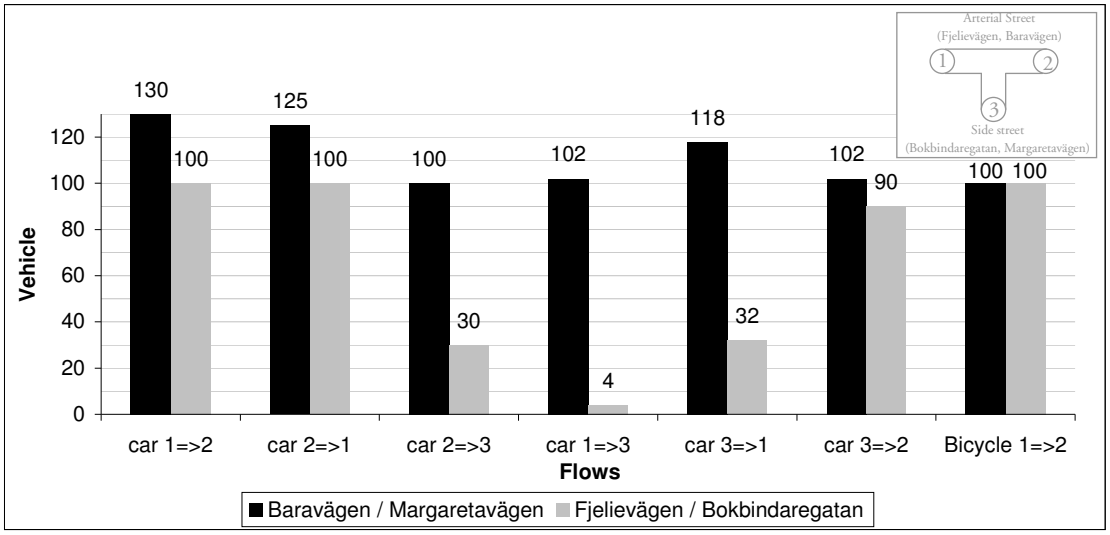


Figure 40: Numbers of speed measured vehicles (2nd pair of junctions)

Figure 4038 visualizes that there are at least 100 speed measurements for each flow at Baravägen / Margaretavägen. Therefore statistical data like confidence interval and sample standard deviation have to be checked. But from the point of view of available number of speeds a scientific evaluation can be done. At Fjelievägen / Bokbindaregatan exist 100 measurements for the motorized flows on the arterial street and 100 for cyclists. However, there are less than 100 measurements in all flows in relation to the side street. Here, the evaluation of the statistical data is basically for a proper use of data. This conclusion counts especially for the flows 2=>3 and 3=>1 since there are only 30 and 32 measurements. For the flow from arm no. 1 to arm no. 3 just four cars are measured. Due to this extreme small number a scientific evaluation is not possible. That is why this flow is not described here any further. Certainly the problem of getting enough data for these flows is expectable looking at the results from the counts of traffic volumes (see chapter 2.1.2 and Figure 17).

1st group: Straight on going motorized flows on the arterial street

The standard deviation of flow 1=>2 is between 5.4 and 5.6 and of flow 2=>1 it is between 6.0 and 6.5 (see Table 10). These values are judged as acceptable and so they are usable for an evaluation. From the data presented in Figure 4139 and Figure 4240 a normal distribution can be suggested for each graph. Moreover, the means and medians are all but one identical. Just the mean at Baravägen / Margaretavägen in flow 2=>1 –computed from the data taken at the level of junction– is 1km/h more than the median belonging to it. Herewith, an existence of normal distributed data is underlined. Further, it can be said that

the real driven speeds are quite well reflected by the used data since the confidence intervals are between ±0.9 and ±1.2 and so, they are judged as small.

The means in flow 1=>2 are 49km/h in three of four times. One speed value is 47km/h and so, it is quite close to the other means of this flow. Further, one can see in Figure 4139 and that the distributions of the measurements are absolutely close in both distances. Consequently also the values of v_{85} are next to each other. visualizes a v_{85} of about 51km/h for the distance of 40m to 50m at Fjelievägen / Bokbindaregatan and it is about 52km/h at Baravägen / Margaretavägen. The measurements taken at the level of the junctions lead at both intersections to a v_{85} of ca. 55km/h. The driven speeds range from 33km/h till 63km/h in both distances at Baravägen / Margaretavägen (see Figure 4139). At Fjelievägen / Bokbindaregatan the speeds cover between 36km/h and 60km/h at the level of junction and it is 32km/h to 58km/h 40m to 50m before the junction. By this it seems that the range of driven speeds at Fjelievägen / Bokbindaregatan is located to a little bit slower speeds than at the other junction.

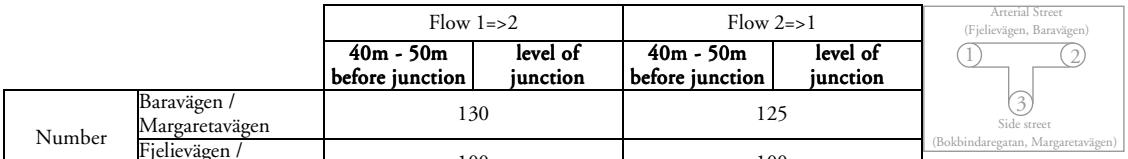
The means of flow 2=>1 are at Fjelievägen / Bokbindaregatan with 49km/h or 48km/h respectively close to each other. However, the means at Baravägen / Margaretavägen differ in 5km/h between 50km/h –40m to 50m before the junction– and 45km/h –at the level of the junction. Thus it seems that there is kind of retarding speed behaviour at Baravägen / Margaretavägen. The range of speeds in the flows 2=>1 is a bit wider than the range of the opposite directed flow. This is especially caused by single speeds faster than 65km/h (compare Figure 4240). Consequently the gradient of the empiric distributions are a bit flatter than in flow 1=>2 especially in the area over 85% (see Table 10). At a distance of 40m to 50m before the junction v_{85} is about 55km/h at Baravägen / Margaretavägen and ca. 51km/h at Fjelievägen / Bokbindaregatan. Thus v_{85} differs just about 1km/h between the different distances at Fjelievägen / Bokbindaregatan since at the level of the junction the measurements lead to a v_{85} of ca. 52km/h. But at Baravägen / Margaretavägen v_{85} is at the level of the junction –compared to the mean– about 5km/h lower. It is about 50km/h.

The assumption of a slowing down at Baravägen / Margaretavägen is visualized in Figure 4442. Since the cars have been measured twice, differences between the speeds can be computed. Negative values make acceleration visible while positive values mean retardation. Two of theses four graphs show a tendency of mostly no change in drivers speed behaviour. This conclusion counts for flow 1=>2 with Baravägen / Margaretavägen and for flow 2=>1 with Fjelievägen / Bokbindaregatan since their graphs are almost parallel to the y-axis. Here, flow 1=>2 is driven on the lane next to the side streets. So, this flow is in general nearby the cycle crossing. This context is especially interesting for the third graph. This is the graph at Fjelievägen / Bokbindaregatan. In this flow the speed behaviour varies between acceleration and no change. However, the reason for acceleration up to 8km/h might be a traffic light which is located ca. 250m from this intersection but already visible. The fourth graph in flow 2=>1 reflects retarding speed behaviour with a speed change up to 20km/h at Baravägen / Margaretavägen.

To sum it up it seems that both junctions are driven mostly with similar speeds. A comparison of the speed changes lead to the suggestion that drivers slow down at non-reconstructed junctions whereas they continue with their speeds mostly at reconstructed junctions.

Table 10: Statistic elements of group 1 (2nd pair of junctions)

		Flow 1=>2		Flow 2=>1	
		40m - 50m before junction	**level of junction**	**40m - 50m before junction**	**level of junction**
Number	Baravägen / Margaretavägen	130		125	
	Fjelievägen / Bokbindaregatan	100		100	
Mean [km/h]	Baravägen / Margaretavägen	49	49	50	45
	Fjelievägen / Bokbindaregatan	47	49	49	48
Standard deviation	Baravägen / Margaretavägen	5.4	5.5	6.5	6.0
	Fjelievägen / Bokbindaregatan	5.5	5.6	6.1	6.1
Confidence interval [km/h]	Baravägen / Margaretavägen	±0.9	±0.9	±1.1	±1.1
	Fjelievägen / Bokbindaregatan	±1.1	±1.1	±1.2	±1.2
Median [km/h]	Baravägen / Margaretavägen	49	49	50	44
	Fjelievägen / Bokbindaregatan	47	49	49	48



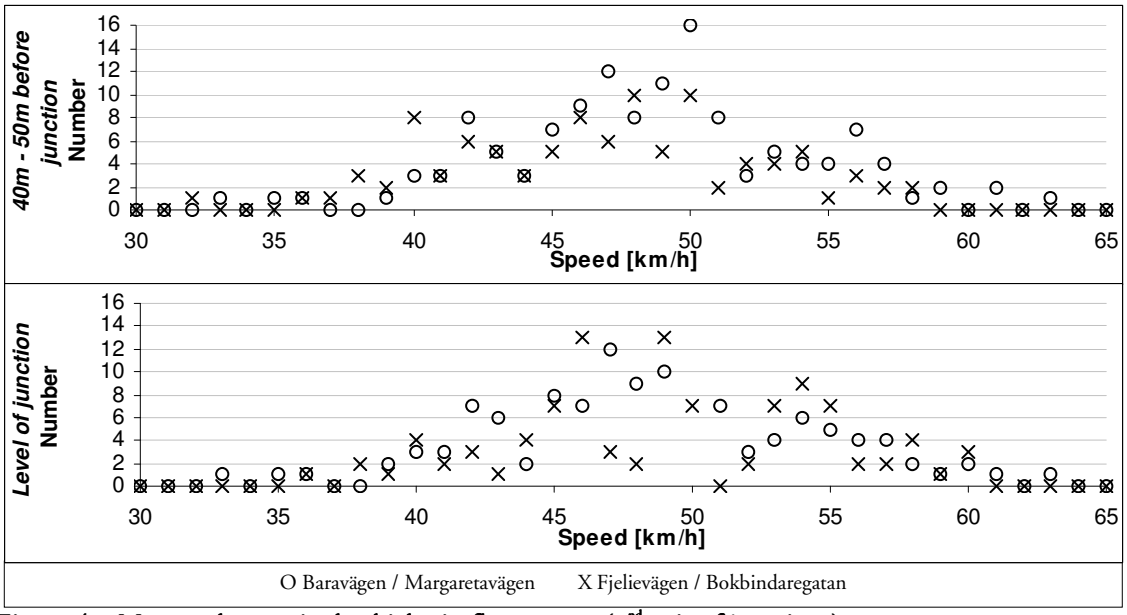


Figure 41: Measured motorised vehicles in flow 1 => 2 (2nd pair of junctions)

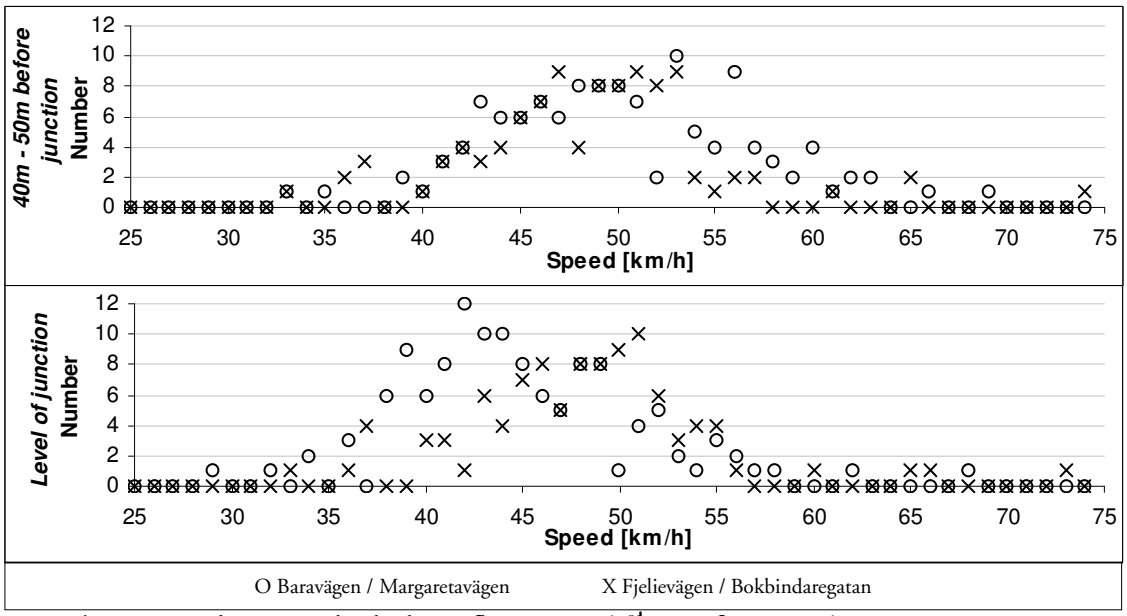


Figure 42: Measured motorised vehicles in flow 2 => 1 (2nd pair of junctions)

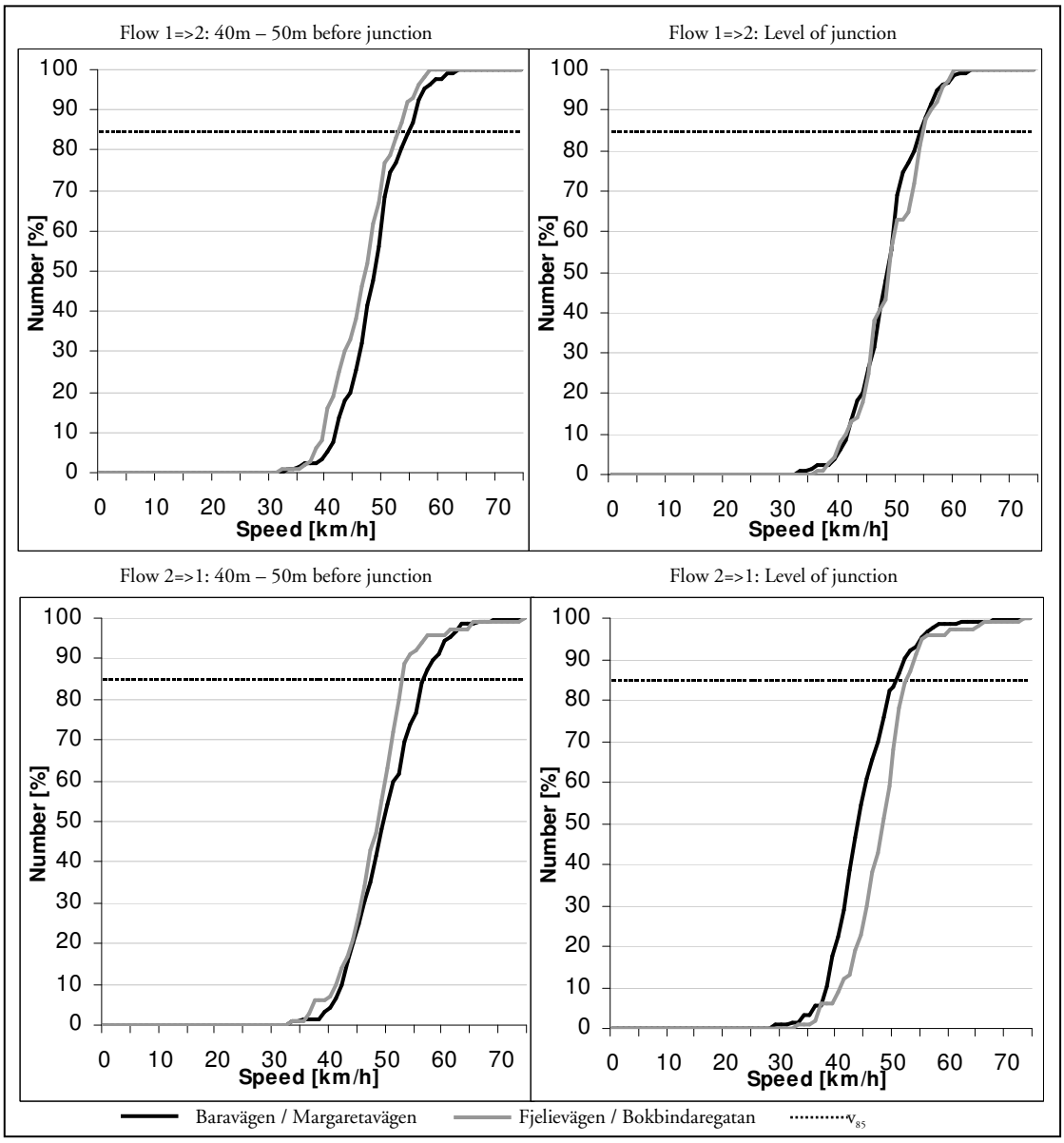


Figure 43: Empiric distributions group 1 (2nd pair of junctions)

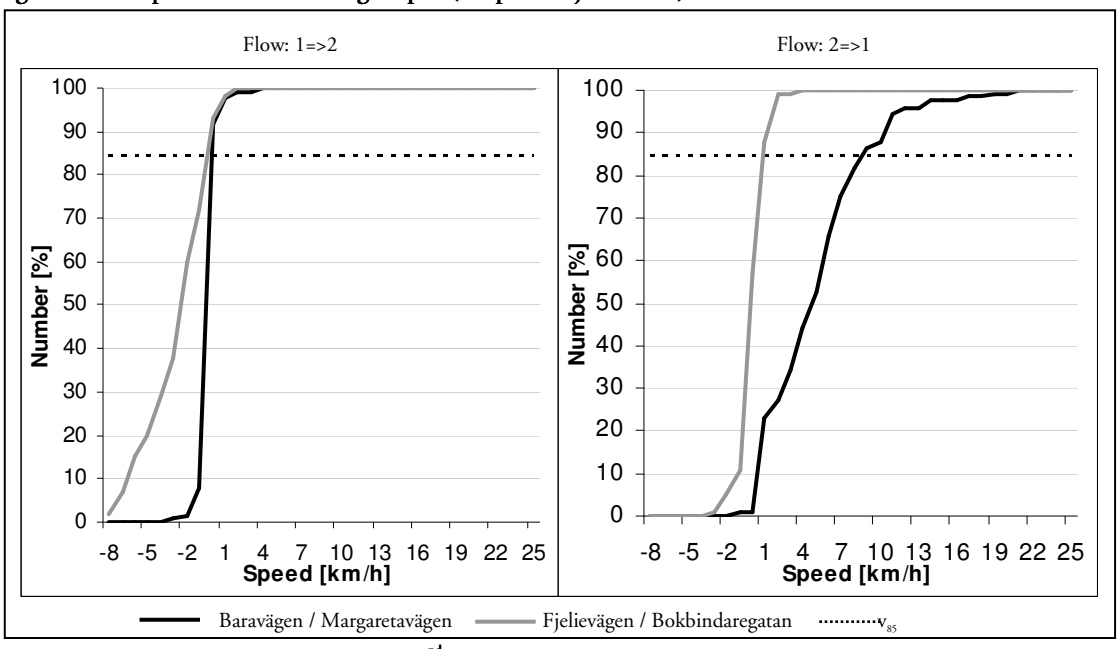


Figure 44: Speed differences group 1 (2nd pair of junctions)

2nd group: Turning motorised flows coming from the arterial street

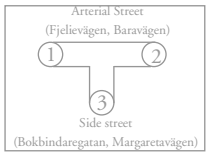
Since there are only four measurements available in flow 1=>3 at Fjelievägen / Bokbindaregatan this flow is not a part of the following description. Still the statistical data in Table 11 are additionally added in brackets.

The sample standard deviation is between 2.4 and 6.6. So, the examined data can be used for evaluation. The means of data taken at Baravägen / Margaretavägen are quite high with 18km/h and 20km/h. However, they are so close to each other that their credibility is underlined. Moreover, the confidence intervals are 0.9 or 1.3 respectively. This fact emphasizes the trueness of measured values compared to the assumed real driven speeds. In Fjelievägen / Bokbindaregatan the mean is with 12km/h much slower. It can be assumed that the data are distributed normally by studying the runs of the courses in Figure 4543 and additionally by comparing the means and medians. These values are identical or differ in only 1km/h. Figure 4543 shows also that the range of driven speeds at Baravägen / Margaretavägen is almost identical in both flows. In flow 1=>3 it ranges from 4km/h to 32km/h and in flow 2=>3 from 9km/h to 31km/h. At all these are quite wide ranges compared to the flow 2=>3 at Fjelievägen / Bokbindaregatan. Here, the speeds cover values between 9km/h and 18km/h. As the difference between 31km/h or rather 32km/h and 18km/h is so clear it can be supposed that the different number of total available measurements is not fundamental for it. The wide range of speeds at Baravägen / Margaretavägen is also reflected by a flatter rise of the appropriate courses in Figure 4644 and a steeper rise of the course at Fjelievägen / Bokbindaregatan. This figure shows also that v_{85} of both distances are very close at Baravägen / Margaretavägen. Hereby, v_{85} is about 25km/h in flow 1=>3 and about 24km/h in flow 2=>3. In Fjelievägen / Bokbindaregatan v_{85} is about 10km/h slower. Here, it is ca. 15km/h.

Finally, it can be said that in both junctions very different speeds have been measured. Here, the quite high speeds of turning cars from Baravägen into Margaretavägen up to 31km/h are to point out.

Table 11: Statistic elements of group 2 (2nd pair of junctions)

		Flow 1=>3 just before crossing/hump	Flow 2=>3 just before crossing/hump
Number	Baravägen / Margaretavägen	102	100
	Fjelievägen / Bokbindaregatan	*(4)*	30
Mean [km/h]	Baravägen / Margaretavägen	18	20
	Fjelievägen / Bokbindaregatan	*(5)*	12
Standard deviation	Baravägen / Margaretavägen	6.6	4.8
	Fjelievägen / Bokbindaregatan	*(1.7)*	2.4
Confidence interval [km/h]	Baravägen / Margaretavägen	±1.3	±0.9
	Fjelievägen / Bokbindaregatan	*(±1.7)*	±0.9
Median [km/h]	Baravägen / Margaretavägen	18	19
	Fjelievägen / Bokbindaregatan	*(5)*	12



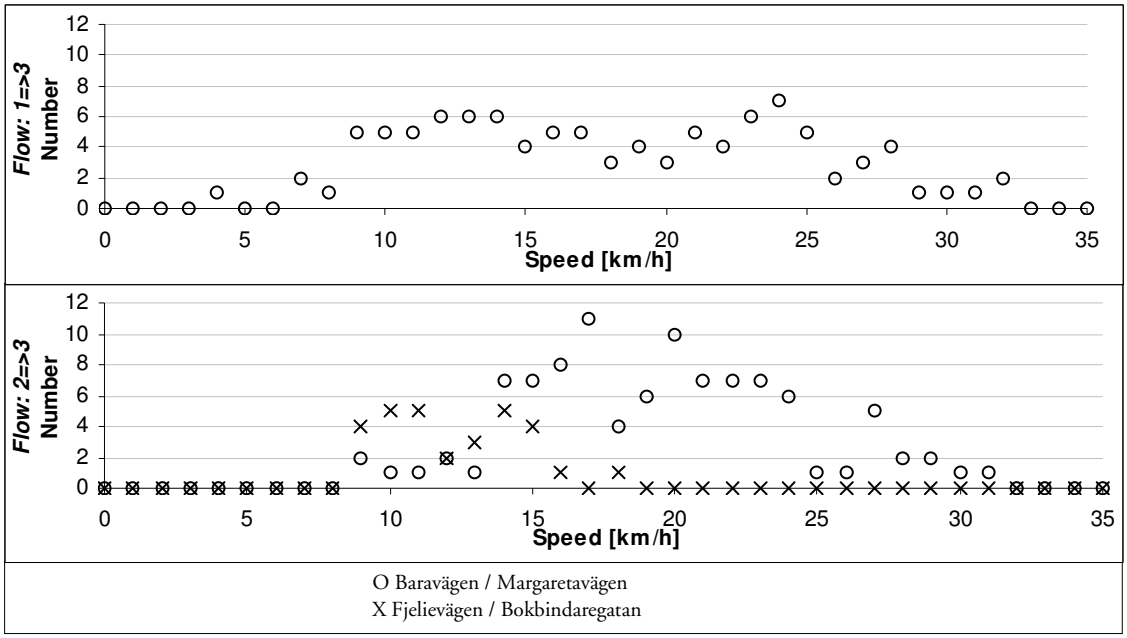


Figure 45: Measured motorised vehicles in group 2 (2nd pair of junctions)

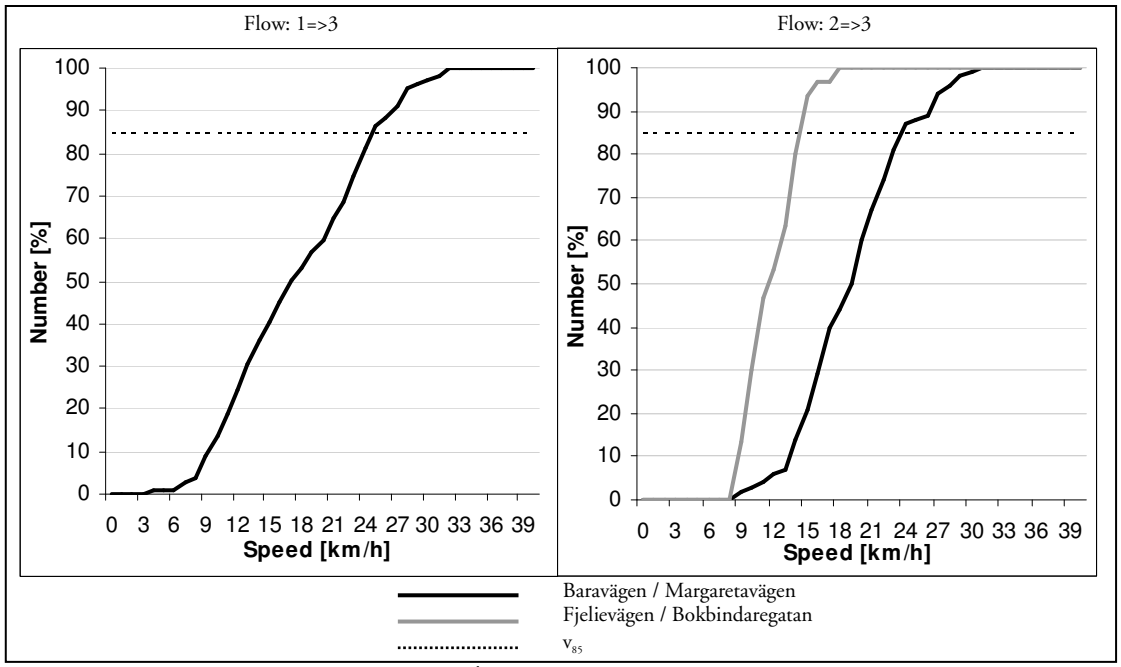


Figure 46: Empiric distribution group 2 (2nd pair of junctions)

3rd group: Turning motorised flows coming from the side street

This group consists of two flows. Cars in one of these flows are measured in two distances. Since finally there are numbers of available measurements between 32 and 118 (see Figure 4038) the sample standard deviations have to be considered. Here, one can see that this statistical element is with values between 2.6 and 8.1 quite high but still acceptable (compare Table 12). It is conspicuous that the standard deviation is always higher at Baravägen / Margaretavägen than at Fjelievägen / Bokbindaregatan. The reason for this is

that the measured values at Baravägen / Margaretavägen always spread out wider than at Fjelievägen / Bokbindaregatan (see Figure 4745 and Figure 4846). Thus an assumed normal distribution has lower gradients at Baravägen / Margaretavägen than at the compared junction in these figures. As a possible indicator for an assumed normal distribution medians and means are compared. Both are identical or differ just about 1km/h.

Moreover, if one compares the means of the same distances in both flows one sees that there is a discrepancy of 1km/h at Baravägen / Margaretavägen. In flow 3=>1 are the means 30km/h or 15km/h respectively and in flow 3=>2 are the means 29km/h and 16km/h (see Table 12). The difference between the measurements per distances might disappear if a higher number of measurements would be taken since the confidence intervals for the data at Baravägen / Margaretavägen are ±0.7km/h just before the crossing and ±1.4km/h / ±1.6km/h at a distance of 40m to 50m before the crossing. This means that the real driven speeds are somewhere between ±0.7km/h and ±1.6km/h and consequently refer to a difference of the means per distance of 1km/h there are probable identical speeds in both flows. At Fjelievägen / Bokbindaregatan there are identical means of 7km/h computed from the data taken just before the hump. The means differ in 2km/h at a distance of 40m to 50m. However, the referring confidence intervals are ±2km/h and ±1km/h. So, there might be the same real driven speeds in the longer distance, too. The difference might be caused by the low number of measurements in flow 3=>1. That is why more data are necessary for an exact analysis nevertheless tendencies can be read from the data. These tendencies include that drivers approach to and pass the reconstructed junction slower than the non-reconstructed one. Since the difference between the measurements taken just before the crossing / hump is so big that it can be suggested that a reconstructed crossing is passed with about half the speed a non-reconstructed is driven over.

The empiric distributions are visible in Figure 4947. Here, it can be seen that the driven speeds at Fjelievägen / Bokbindaregatan are almost every time slower than at Baravägen / Margaretavägen. Only the graphs for the flows 3=>2 –compared to the data taken at a distance of 40m to 50m– show up to 40% almost equal runs at both junctions. The tendency of slower speeds in Fjelievägen / Bokbindaregatan than in Baravägen / Margaretavägen is also reflected by the values of v_{85}. In three of four cases v_{85} is about 9km/h slower at the reconstructed junction than at the non-reconstructed one. So, the data –taken just before the hump / crossing at the reconstructed intersection in both flows– reflect a v_{85} of ca. 10km/h and at the non-reconstructed junction of about 19km/h. The values of v_{85} in flow 3=>1 at a distance of 40m to 50m can also be read from Figure 4947. Thus v_{85} at Fjelievägen / Bokbindaregatan is about 29km/h and at Baravägen / Margaretavägen it is about 38km/h. In contrast flow 3=>2 at a distance of 40m to 50m shows a difference of less than 9km/h. Here, v_{85} is about 32km/h at Fjelievägen / Bokbindaregatan and about 38km/h at Baravägen / Margaretavägen. Therefore the difference is 6km/h.

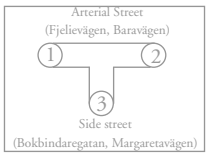
The change of speeds can be calculated from the taken measurements. The appropriate results are visualized in Figure 5048. The run of the graph of Fjelievägen / Bokbindaregatan in flow 3=>1 is not really clear compared to the run of Baravägen / Margaretavägen. From this graph it can be read that about 50% of all drivers slow down more at the rebuilt junction and 50% of them behave nearly the same at both junctions. In contrast to this there is a clear difference between both junctions in flow 3=>2. Here, it can be seen that

drivers slow down more at the reconstructed junction than at the non-reconstructed intersection. Furthermore, a max. speed change of ca. 30km/h exist in both flows and at both junctions.

Finally, it can be stated that there are higher speeds at the non-reconstructed junction than at the reconstructed one. Additionally, the change of speeds is smaller than or equal to the speed changes at the rebuilt junction.

Table 12: Statistic elements of group 3 (2nd pair of junctions)

		Flow 3=>1		Flow 3=>2	
		40m - 50m before crossing/hump	just before crossing/hump	40m - 50m before crossing/hump	just before crossing/hump
Number	Baravägen / Margaretavägen	118		102	
	Fjelievägen / Bokbindaregatan	32		90	
Mean [km/h]	Baravägen / Margaretavägen	30	15	29	16
	Fjelievägen / Bokbindaregatan	24	7	26	7
Standard deviation	Baravägen / Margaretavägen	8.0	3.6	8.1	3.6
	Fjelievägen / Bokbindaregatan	5.9	3.2	5.0	2.6
Confidence interval [km/h]	Baravägen / Margaretavägen	±1.4	±0.7	±1.6	±0.7
	Fjelievägen / Bokbindaregatan	±2.0	±1.1	±1.0	±0.5
Median [km/h]	Baravägen / Margaretavägen	30	15	29	16
	Fjelievägen / Bokbindaregatan	23	7	27	7



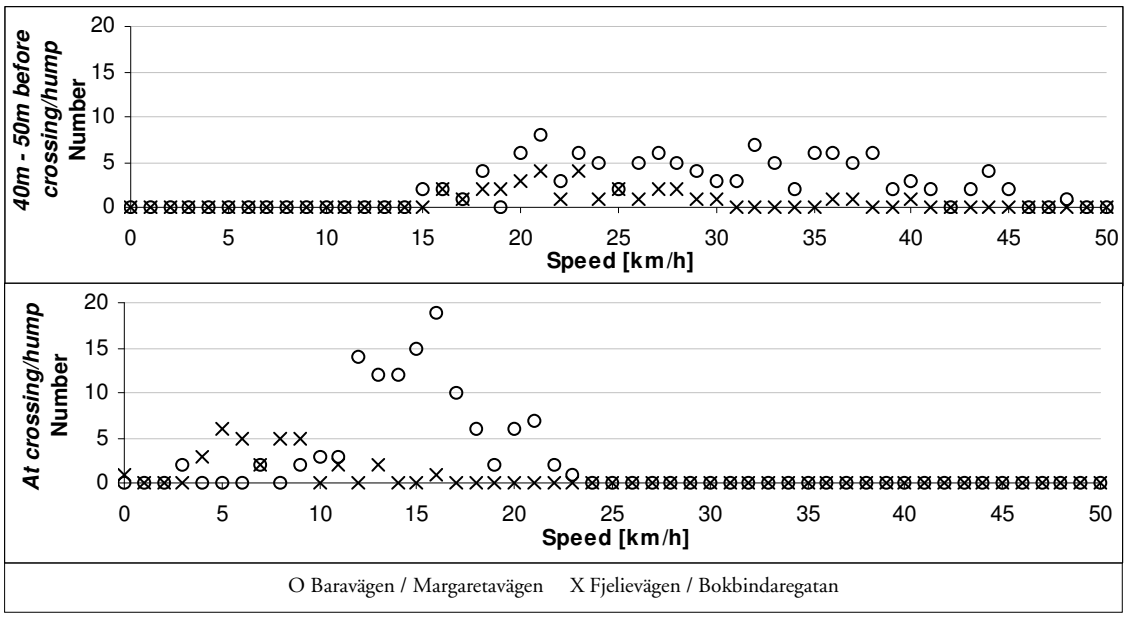


Figure 47: Measured motorised vehicles in flow 3 => 1 (2nd pair of junctions)

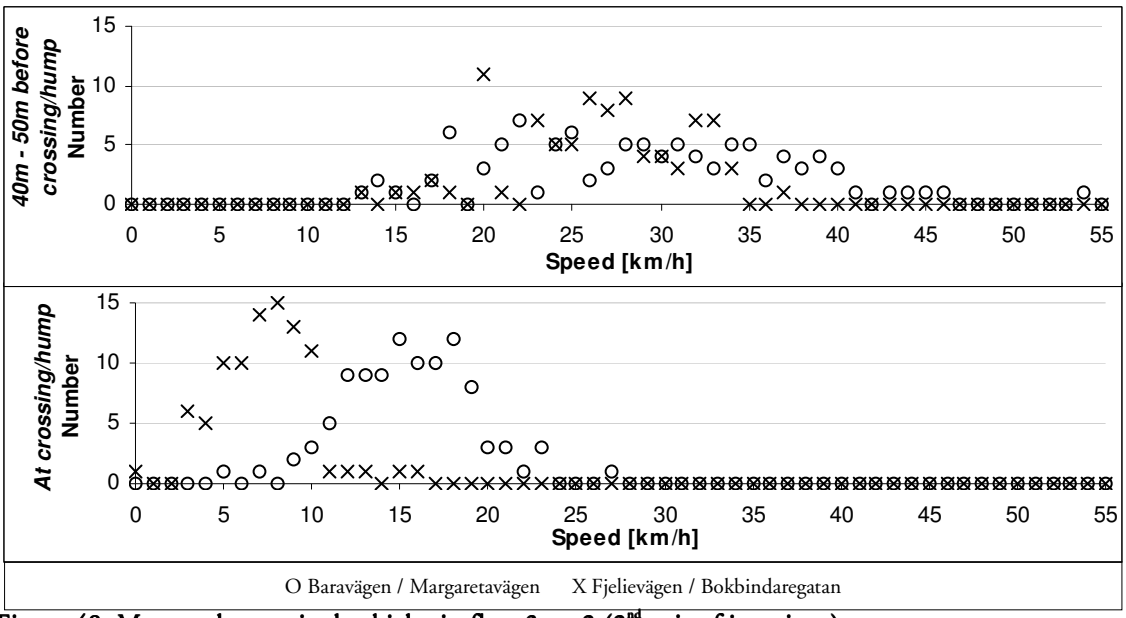


Figure 48: Measured motorised vehicles in flow 3 => 2 (2nd pair of junctions)

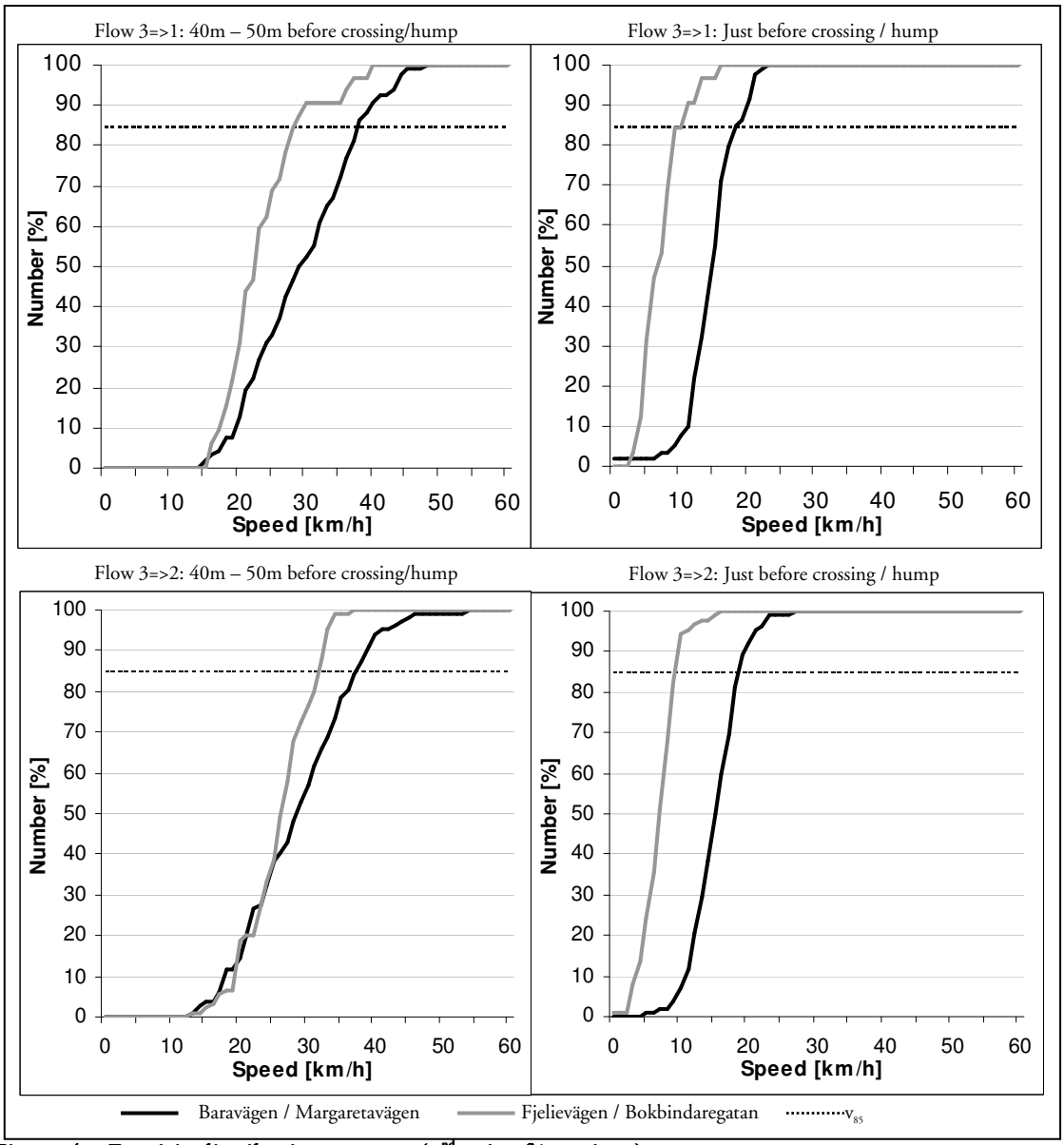


Figure 49: Empiric distribution group 3 (2nd pair of junctions)

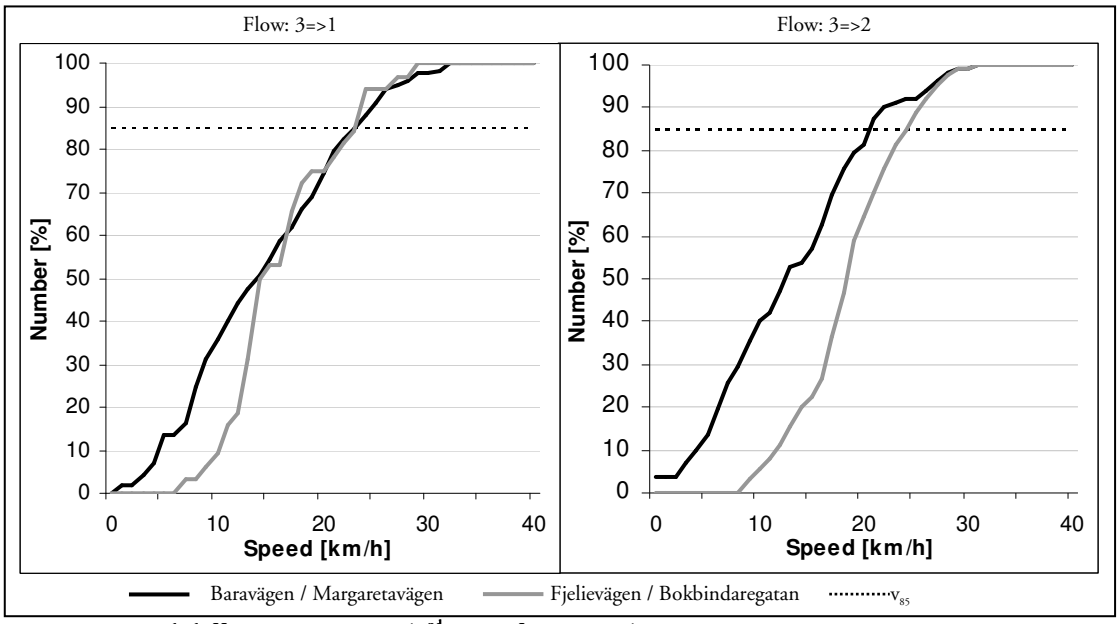


Figure 50: Speed differences group 3 (2nd pair of junctions)

4th group: Cyclists on the cycle track

Cyclists are measured in one direction per junction and thus in one flow. According to Figure 4038 there are 100 measurements available for each intersection. Moreover, the sample standard deviations –which are presented in Table 13– are acceptable with values between 3.1 and 3.8. Consequently a scientific evaluation from these two aspects is possible. Furthermore, a possible normal distribution of data is on the one hand reflected by the distributions of measured data (see Figure 5149). On the other hand means and medians are identical through which a normal distribution is underlined. Besides the confidence intervals are between ±0.6km/h and ±0.8km/h, which lead to the conclusion of having a realistic data pool. Further, Figure 5149 reflects ranges, which are very close to each other per junction. So, the range of speeds is –at Fjelievägen / Bokbindaregatan taken 40m to 50m before the crossing between– 9km/h and 26km/h and at the kerbstone between 9km/h and 24km/h. The ranges of speed values per distance are almost identical at Baravägen / Margaretavägen, too. At a distance of 40m to 50m speed values between 14km/h and 31km/h are measured. At the kerbstone the results cover values between 11km/h and 29km/h.

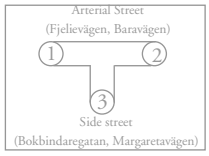
The means at Baravägen / Margaretavägen are on the one hand higher than at Fjelievägen / Bokbindaregatan. On the other hand there are higher means 40m to 50m before the junction than at the kerbstone. However, the means are quite high caused by a downhill tendency at both junctions along the cycle track. The difference between the two distances at Baravägen / Margaretavägen is 3km/h and 1km/h at Fjelievägen / Bokbindaregatan (see Table 13). Consequently a significant change of speed cannot be shown from this point of view. However, Figure 5351 visualizes speed changes at both junctions. At Fjelievägen / Bokbindaregatan changes between an acceleration of 3km/h and a retardation of 4km/h are computed. At Baravägen / Margaretavägen is the range between a slowing down by up to 8km/h and acceleration up to 2km/h.

Besides the means also the empiric distributions show slower speeds at the reconstructed junction than at the non-reconstructed one (see Figure 5250) while the runs of the courses are almost parallel in both distances. Moreover, in both distances v_{85} is about 20km/h to 21km/h at Fjelievägen / Bokbindaregatan. At Baravägen / Margaretavägen it is ca 26km/h at a distance of 40m to 50m and about 24km/h at the kerbstone.

To sum it up it seems that cyclists at the reconstructed junction approach and cross the streets slower and retard less than at the non-reconstructed junction.

Table 13: Statistic elements of group 4 (2nd pair of junctions)

		Flow 1=>2	
		40m - 50m before crossing	at kerbstone
Number	Baravägen / Margaretavägen	100	
	Fjelievägen / Bokbindaregatan	100	
Mean [km/h]	Baravägen / Margaretavägen	22	19
	Fjelievägen / Bokbindaregatan	18	17
Standard deviation	Baravägen / Margaretavägen	3.4	3.8
	Fjelievägen / Bokbindaregatan	3.1	3.2
Confidence [km/h]	Baravägen / Margaretavägen	±0.7	±0.8
	Fjelievägen / Bokbindaregatan	±0.6	±0.6
Median [km/h]	Baravägen / Margaretavägen	22	19
	Fjelievägen / Bokbindaregatan	18	17



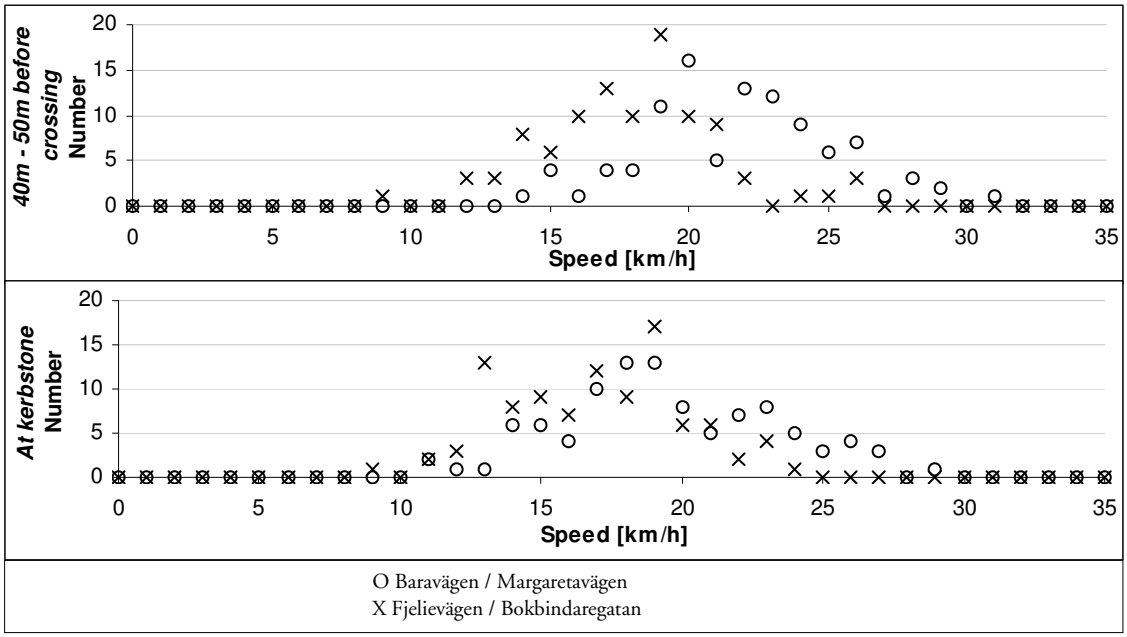


Figure 51: Measured cyclists in flow 1=>2 (2nd pair of junctions)

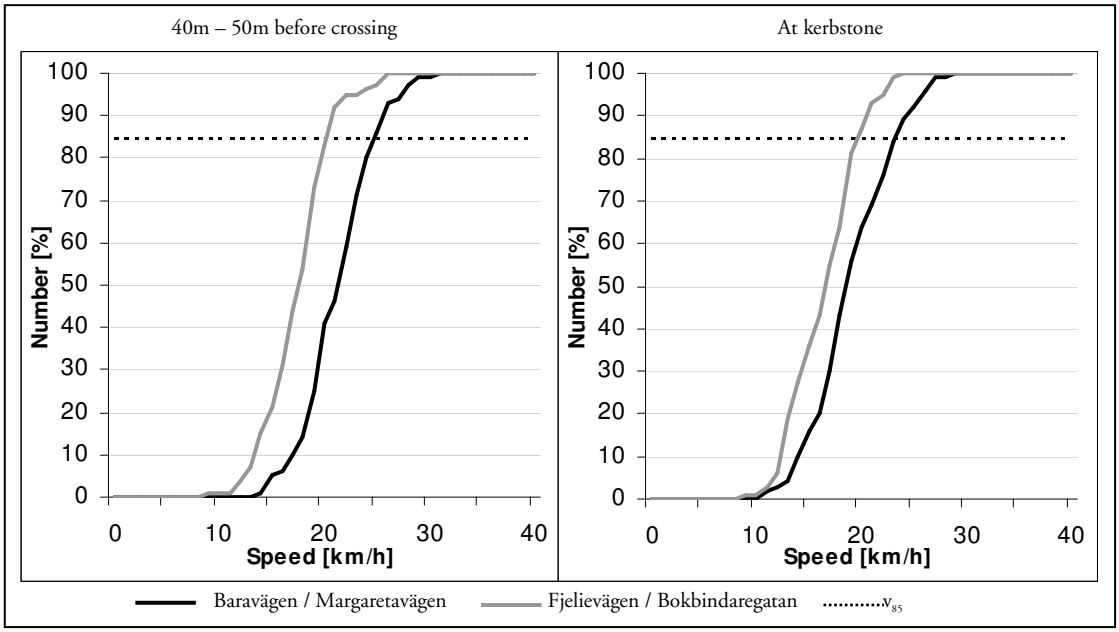


Figure 52: Empiric distribution group 4 (2nd pair of junctions)

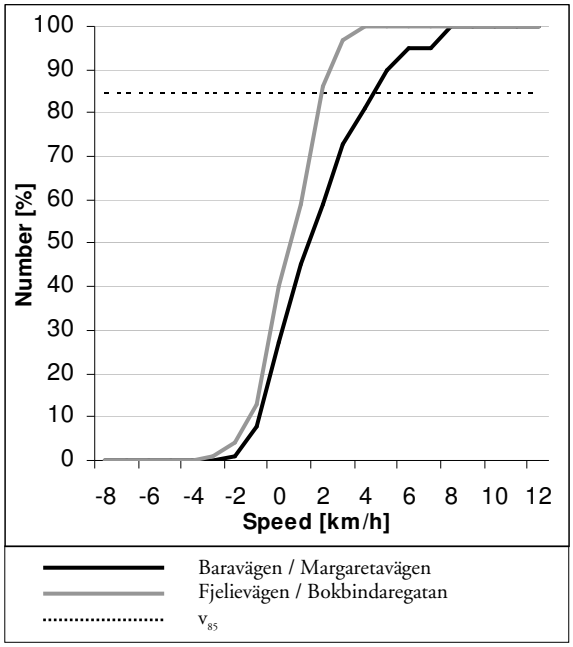


Figure 53: Speed differences group 4 (2nd pair of junctions)

Comparison between the two pairs of junctions

1st group: Straight on going motorized flows on the arterial street

Under this aspect two flows are discussed. Drivers in flow 1=>2 drive on the lanes where the side streets enter the junctions. Drivers in flow 2=>1 use the opposite directions. The ranges of speeds and means of examined data are almost the same, independent if the junction is rebuilt or non-rebuilt. In detail a tendency might be assumed to a bit wider

ranges at reconstructed junctions than at non-reconstructed in both flows. Moreover, the data underline a comparability of the junctions in a pair.

According to flow 1=>2 no clear conclusions can be drawn from the data of speed measurements. The data reflect an almost unchanged speed level in the 1st pair at the reconstructed junction and in the 2nd pair at the non-reconstructed junction. Furthermore, there is a tendency for retardation at the non-reconstructed junction of the 1st pair and a tendency for acceleration at the rebuilt junction of the 2nd pair. However, this acceleration might be caused by a nearby traffic light.

According to the flow 2=>1 clear conclusions are drawn from the speed measurements. Comparing the means it becomes clear that a tendency for retardation exists at the non-rebuilt junctions. This tendency means here a change of speed of 4km/h at Rudeboksvägen / Gunnesbovägen and 5km/h at Baravägen / Margaretavägen. Since both amounts are almost identical it can be assumed that the influence of the parking place gateway on speed behaviour is not so big.

Moreover, it can be concluded that there are almost no speed changes at both reconstructed junctions in the flow 2=>1.

2nd group: Turning motorized flows coming from the arterial street

The available data for these flows show a clear speed reducing effect at the reconstructed junctions. So, there is a mean difference of 3km/h in flow 1=>3 in the 1st pair. In flow 2=>3 of the 2nd pair the means differ in 8km/h. The measured driven speeds lead to the assumption that the pairs differ a lot in the general driven speeds. Therefore only the tendencies but not the total amounts of speeds and speed differences are comparable. Based on the different values of v_{85} it seems that the speeds in these flows are about 1/3 lower at rebuilt junctions than at non-rebuilt intersections.

Moreover, the ranges of measured speeds at the reconstructed junctions are smaller than at the non-reconstructed intersections within each pair.

3rd group: Turning motorized flows coming from the side street

From the available pool of data a retardation of speeds in both distances can be read. The means and v_{85} of the values measured just before the crossings / humps reflect that one drives about half as fast as at reconstructed junctions compared to non-reconstructed intersections. That is why speeds less than 10km/h are measured more often just before the humps.

Moreover, the ranges are bigger at non-reconstructed junctions than at reconstructed ones independent from the distances. These ranges start only at reconstructed intersections with 0km/h. So, there are some drivers who retard in order to stop at these intersections.

Further, no obvious differences between left and right turning cars are measurable from the examined speed values. However, there might be a difference relating to the calculated

speed differences which are visualized in figures above. Here, no clear tendency is readable from the data. In the 2nd pair speed changes of right turning cars are bigger at reconstructed junctions than at non-reconstructed and left turning cars are equal at both junctions. The data from the 1st pair show a smaller speed change for left turning cars at the reconstructed junction than at the non-reconstructed intersection.

4th group: Cyclists on the cycle track

At the 1st pair of junctions there are cyclists riding into two directions whereas at the 2nd pair there are cyclists riding only into one direction. Therefore the cycle flow of the 2nd pair is compared to both flows at the 1st pair.

Here, the means show just small retarding speed differences between both distances at reconstructed junctions. These differences are 1km/h and 2km/h. In contrast to this there are bigger retarding speed differences of 3km/h to 5km/h at non-reconstructed junctions. Furthermore, no statement about generally higher or lower speeds at reconstructed and non-reconstructed intersections is possible. The reason for this is that the compared data for the 1st pair show a slower speed at the non-rebuilt intersection and for the 2nd pair a faster speed at the non-rebuilt junction compared to the belonging rebuilt intersections.

The ranges of cycle speeds at non-rebuilt junctions are –except in one case– usually not wider than at rebuilt junctions. Moreover, the comparison of the computed speed changes shows less retardation and more acceleration at reconstructed junctions than at non-reconstructed intersections.

3.3.2 Results from the behaviour studies

Based on the 2nd, 4th and 5th hypotheses behaviour of cyclists and drivers are evaluated while both kinds of road users interact with each other (compare Figure 1). The comparison between two rebuilt and two non-rebuilt junctions, which are chosen as an example, leads to general assumptions concerning the handling of priority and speed behaviour at both kinds of intersections. A description of basic thoughts and the final realization is given in chapter 2.4.2.

The description scheme of the results of the behaviour studies is divided into three parts. First, the credibility and usability of data is checked. Second, the results are described under two points of views. One aspect is the description of behavioural patterns and handlings and the other aspect handles with speeds and distances. Finally, these partial results are reflected in a context.

Credibility and usability of data (1st part)

Table 14 reflects the aimed numbers of 30 studies per junction in the 1st pair of junctions and 35 studies in the 2nd pair of junctions (compare chapter 2.4.2). Results from both pairs reflect similar distributions of numbers of priority taking and giving road users. Due to this conclusion the credibility and usability of the data is underlined.

These similarities consist on the one hand of an almost fifty-fifty distribution of priority giving and taking between both kinds of road users at non-rebuilt junctions. On the other hand there is a distribution of about 1/3 to 2/3 at reconstructed junctions. Here, 2/3 of cyclists take priority whereas it is 1/3 of drivers.

Table 14: Numbers of behaviour observations

Priority taking road user	1st pair of junctions				2nd pair of junctions			
	Non-rebuilt junction		Rebuilt junction		Non-rebuilt junction		Rebuilt junction	
	Rudeboksvägen / Gunnesbovägen		Rudeboksvägen / Dösvägen		Baravägen / Margaretavägen		Fjelievägen / Bokbindaregatan	
	[Number]	[%]	[Number]	[%]	[Number]	[%]	[Number]	[%]
Driver	14	47	10	33	17	49	9	26
Cyclist	16	53	20	67	18	51	26	74
Sum	30	100	30	100	35	100	35	100

Additionally, Figure 5452 shows a distribution of the flows which the drivers –having interactions with cyclists– are following. Here, no tendency relating to reconstructed or non-reconstructed junctions can be specified. However, the comparability of junctions in a defined pair can be traced back. So, about half of the drivers turn from the arterial street into the side street and half of them drive into opposite directions at both junctions of the 1st pair. In the 2nd pair can be clearly seen that there are more interactions between cyclists and drivers coming from the side streets than these coming from the main streets.

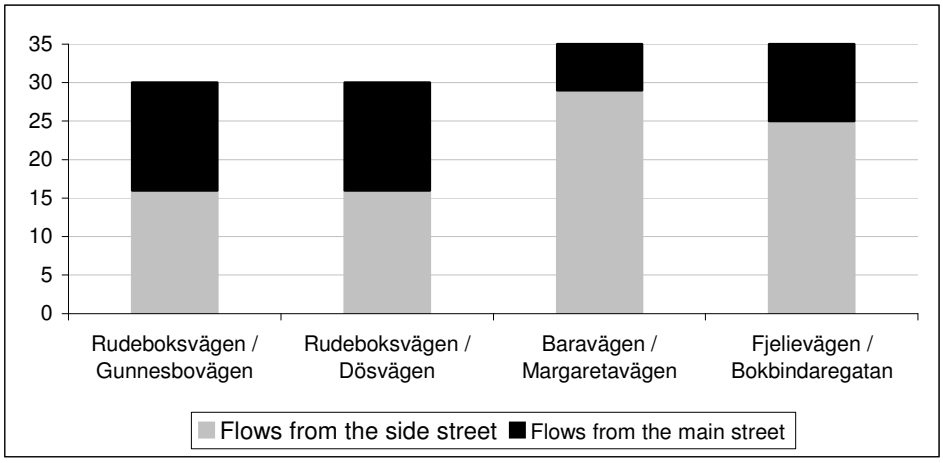


Figure 54: Motorized traffic flows in behaviour studies

Behaviour and handlings (2nd part)

In order to evaluate the behaviour studies the described observations are summarized by a code. Following first, the code and then the summarized data are described.

The code

This topic concentrates on the aspect of different kinds of actions and reactions. Here, it is distinguished two times. First, the comparison depends on which road user takes priority and second, it is look at the actions of both road users while crossing the junction. Some interactions are more complex than others. Therefore these interactions are described more in detail. However, the evaluation concentrates on the last action of drivers and cyclists, which are done in order to give or take priority without forcing an accident. That is why every noted interaction is finally considered just one time during this evaluation.

The code number and description reflects on the one hand which road user takes priority (see Table 15). On the other hand the activities of both road users are explained. Hereby, the originally noted descriptions of both road users' behaviour have to be considered since a more exact impression of all activities is presented. The notes made during the observations are added in the appendix (see Appendix B to Appendix E).

Table 15: Code explanations of behaviour study

Driver takes priority				Cyclist takes priority			
Driver (code no. / description)		Cyclist (code no. / description)		Driver (code no. / description)		Cyclist (code no. / description)	
1	Retarding to stop before crossing	6	Stops pedalling and stops	11	Retarding to stop before crossing	16	Stops pedalling and stops
2	Retarding to roll	7	Stops pedalling and rolls	12	Retarding to roll	17	Stops pedalling and rolls
3	Accelerating	8	Accelerating	13	Accelerating	18	Accelerating
4	Drives over	9	Pedals over	14	Drives over	19	Pedals over
5	Standing on the cycle crossing	10	Pedals around the car	15	Standing on the cycle crossing	20	Pedals around the car

The reduction of speed is distinguished in the code relating to the final speed. So, the code number depends on the speed just before or on the cycle crossing. This means a situation when the road user stops –consequently with a final speed of 0km/h– or when he / she continues the ride with a reduced speed while rolling. During the observations different explanations were written down but they explain the same context. So, if it is noted waiting, get off the bike or stop the road user reduced his / her speed and stopped. If there is noted rolling, retarding, braking, slowing down or stopped pedalling the description means a reduction of velocity without stopping. Hereby, no differentiation between retardation by braking or by taking away gas for the driver's behaviour is possible. The reason for this is that if the observer stands in front of a car he / she cannot see the braking lights, which are an indicator for braking. Moreover, there is no differentiation between braking and stop pedalling for cyclists possible. This decision bases on the fact that it is hard to see a braking when cyclists do not use their back-pedal brakes.

Furthermore, the code number depends on the position where drivers stopped. According to number one and eleven they stop before the crossing and according to number five and fifteen drivers stop on the cycle crossing. In this case the cars stand at the 2nd pair of junction automatically at the line of sight and therefore an interaction is forced. At the other pair of junctions there is a distance of several meters between the line of sight and the cycle crossing (see chapter 2.1.1). That is why a car does not stand automatically on the cycle crossing and an interaction is not automatically forced. But still it can happen that a car stands on the cycle crossing, if e.g. more than one car waits for turning from the side street into the main street. In this context it is sometimes noted that a driver stops before or on the triangles. Here, it has to be considered at which pair of junctions the interaction took place (see chapter 2.1.1).

In other descriptions it is noted that the driver stands on a coloured area. This is due to the colours of rebuilt cycle crossings: 1st grey – red – 2nd grey. Grey are the ramps and the footpath. Red symbolizes this part of the crossing used by cyclists. The noted descriptions are always given from the view of the driver. Finally, if a car stands on red or on the 2nd grey it stands on the cycle crossing. If it stands on the 1st grey the car stopped before the cycle crossing. Equal to the meaning of red is the meaning of hump in a description. Standing on the hump means standing on the cycle crossing. In order to define the code number it is absolutely necessary to study the notes concerning cyclists' behaviour. If they have had to make turns or to stop in order to avoid a crash then the cars stood on the cycle crossing.

If a car stands on the cycle crossing so, cyclists have different opportunities. One of these opportunities is to cycle around the car. During the observations it was noted whether cyclists cycle around a car's back or its front. However, this action is not evaluated in detail since there is a too small number of corresponding interactions. That is why both kinds of cycling around a car are combined in code numbers 10 and 20.

Besides retardation of speed accelerating is also a possibility of interaction in order to prevent a collision. Therefore there is a code number for every priority taking and giving road user. The belonging code numbers are three, eight, thirteen and eighteen. In some cases the car stood on the cycle crossing and the driver accelerated when the cyclist approached. During these interactions the last decisive activity to prevent an accident is the acceleration. Another case is that sometimes cyclists who finally take priority brake before they pass the crossing while pedalling. In these cases the cyclists often accelerate afterwards. However, the acceleration is not the last activity by which cyclists avert an accident. That is why these observation cases are given one code number reflecting retardation.

Also the observation showed that there are also road users who do not change their speed before entering a junction. These behaviour are described with drive over and pedal over by the numbers four, nine, fourteen and nineteen. Furthermore, the observational notes describe the behaviour of cyclists sometimes with cycling. Here, the meaning of cycling is the same like pedalling.

Summary

Based on the small number of activities per code number only tendencies can be read from the distributions shown in Figure 5553 and Figure 5654. This step of the evaluation distinguishes in general between the priority giving and taking road users.

If drivers take priority (see Figure 5553) they do not retard to stop, independently from the kind of junction. Moreover, it seems that at rebuilt junctions fewer cars stand on the cycle crossing and fewer drivers take priority by accelerating. However, a higher percentage of cars just drive over the crossing. From this it can be assumed that drivers rather try to keep on moving than to stop. So, it seems that the general behaviour for priority taking drivers is that they just drive over the crossing and keep on moving. So, it might be that drivers check the traffic situation earlier at reconstructed junctions –while approaching the junction– than at non-rebuilt junctions. Relating to the aspect of drivers retarding to roll no statement is possible since the data say in one case a rising number and in the other case a falling number at the rebuilt junctions compared to the non-rebuilt junctions.

The behaviour of cyclists –if drivers take priority– seems to be that way that cyclists stop more seldom and cycle more seldom just over reconstructed crossings. However, a higher percentage of cyclists retards to roll. Moreover, no accelerating behaviour was noted. Relating to the aspect of pedalling around the car no statements can be made as there is one time an increased and one time a decreased percentage at reconstructed junctions compared to non-reconstructed junctions. Finally, it seems that cyclists at reconstructed junctions remain rather in motion. But since the percentage of retarding to roll increases it might be that like the drivers cyclists earlier check the traffic situation at these junctions than at non-reconstructed intersections.

Moreover, relationships between the different kinds of activities of a priority taking driver and a priority giving cyclist seem to exist. These interactions are independent from the kind of junction. So, the more drivers retard to roll the more cyclists retard to roll and the less cyclists pedal around the car. Further, the more drivers just drive over the crossing the more cyclists stop pedalling and rolling. In conclusion one can assume that cyclists adapt their speeds to the traffic situation so that they do not have to stop.

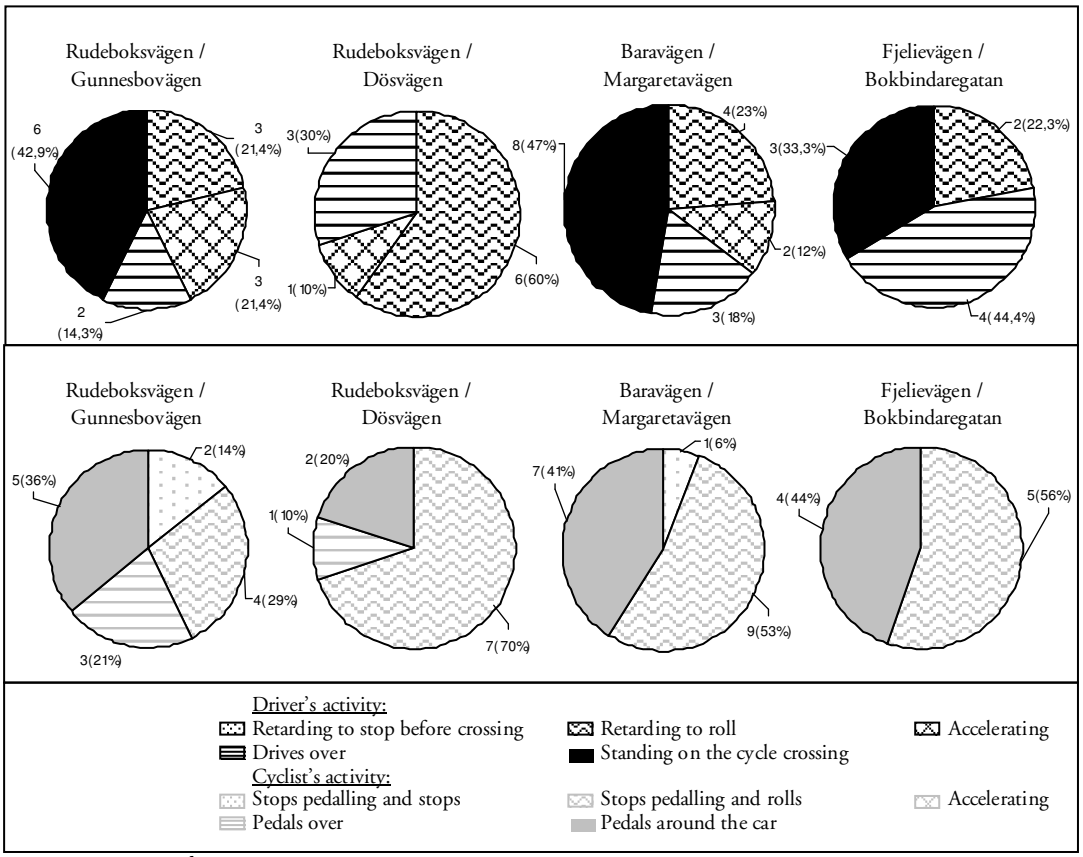


Figure 55: Driver takes priority

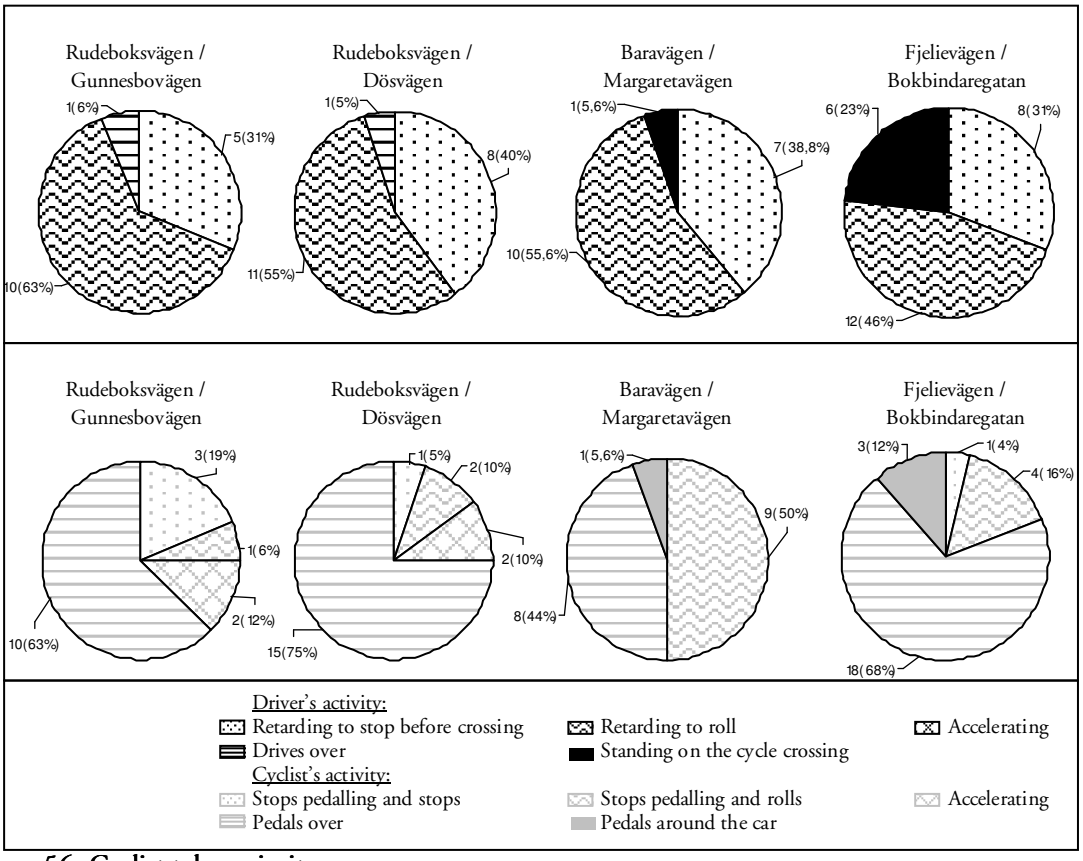


Figure 56: Cyclist takes priority

In Figure 5654 the kinds of behaviour when cyclists take and drivers give priority are compared. In this context it is hard to draw conclusions since the results from both pairs of junctions differ in many cases. However, some relationships can be assumed.

In contrast to the behaviour when drivers take priority, drivers retard to stop when cyclists take priority. However, no tendency between rebuilt and non-rebuilt junctions is visible. So, there is one pair of junctions where more drivers stop at the rebuilt than at the non-rebuilt junction. However, fewer drivers stop at the rebuilt junction compared to the non-rebuilt junction at the other pair of junctions. A further general aspect is that there are no cars observed whose drivers accelerated. The most common behaviour in giving priority seems to retard to roll or to stop. Relating to this aspect a context between reconstructed and non-reconstructed junctions is visible. In each pair the percentage of retarding to roll behaviour is smaller at reconstructed junctions than at non-reconstructed junctions.

Cyclists seem to take priority in general mostly by just pedalling over the crossing. This behaviour seems to appear more often at rebuilt junctions than at non-rebuilt intersections. Moreover, differences between the two pairs of junctions are recognizable. So, drivers seem rather to roll over the crossing than to stand on the crossing at the 1st pair of junctions. Further, there is a bigger variety of cyclists' activities since they sometimes accelerate or stop. In contrast to these behaviour at the junctions of the 1st pair, cyclists cycle around the car which stands on the crossing at the 2nd pair of junctions. However, these differences might be generated by the position of the stop line (compare chapter 2.1.1).

To sum up it seems that both kinds of road users take priority by just continuing their rides. This behaviour is more developed at reconstructed junctions. Moreover, it seems that if a cyclist stops he or she does it at a non-rebuilt intersection. Drivers stop before the crossing only to give priority. So, it seems they do not stop in every case. Further, cars stand in general rather more often on the crossing when the priority giving traffic signs for drivers coming from the side street are before the crossing. At all it seems to be in common for both types of road users to stay in motion as long as possible.

Speeds and distances (2nd part)

In order to evaluate the observed data relating to the estimated distances and speeds a code is defined. After the description of the code an analysis of the data relating to this paragraph follows.

The code

There are in general two code keys *less* and *more*. Here, less encodes all values for distances and speeds which are smaller than or equal to the defined values (see chapter 2.4.2). In contrast to less all observed values that are bigger than the predefined values are encoded with more.

It has to be considered that these limits have already been known while observing. Therefore the originally noted data (see Appendix B to Appendix E) are not to be used in their exact meaning. Instead these notes always have to be judged in context to the predefined limits. So, the noted data from the observations sometimes do not consist of

numbers for the distances or speeds but of descriptions. Therefore the distances are described by before / in intersection / junction, before / in curve, on zebra or at kerbstone. Here, all descriptions –except these which include before– are encoded with less. Otherwise it is coded with more. Furthermore, in some cases more and less are already noted while observing. These assessments are adapted to the code with the identical specifications. Moreover, a distance or a speed value can be noted as zero while observing. In these cases an interaction was increased because of the constellation that e.g. one road user already stood while the second road user approached. That is why the distance and the speed of the first road user are encoded with less.

Table 16: Distances and speeds (1st pair of junctions)

	Code		Rudeboksvägen / Gunnesbovägen				Rudeboksvägen / Dösvägen			
	No.	description	Number	%			Number	%		
Driver takes priority	less	Distance of cyclist is less than or equal 4m	7	50,0			4	40		
	more	Distance of cyclist is more than 4m	7	50,0			6	60		
	Sum		14	100,0			10	100,0		
					Distance of cyclist is less than or equal 4m	Distance of cyclist is more than 4m			Distance of cyclist is less than or equal 4m	Distance of cyclist is more than 4m
	less	Speed of driver is less than or equal 20km/h	10	71,4	5	5	8	80	2	6
	more	Speed of driver is more than 20km/h	4	28,6	2	2	2	20	2	0
	Sum		14	100,0			10	100,0		
Cyclist takes priority	less	Distance of driver is less than or equal 10m	9	56,3			13	65		
	more	Distance of driver is more than 10m	7	43,8			7	35		
	Sum		16	100,0			20	100,0		
					Distance of driver is less than or equal 10m	Distance of driver is more than 10m			Distance of driver is less than or equal 10m	Distance of driver is more than 10m
	less	Speed of cyclist is less than or equal 15km/h	12	75,0	8	4	7	35	5	2
	more	Speed of cyclist is more than 15km/h	4	25,0	1	3	13	65	8	5
	Sum		16	100,0			20	100,0		

Table 17: Distances and speeds (2nd pair of junctions)

	Code		Baravägen / Margaretavägen				Fjelievägen / Bokbindaregatan			
	No.	description	Number	%			Number	%		
Driver takes priority	less	Distance of cyclist is less than or equal 4m	2	11,8			4	44,4		
	more	Distance of cyclist is more than 4m	15	88,2			5	55,6		
	Sum		17	100,0			9	100,0		
					Distance of cyclist is less than or equal 4m	Distance of cyclist is more than 4m			Distance of cyclist is less than or equal 4m	Distance of cyclist is more than 4m
	less	Speed of driver is less than or equal 20km/h	14	82,4	2	12	9	100,0	4	5
	more	Speed of driver is more than 20km/h	3	17,6	0	3	0	0,0	0	0
	Sum		17	100,0			9	100,0		
Cyclist takes priority	less	Distance of driver is less than or equal 10m	13	72,2			21	80,8		
	more	Distance of driver is more than 10m	5	27,8			5	19,2		
	Sum		18	100,0			26	100,0		
					Distance of driver is less than or equal 10m	Distance of driver is more than 10m			Distance of driver is less than or equal 10m	Distance of driver is more than 10m
	less	Speed of cyclist is less than or equal 15km/h	9	50,0	7	2	7	26,9	5	2
	more	Speed of cyclist is more than 15km/h	9	50,0	6	3	19	73,1	16	3
	Sum		18	100,0			26	100,0		

Summary

Table 16 and Table 17 reflect the facts if drivers take priority their speeds are independent from the kind of the junction. This context becomes clear since the percentage distributions reflect that there are more drivers driving max. 20km/h than driving faster than 20km/h at each junction. Relating to the distance of cyclists it can be stated that at both junctions of the 2nd pair and at the rebuilt junction of the 1st pair the distance of cyclists is usually longer than 4m. However, there is a fifty-fifty distribution at the non-rebuilt junction of the 1st pair. So, a general tendency might be that –independent of junction's construction type– cyclists normally have a distance of more than 4m when drivers take priority.

The tables above also present the results for these cases when cyclists take priority. Here, one sees that there are no differences relating to drivers' distances between the junctions. So, there are higher percentages of drivers reacting at a distance of max 10m than reacting at a distance longer than 10m. However, cyclists' speeds seem to depend on the type of junction when they take priority. The tables reflect that cyclists' speeds are usually max 15km/h at the non-reconstructed junction of the 1st pair whereas there is a fifty-fifty distribution at the non-reconstructed junction of the 2nd pair. Contrary to this speeds of cyclists are usually higher than 15km/h at the reconstructed junctions of both pairs.

The conclusion is that there are no differences between rebuilt and non-rebuilt junctions if drivers take priority. However, if cyclists do they seem to cross faster at reconstructed intersections and slower at non-reconstructed intersections.

Context (3rd part)

The analysis of behaviour and handlings shows among others that the general behaviour of staying in motion and therefore continuing of cycling is more developed at rebuilt than at non-rebuilt intersections. This kind of behaviour is underlined by the results from the analysis of speed and distances. Hereby, it is found that cyclists cross faster during an interaction at rebuilt junctions than at non-rebuilt intersections. So, it can be concluded that they do not prepare for a stop.

3.3.3 Results from interviews

The interviews took place at one of the defined pairs of junctions. They were done in order to get an impression of cyclists' priority knowledge and safety feelings depending on the construction type of junction. Within this type of field observation 30 cyclists per junction were interviewed. A more detailed description of the interviews' realization is given in chapter 2.4.3. The context to the topic of this thesis bases on hypotheses which are explained in chapter 2.

The results of the interviews are described in three steps. First, background data of the interviewees are presented. Here, the results of the fifth question are considered. The second step includes a description of the answers to question 1 to 4. During the last step all results are seen in a context.

Background data of interviewees

The interviewees are classified by their gender, their age and the frequency in which they cycle on the evaluated path. In Figure 5755 are these results visualized.

Relating to the gender there is a small tendency to more female cyclists at the non-reconstructed junction –Rudeboksvägen / Gunnesbovägen, whereas there are some more male cyclists interviewed at the reconstructed junction –Rudeboksvägen / Dösvägen. However, a quite well fifty-fifty deviation of both sexes exists in general at both junctions.
Furthermore, it can be concluded that a clear majority of the interviewed cyclists are estimated to an age between 18 and 60 years. The credibility of this clarity corresponds with statistical data from the municipality of Lund (Folkmängden efter alder, 2004). It is assumed that most cyclists of this age have a driver's licence and therefore a certain amount of knowledge about traffic regulations (see chapter 2.4.3). Further, the percentage distribution reflects more cyclists under 18 years than over 60 years at both junctions.

According to the frequencies most interviewed cyclists ride daily on this path. If one sum up the results of both junctions, one gets an amount of about 2/3 of all cyclists riding on

the path every day. Therefore about 1/3 of the cyclists ride more seldom on this path than once a day. Here, cyclists riding there several times a week dominate this 1/3.

The conclusions are that most of the interviewed cyclists are between 18 and 60 years old, cycle on this path every day and additionally there is no dominance of a gender recognizable. These results are corresponding to the results of junctions' descriptions in chapter 2.1.1.

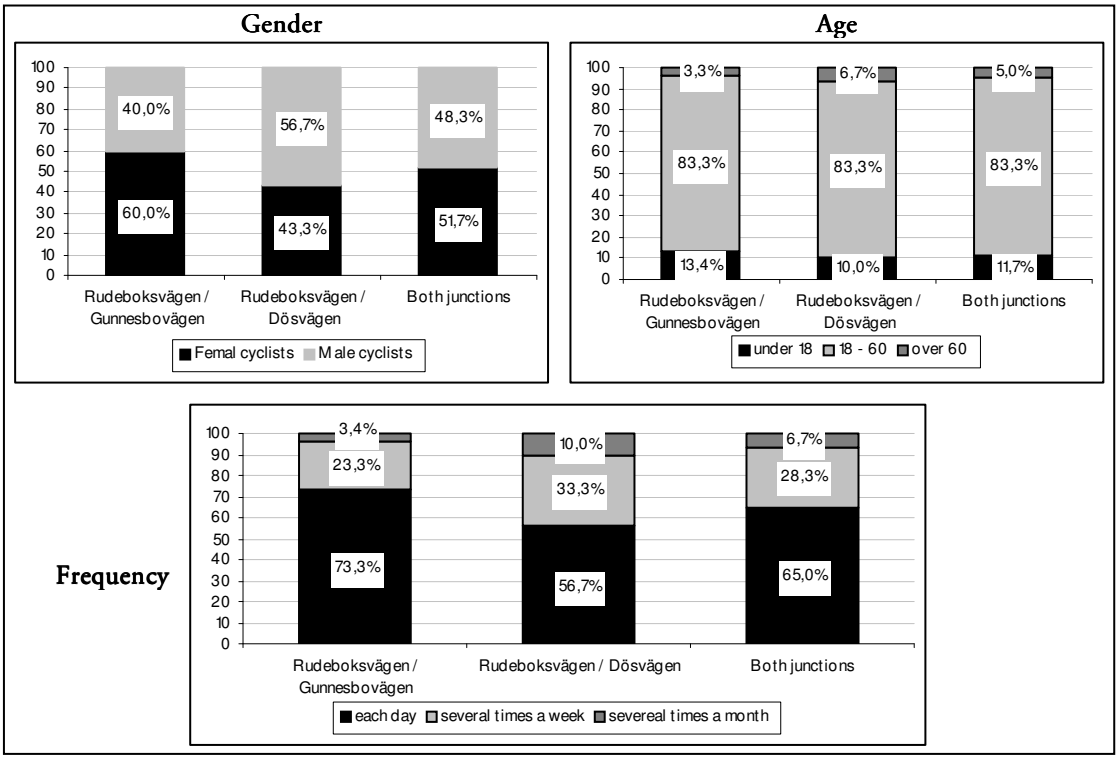


Figure 57: Basic data of interviewees

Questions and answers

Question 1: Which colour has the crossing you passed right now?

The answer alternatives grey and white are judged as correct answers at the non-reconstructed junction. So, 1/2 of the cyclists gave the right answer (see Figure 5856). In contrast to these colours red is the correct answer at the reconstructed junction. This answer was given by 1/3 of the cyclists at the corresponding junction. So, there seems to be a tendency that cyclists recognize red crossings but since also four times red was given as answer at the non-corresponding junction, no obvious conclusions can be drawn. Moreover, it is to point out that 40% of the cyclists answered grey or white even at the reconstructed junction. By this the most often given answer alternatives consist of these colours at both junctions.

A further possible answer alternative is yellow. It was one times answered at the non-reconstructed junction and two times at the reconstructed junction. So, this answer was given in almost the same high at both intersections. Further, it could be answered blue. Still

no one answered this colour at the rebuilt junction but three cyclists did it at the non-rebuilt one. The reasons why someone answers yellow or blue are not clear. It might be that the yellow coloured nature during the autumn has had an influence –at least to the answers yellow. Moreover, it might be that the cyclists know cycle crossings from other towns where these colours are usual. Last but not least it is also possible can be that these answers are given because of hurry. In order to evaluate the answers yellow and blue more interviews are necessary.

Moreover, about the same number of cyclists gave no idea as an answer at both junctions. So, this answer amounts about 20% at each intersection.

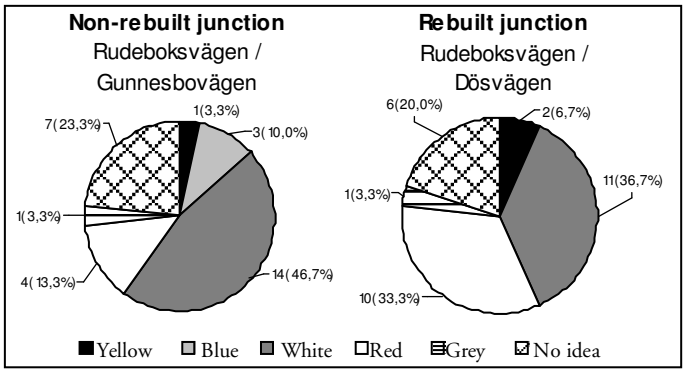


Figure 58: Question 1

Finally, it can be said that the number of correct answers rises when the answer matches with the type of junction. However, half of the cyclists at the non-rebuilt and 2/3 of the cyclists at the rebuilt junction gave wrong answers or said that they have no idea. So, there are more uncertainties relating to the colour at the reconstructed intersection. Further, it is guessed –based on these distributions– that the red colour has no pregnant influence on the memory of most cyclists. Moreover, it is remarkable that at both junctions white is the most often answered colour. Therefore it is assumed that this colour is more often unconsciously connected with a cycle crossing than other colours by cyclists.

Question 2: Do you think that cyclists or cars have priority at the crossing you passed right now?

According to the interview form there are following possibilities to answer: cyclists, cars or no idea. So, four cyclists marked that they do not know the answer. All three answer alternatives are given at the rebuilt junction. Moreover, the percentage of cyclists saying they have priority is higher at the rebuilt junction than at the non-rebuilt junction (see Figure 5957). Contrary to this the percentage of cyclists thinking that drivers have priority decreases from more than 1/2 at the non-rebuilt junction to about 1/3 at the rebuilt one.

From these answers it becomes clear that there are a lot more uncertainties about priority regulations at the rebuilt junction than at the other one. Also it is assumed that the type of construction influences cyclists' opinions. So, more cyclists think they would have priority at the rebuilt junction. Additionally, there are some cyclists who do not know who has priority only at the reconstructed intersection.

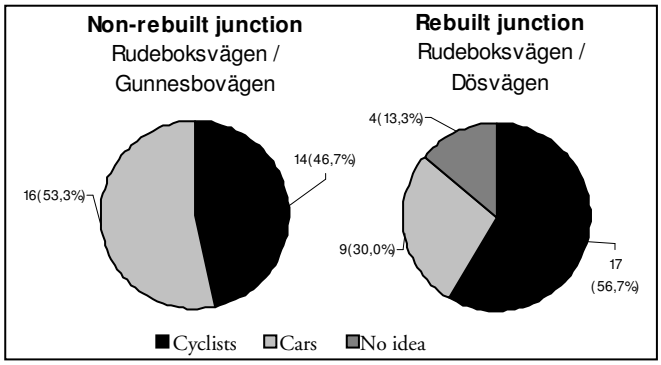


Figure 59: Question 2

Question 3: Why do you think that someone has priority?

The original answers are given in Swedish. In order to evaluate the data during this thesis the answers are translated word-to-word into English (Appendix J, Appendix K). Further, the answers are summarized in eight alternatives (see Table 18). All alternatives base on answers, which are given at least two times or handle with typical characteristics of the rebuilt junctions –the elevation and the red colour.

Under alternative no.1 all answers are summarized which includes that the cyclists do not know about the right of way regulation. Answer alternative no.2 is assigned to all answers when the interviewee explains the right of way regulations at a zebra or when he / she wrote down only the word zebra. At least the given answer has to deal with the fact that pedestrians have priority before cars. Moreover, by the third alternative answers are summarized referring to the presentation or position of traffic signs. Furthermore, alternative four handles with these answers, which explain the regulations by an existing law. If just the existence of a cycle crossing is presented as explanation the answers are summed up in alternative no.5. Here, it is assumed that what the cyclists really mean by writing down *cycle path in the junction* is a cycle crossing. Last but not least there are answers, which are not summed up. These O*ther* answers are combined in alternative eight.

Table 18: Interviews

Alternative		Non-rebuilt junction Rudeboksvägen / Gunnesbovägen			Rebuilt junction Rudeboksvägen / Dösvägen			
No.	Description	Cars have priority	Cyclists have priority	Sum	Cars have priority	Cyclists have priority	No idea	Sum
1	No idea	6	6	12	2	8	3	13
2	Zebra	4	3	7	1	0	0	1
3	Traffic sign	0	1	1	1	0	0	1
4	Law	1	0	1	1	2	0	3
5	Cycle crossing	0	2	2	0	1	0	1
6	Elevation	0	0	0	0	2	0	2
7	Red coloured	0	1	1	0	0	0	0
8	Others	3	3	6	4	4	1	9
Sum		14	16	30	9	17	4	30

Almost half of the interviewees have no idea why someone has priority independent of the type of junction. Although a polarisation exists at the rebuilt junction. There are obviously more cyclists thinking they have priority instead of drivers, without knowing the reason. Moreover, all but one cyclist having no idea who has priority answered the third question again that they have no idea. Contrary to this polarisation at the rebuilt junction is the distribution at the non-rebuilt junction. Here, half of the cyclists saying that they have no idea why someone has priority think that cars or rather cyclists would have priority. So, it seems that the reconstructed junction might have an unconscious influence on cyclists' decision about having priority.

A further aspect is that the answers no.6 Elevation and no.7 Red coloured describe a situation, which does not exist at the non-rebuilt junction while no.2 is not real at the rebuilt intersection. However, these answers are given one time per junction. Although the assumed explanation is unreal a conclusion can be drawn from these answers. So, if there would be a zebra the cyclist says that drivers have priority and in addition if there would be red colour the cyclists think that they have priority. Following this train of thoughts and having a look to alternatives no.5, no.6 and no.7 one concludes that three cyclists per junction take the existence of a cycle crossing, the elevation or the red colour as an indication for having priority.

One more aspect is the existence of a zebra. So, for seven cyclists the decision of having or giving priority depends on this fact at the non-rebuilt junction and for one cyclist at the rebuilt junction. But the distribution is almost fifty-fifty tending to the conclusion that drivers have priority. It is assumed that these cyclists, who explained their decision by the existence of a zebra, seem to know how to behave while crossing a street on a zebra. So, they know that they have to get off the bike in order to get priority. However, it seems that they do not know whether the cycle crossing is a part of the zebra or not. That is why it is assumed that these cyclists do not know or are not sure about the regulations on a cycle crossing but on a zebra.

Concerning the alternative no.4 one sees that no cyclist thinks that he / she has priority based on the law at the non-rebuilt junction. However, two cyclists think so at the rebuilt junction.

Relating to alternative no.3 Traffic Sign clear conclusions cannot be drawn. This answer is given one time for the situation that cyclists have priority at the non-reconstructed junction and it is given one time based on the decision that drivers have priority at the rebuilt junction.

All other answers can be looked up in Appendix J and Appendix K. Table 18 reflects a fifty-fifty distribution of all other answers at both junctions.

To sum it up it seems that more cyclists feel self-confident in their right of having priority at the reconstructed junction compared to non-reconstructed one. So, it might be that road users are lead to a more offensive cycling at rebuilt junctions and to more defensive cycling at non-rebuilt junctions. All together there seems to be a lack of knowledge concerning the priority regulations.

Question 4: How safe do you feel in the intersection?

The positions of the crosses made on the interview protocols are summarized and reflected per junction in Figure 6058. The distributions are almost equal at both intersections. There are polarisations on the right half scale –from the centre of the scale directed to the end *very safe*.

A statistical t-test shows that the null hypothesis "*the means of both junctions are not different"* cannot be rejected. The difference between the mean values is statistically not significant on the $p \leq 0.05$ level. So, it can be concluded that cyclists do not feel safer at the rebuilt junction than at the non-rebuilt junction.

At both junctions the nearby surrounding of the end *very safe* is crossed several times. However, the very unsafe end is never marked. Though there is one pair of markings per junction, which is made nearby this end. Here, the crosses for the reconstructed junction are made closer to the end than for the non-rebuilt intersection.

Three of the interviewees who made their cross in these areas gave reasons for their decision during an informal interview afterwards. So, one cyclist said that she feels so unsafe caused by the bus or bus drivers respectively at the non-reconstructed junction. At the reconstructed junction the reasons for these marks was one time that the cyclist –who was older then 60- just started with riding a bike in general and that is why he feels unsafe at almost every junction. The other cyclist explained her decision by the speed behaviour of the drivers, since they often approach with a high speed and brake suddenly just before the hump. That is why she never knows if the driver really stops or continues its ride. Moreover, she feels definitive safer at a non-reconstructed junction since there she knows that she has to give priority. About the regulation at the rebuilt junction she was not sure.

Finally, one sees that there is no difference in the general safety feeling relating to the construction type of the intersection.

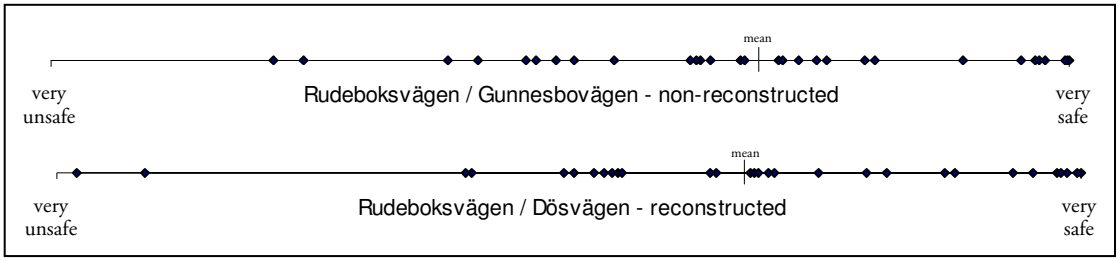


Figure 60: Question 4

Context

Although equal distributions of gender, age and frequencies of the interviewees are proved at both junctions there are differences between both junctions relating to cyclists' opinions of the priority regulations. In general it seems that there are more uncertainties to this topic at the rebuilt junction than at the non-rebuilt junction, although cyclists' safety feeling does not differ at both junctions. Moreover, it is assumed that cyclist do not recognize the reconstructed crossings directly. The construction rather seems to have an indirect influence on their decision having priority.

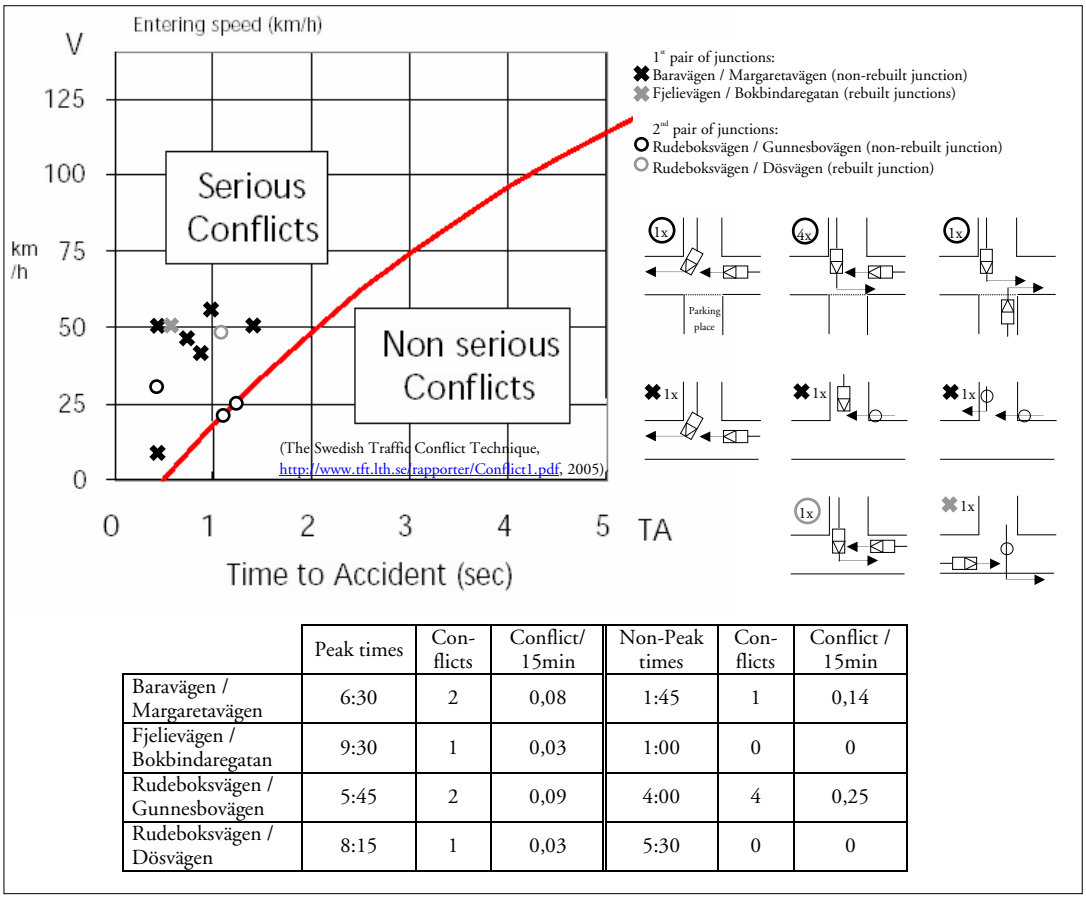
3.3.4 Results from the conflict studies

Based on the Swedish conflict Technique (compare chapter 0) four junctions are studied. Hereby, at last five hours during the peak times and eight hours at all were observed.

As there are different total times of observations per junction, rates reflecting conflicts per 15minutes are calculated (see Figure 6159). There are two rates -one time representing the peak times and one time representing the non-peak times. One sees that there is always a higher rate at the non-rebuilt junctions than at the rebuilt junctions independent from the time classification. Furthermore, are all serious conflicts summarized in a standardized diagram. This figure reflects a centre around the 50km/h line. A relationship between the data of driven speeds and number of serious conflicts and the construction type of the junction cannot be recognized.

Though the centre of interest are serious conflicts involving cyclists on the evaluated cycle path or on the crossing. There are two of these conflicts registered. Reasonable for such a small number of serious conflicts with cyclists might be a general rare traffic volume in side streets, a speed of cyclists less than 20km/h and crossings with a width of more than 10m. From the last two aspects follows that the Time-to-Accident-values reflect more often non-serious conflicts. Besides both conflicts with cyclists took place at Baravägen / Margaretavägen. In one case a cyclist turned right from the side street to continue on the cycle path and another cyclist –already on the cycle path– crosses the side street. Both cyclists braked and swerved around each other. The second case consists of a private car coming from the side street. While the driver braked on the zebra a cyclist swerved around the car's front.

Finally, it can be concluded that the number of observed serious conflicts is quite rare and therefore the only clearly drawn conclusion is that there are in general less serious conflicts at rebuilt junctions. However, these kinds of conflicts are generated rather between drivers than between a cyclist and a driver.



	Peak times	Con-flicts	Conflict/ 15min	Non-Peak times	Con-flicts	Conflict / 15min
Baravägen / Margaretavägen	6:30	2	0,08	1:45	1	0,14
Fjelievägen / Bokbindaregatan	9:30	1	0,03	1:00	0	0
Rudeboksvägen / Gunnesbovägen	5:45	2	0,09	4:00	4	0,25
Rudeboksvägen / Dösvägen	8:15	1	0,03	5:30	0	0

Figure 61: Conflict studies

4 Discussion and Conclusion

Test of Hypotheses

An overview concerning the results of the hypotheses is presented in Table 19. A detailed description is given in the next paragraphs.

Table 19: Hypotheses

Hypotheses		Result
1.	There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections.	No clear result, but tendency of equality
2.	Cyclists feel safer at rebuilt intersections.	Can not be proven
3.	Priority is clearer at rebuilt than at non-rebuilt intersections.	Can not be proven
4.	Car-drivers give more often priority to cyclists at rebuilt than at non-rebuilt intersections.	Proved
5.	The elevation as one characteristic aspect of the rebuilt crossing has a speed reducing effect on car-driver's behaviour.	Proved
6.	Car-drivers slow more down before a rebuilt intersection than before a non-rebuilt intersection.	Partly proved

1. Hypothesis: There are less accidents and conflicts between car-drivers and cyclists at rebuilt intersections than at non-rebuilt intersections.

The general number of accidents in Lund per year follows a run equally to the courses of Sweden and Skåne. From this point of view there is no special tendency in Lund's development. Relating to the reasons of cycle accidents it is found that 1/3 of them consist of a crash with a motorized vehicle –except mopeds. Though no according results can be read from STRADA. That is why no clear conclusions can be drawn by comparing rebuilt and non-rebuilt junctions referring to the aspect of numbers. However, the accident reports in STRADA lead to the suggestion of general problems caused by misunderstandings between both kinds of road users concerning to the right of way regulations.

The results of the conflict study reflect a generally higher number of serious conflicts at non-rebuilt junctions than at rebuilt junctions. However, relating to serious conflicts between cyclists and drivers no conclusions can be drawn.

To sum it up this hypothesis cannot be answered clearly since the basic data are rarely. However, a tendency of equality between both construction types can be assumed from the data.

2. Hypothesis: Cyclists feel safer at rebuilt intersections.

The results of the interviews show that cyclists have no different safety feeling at both construction types of junctions, so this hypothesis is wrong. Here, most of the interviewees feel rather very safe than very unsafe. Two of four cyclists who feel very unsafe gave the unpredictable behaviour of drivers for the reason.

The context between the results of this hypothesis, the results of the behaviour study and speed measurements are discussed in chapter 4.1 and 4.2.

3. Hypothesis: Priority is clearer at rebuilt than at non-rebuilt intersections.

The right of way regulations are quite confusing for both kinds of road users. Cyclists have to decide about having priority or not due to different traffic signs. They have to find triangles and squares on the road surface and then they have to combine their meanings. Additionally, they have to remember further regulations. Finally, there are cases when cyclists have total priority or just on half of the crossing and sometimes they have no priority at all. Hereby, no general priority regulation exists relating to the type of construction.

Moreover, during the literature study it is discovered that humps –combined with crossings– lead to misunderstandings concerning the priority regulations. Reasonable for this context might be that motorized vehicles have to slow down. This speed behaviour might be interpreted by non-motorized road users as a sign for giving priority to them. Further, it seems that the red colour supports a fast crossing by cyclists, although this behaviour might be rather unconscious. The assumption of this unconscious behaviour bases on the one hand on the warning effect of this colour and on the other hand on the results of the behaviour study and the speed measurements. These results are faster crossing cyclists while interacting with drivers and less speed changing cyclists during an undisturbed passage at rebuilt junctions. Therefore an unconscious thinking like "the reconstructed crossings are dangerous and that is why one has to cross faster in order to leave this place" might be created.

The confusion relating to the priority regulations is also reflected by the answers of the interviewees. They are more unsure about who has priority and about the reasons why someone has priority at rebuilt junctions. They seem to guess more often and to follow more often a feeling at these intersections. Although they do not have priority at the rebuilt junction, where they were interviewed, the number of cyclists thinking that drivers have priority is less than 1/3. At the non-reconstructed junction more than 1/2 of the interviewees think drivers have priority. Hereby, the assumed unconsciousness is again underlined since just 1/3 of the interviewees remembered the colour of the reconstructed junction whereas there are 1/2 of them at the non-reconstructed junction.

All together it seems that this hypothesis can be rejected. The right of way regulations are not clearer at reconstructed junctions since cyclists assume more often having priority, although drivers have priority. So, if one takes the understanding of priority regulations as fundamental for traffic safety theses reconstructed junctions do not support this character of traffic safety.

4. Hypothesis: Car-drivers give more often priority to cyclists at rebuilt than at non-rebuilt intersections.

Based on the results of the behaviour study this hypothesis is supported by the results. Half of the cyclists get priority at non-reconstructed junctions whereas it is 2/3 of the cyclists at the reconstructed junctions.

The interaction of both kinds of road users does in general not depend on the construction type of junction. It is determined by a *stay in motion as long as possible* behaviour of both road users. This means that drivers rather retard to roll and cyclists stop pedalling than generating total stops. Another common situation when drivers get priority is when the cars already stand at the line of sight especially at non-rebuilt junctions. So, cyclists already see them while approaching and adapt their behaviour.

5. Hypothesis: The elevation as one characteristic aspect of the rebuilt crossing has a speed reducing effect on car-driver's behaviour.

According to the literature study humps let drivers slow down to 20km/h - 25km/h. The estimated speeds when drivers take priority reflect that most drivers drive slower than 20km/h during an interaction. However, this speed behaviour is independent from the construction type of the junction.

The speed measurements present results when drivers are having an undisturbed passage – without any kind of interruption. Under these circumstances a clear speed reducing effect is analyzed concerning the traffic flows into and from the side street. The flows coming from the arterial street and going into the side street have a v_{85}, which is 1/3 lower at the rebuilt intersections. Further, the average speeds and v_{85} of cars on the flows coming from the side street and going into the arterial street are about half as fast at rebuilt junctions compared to non-rebuilt intersections. By this the mean speeds are less than 10km/h at rebuilt junctions whereas it is between 15km/h to 19km/h at non-rebuilt intersections. Moreover, cars, which stopped at the crossing, are measured only at rebuilt junctions.

Referring to the traffic flows on the arterial streets no conclusions can be drawn to the flows on the side of the side street. However, the opposite flows have a tendency of being driven a bit slower on the level of junction at the non-reconstructed junctions than at the reconstructed junctions.

It can be said, that this hypothesis is supported by the results. The achieved speed reductions in the side streets are even bigger than the given values in literature. So, from this point of view the traffic safety is obviously increased at the rebuilt junctions. How far the speed trends on the arterial streets depend on the construction of the crossing or if it is general speed behaviour of drivers has to be evaluated additionally.

6. Hypothesis: Car-drivers slow more down before a rebuilt intersection than before a non-rebuilt intersection.

No speed changes are found on the arterial streets either in the lane nearby the side street or in the opposite direction at the rebuilt junctions. Contrary to this the speeds in the opposite directions at the non-reconstructed junctions are changed. Here, retardations of 4km/h and 5km/h are measurable.

For the flows coming from the side street and driving into the arterial street no general conclusions can be drawn. The reason is that the speed differences' medians and the speed differences caused by 85% of the drivers are almost equal at both non-reconstructed junctions. However, there are differences relating to the reconstructed junctions. These differences are assumed to base on the position of the priority giving traffic signs. If these signs are after the reconstructed crossing –like at the 1st pair of junctions– the drivers slow down less compared to the non-reconstructed junction. If these signs are before the reconstructed crossing –like at the 2nd pair of junctions- drivers slow down equally to more than at the non-reconstructed junction.

It is assumed that the meaning of the characteristic elements relating to the speed behaviour is limited to the general speed reducing effects of humps, while the humps are emphasized by the red colour. That is why it is supposed that the influence of the position of priority giving traffic signs is bigger than the influence of the characteristic elements on the speed changing.

All together this hypothesis can neither be proved nor rejected.

Limitations

The validity of evaluations bases in general on the quality and quantity of the examined data. That is why it would always be useful having a more comprehensive data base. This problem appears in the accident analysis. Since STRADA is too young -under the aspect of this thesis- a supplementary examination should be realized in two to three years. Moreover, the number of examined places could be raised by expanding the subject from evaluation of junctions of side streets with arterial streets to additional subjects like entries of parking places. The same issue of having too few data considers some flows during the speed measurements. In order to underline the results of this thesis it might be helpful getting some more speed values at these places.

Furthermore, if there will be behaviour studies based on this thesis, it is suggested to give more exact information about the distance of cyclists during the observations.

Moreover, the meaning of the colour red is discussed rarely. Considering the fact that this colour has different meanings according to different cultures –like e.g. luck in China-, the transfer of results from other countries might be checked. Eventually continuing researches might be useful.

4.1 Discussion: Interactions and undisturbed passages

During the behaviour studies interactions between cyclists and drivers are evaluated. These studies contain descriptions of the behaviour of road users and estimated speeds and distances. In contrast to this undisturbed passages of both kinds of road users are evaluated by speed measurements.

Drivers' speed behaviour while having undisturbed passages seem to depend on both the construction type of the intersection and the position of the priority giving traffic signs. First, the hump leads to slower speeds at reconstructed junctions compared to non-reconstructed junctions. Second, the position of the traffic sign seems to be causal for drivers' preparations for crossing road users. This is assumed since the speed measurements reflect smaller drivers' speed changes when the priority signs are after the reconstructed crossing. However, there are bigger changes when the priority signs are in front the reconstructed crossing compared to the non-reconstructed junctions. So, drivers prepare more for crossing road users, when the priority giving traffic signs are before the crossing.

The behaviour of drivers passing a cycle crossing during an interaction seem rather to depend on the position of the priority giving signs than on the construction type. This assumption bases on results of the behaviour study. It presents that drivers stand more often on the crossing when these signs are before the crossing and roll rather over the crossing when the signs are after the crossing. Here, it is supposed that the speed is no indicator for the behaviour under this topic since drivers cross in general reconstructed crossings slower than non-reconstructed ones. So, cars stand more often on the crossing when the space between the cycle crossing and the line of sight is less than one car's length. Therefore it is guessed that drivers care more about standing as close as possible to the arterial street than standing at a distance so that cyclists could continue their rides on the cycle crossing. Here, humps do not seem to play any role for drivers.

Relating to cyclists' speed behaviour there is a correlation with the type of construction since they cross faster during an interaction at rebuilt junctions than at non-rebuilt junctions. Moreover, undisturbed passing cyclists retard less and accelerate more often at rebuilt junctions than at non-rebuilt junctions. Further, there are no direct relationships between the priority giving signs and cyclists' speeds. However, cyclists react on drivers speed behaviour, which again depend on these signs. For instance cyclists ride around cars standing on the cycle crossing.

The assumption that cyclists' behaviour are connected to drivers' speed behaviour is also mentioned by Towliat (2003). He says that some cyclists getting more self-confident when driver's speed is slow. This impression is supported by results from my behaviour studies. Here, it is found that priority taking cyclists cross faster during an interaction at rebuilt junctions, where slower speeds are driven compared to non-rebuilt junctions. Moreover, priority taking cyclists cross rebuilt junctions more often without situation adapting speed changes than non-rebuilt junctions. So, the general trend to stay in motion, which is more developed at rebuilt junctions, seems to create a tendency that priority taking cyclists do not prepare to stop at the kerbstone –including eventual giving priority. These behaviour reflect a stronger self-confidence of cyclists at rebuilt junctions.

It seems that while drivers adapt their behaviour and speed behaviour to the construction type and the position of the priority giving traffic signs, cyclists seem rather to adapt their behaviour to drivers' behaviour. This assumption is seen in context with Räsänen (2000). Here, it is written that rather cyclists see approaching cars than drivers see approaching cyclists before an accident. The problem following from this aspect is, when cyclists see drivers first and adapt their behaviour they have to interpret drivers' behaviour correctly in order to prevent serious conflicts or accidents. However, the results of the interviews and some reports from STRADA explain that cyclists have problems to assess from approaching drivers' behaviour whether they will give or will take priority. This happens independent from the type of construction. Räsänen (2000) found a comparable context. It contains that cyclists who had an accident with a car at a junction often gave as reason that they thought the driver would give priority.

An additional problem is that both kinds of road users try to stay in motion while interacting. Herewith, the number of possible activities in order to adapt the behaviour to the interpreted traffic situation is decreased. Especially the most defensive activity of stopping is not included any longer. So, even if cyclists have the opportunity to prevent conflicts they rather stay in motion and adept their way of crossing the street than to stop. Besides, if cyclists stop they do it at non-rebuilt junctions.

From the point of traffic planning a possible reason for the basic problem might be that cyclists just do not know who has priority. So, they just react on the situation in front of them and handle it somehow. An indication for this assumption is that cyclists have no official indicators relating to the right of way regulation. However, the researches within this thesis lead to the assumption of an unconscious interpretation of the rebuilt junctions by cyclists. They think more often that they would have priority even if they do not have. In contrast to cyclists' situation drivers have official priority giving traffic signs. Additionally, they are forced to slow down –even if they do not recognize a cycle crossing– by a hump at rebuilt junctions.

A further aspect of interaction is the distribution of giving and taking priority between both kinds of road users. Here, an influence of the position of the priority giving traffic signs to the frequency of giving way is not included by Várhelyi (1990).

However, Towliat (2001 and 2003) shows a relationship between speed reduction of motorized traffic and frequency of giving priority to non-motorized road users. He concludes the higher the retardation of motorized vehicles the more often non-motorized road users get priority. Further, he determines that drivers give priority rather to cyclists than to pedestrians. Following this train of thoughts Heerekop and Jacobs (Heerekop, 2000, p.6) concluded that faster speeds of cars refer to less priority taking pedestrians. The fact that the frequency of getting priority is strongly influenced by drivers' speeds matches to the results of this thesis. Here, cyclists get priority more often at rebuilt junctions, where slower speeds are driven than at non-rebuilt junctions. Though it has to be reminded that cyclists do not automatically have priority at rebuilt junctions, although drivers' speeds are slower at these junctions. That is why it might be that these reconstructed junctions lead to misinterpreted right of way regulations.

4.2 Discussion: Objective and subjective safety

It is assumed that the objective safety bases on the results of the accident analysis whereas the subjective safety consists of interviewees' answers. Additionally, cyclists' behaviour are analyzed concerning both points of views. The background of this discussion is that the rebuilt cycle crossings are elevated to the level of the cycle path. Therefore the problem of crashing on kerbstones does not exist any longer for cyclists. Following this train of thoughts it might be that if cyclists do not have to concentrate on protecting their rims, they could spend more concentration on activities at the junctions. By this they could improve their objective and subjective safety themselves.

Relating to their subjective safety cyclists answered that they would have no different feeling of rather safe than unsafe at both types of junctions. So, from this point of view there is no increased traffic safety feeling measurable at the rebuilt junctions. However, the analysis of cyclists behaviour refers to a contrary assumption. Basically for this is at first, that priority taking cyclists' measured speeds are higher and second, that cyclists' activities to take priority are more self-confident at rebuilt junctions. But also priority giving cyclists seem to be more self-confident since they cross more often rebuilt junctions by rolling whereas they sometimes even stop at non-rebuilt junctions.

Another aspect is that cyclists take more often priority at rebuilt junctions. The interviewees underline this examined behaviour since the number of cyclists thinking they have priority is higher at rebuilt junctions than at non-rebuilt ones. However, – independent from the construction type– the interviewees could not give reasons why someone would have priority. Besides a lot of cyclists seem to know how to behave as a cyclist on a zebra. But nobody seems to know about the correct combination of right of way regulations on a cycle crossing. So, cyclists' behaviour and their handling of priority seem to be more self-confident at rebuilt junctions. Therefore it is supposed that they feel in an unconscious way safer at these junctions. However, this is just an assumption since the answers from the interviewees reflect an unchanged safety feeling and the uncertainties about the priority regulation are stronger developed at rebuilt junctions. Therefore more research dealing with this aspect might be helpful to prove this assumption.

Having these conclusions in one's mind it is interesting to compare them with the numbers of accidents and serious conflicts representing the level of objective safety. However, no tendencies of in- or decreasing numbers of such incidents between cyclists and drivers can be evaluated. This development might be caused by the humps forcing drivers to slow down. So, drivers might spend earlier or more attention to cyclists at reconstructed junctions. Accordingly, Towliat (2001) found that lower drivers' speeds lead to less numbers of serious conflicts. Further, he mentions that drivers give more often priority the slower they drive. So, it seems that the stronger subjective safety of more self-confident cyclists is compensated by more defensive behaviour of drivers at rebuilt junctions. Therefore the objective safety might be on the same level at both construction types.

However, the results of Räsänen (2000) let assume that the potential of a finally decreased objective safety exists. He found that the more cyclists know that they have priority the more accidents happen. The relationship between these facts might be that these cyclists insist on their priority. The results from my thesis do not reflect that cyclists know who has

priority but they think more often they would have it at rebuilt junctions. So, the potential of accidents is increased at the reconstructed junctions.

Finally, it turns out that if cyclists would know about having or giving priority they might act corresponding to these regulations more often. Therefore they could increase their objective as well as their subjective safety.

4.3 Conclusion

In the beginning of this thesis the following question is asked: Is the traffic safety of cyclists increased by red-grey coloured and elevated cycle paths? With all results seen in a context this question has to be negated. It seems rather that the safety of cyclists remains unchanged at reconstructed junctions compared to non-reconstructed junctions. However, this final statement bases on changed drivers' and cyclists' behaviour. Here, the effects of rebuilt bicycle paths on cyclists are: being surer about having priority and riding a bit faster during interactions with drivers. The effects on drivers are dominated by the hump, which force them to slow down and as a result to give more often priority to cyclists (Towliat, 2001). So finally, the interaction between road users is influenced by a more defensive driving of motorized road users and a more offensive riding of cyclists.

It is assumed that the main reason for the unchanged safety effect is probably the lack of knowledge concerning the right of way regulations by cyclists –especially at rebuilt junctions. Therefore it is suggested to create indicators, which help cyclists to understand the specific regulation at a certain junction –like it is done for drivers. Under these changed circumstances the traffic safety for cyclists might be improved.

Possible indicators could be a vertical giving priority sign at the cycle path or a giving priority line on the surface of the cycle path before the crossing. By this it might be possible that cyclists recognize the regulations already while approaching. This advantage would be especially useful when the intersection itself is not so well to recognize caused e.g. by vegetation. Moreover, the effect of Trf§61, which generates different regulations at intersections depending on the location of the cycle crossing, would be smaller.

A further indicator in order to direct cyclists' behaviour could be the use of e.g. white stripes on the cycle crossing. By this it might be that the presence of a crossing is more emphasized for cyclists. This assumption bases on the results of the interviews, by which white was the most often given answer at both types of junctions. Therefore it seems that cyclists interpret more often white with a cycle crossing than red. Furthermore, these white stripes could contribute a better emphasis of cycle crossings under bad lighting conditions, when red is not so well to recognize. However, it is necessary to check this supposition since it might also be that cyclists feel once more confirmed in having priority since the cycle crossings are pointed out extra by this additional measure.

Moreover, a standardization of cycle crossings might be helpful. Herewith, it is meant that the reconstructed cycle crossings could get accompanying white squares at their edges. By this measure the reconstructed cycle crossings would become official cycle crossings like the

non-reconstructed crossings. So, the right of way regulations would not differ any longer between both construction types.

Concerning the influence of red colour Räsänen (1998) found a relationship between drivers' attention to cyclists and cycle crossings in this colour. Hereby, the attention of driver is increased by red marked cycle crossings. However, these crossings in Helsinki / Finland are not elevated. Therefore there might be other impressions of this colour to drivers –due to another view angle– at the junctions in Lund / Sweden. Though Räsänen found a relationship between drivers' behaviour and this colour while an unconscious relationship between this colour and cyclists' behaviour is discovered within the present study. So, the influence of the red colour on elevated crossings on drivers' behaviour is still unsure. However, there seems to be one. Besides red is a colour, which needs bright lightning conditions to be well recognized. So, if one likes to point out this colour the cycle crossings should be more lighted up.

Finally, it can be concluded that it seems that the rebuilt cycle crossings lead to no increased traffic safety for cyclists until now, but there are big potentials to develop these constructions in order to improve cyclists' traffic safety. These potentials base on the more defensive behaviour of driver and the possibilities to change the self-confident behaviour of cyclists at rebuilt junctions.

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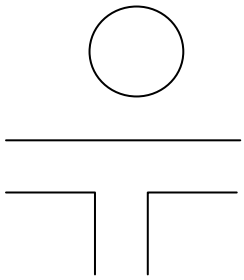
5 Appendix

Appendix A: Behaviour study - protocol

Behaviour study: Car - Cycle



Observer: Date: Time:

Town: Lund Place:

Weather: Sunny: Cloudy: Rainy:
Roadway: Dry: Wet:

	Car first						Cycle first					
	CYCLE			CAR			CYCLE			CAR		
	Direction	handling	Start of reaction <= / > 4m before crossing	Direction	handling	>= / < 20km/h	Direction	handling	>= / < 15km/h	Direction	handling	Start of reaction <= / > 10m before crossing
1												
2												
3												
4												
5												
6												
7												
8												
9												
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11												
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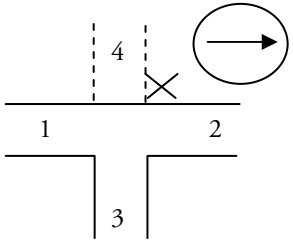
23												
24												
25												

Appendix B: Behaviour study at Rudeboksvägen / Gunnesbovägen

Observer: König Date: 2005-10-12 Time: 07:15 - 11:00
2005-10-12 13:00 - 17:15
2005-10-15 11:00 - 13:00



Town: Lund Place: Rudeboksvägen / Gunnesbovägen

Weather: Sunny: X Cloudy: Rainy:

Roadway: Dry: X Wet:

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
1											2=>1	19	pedals over	more	17	1=>3	11	retarding till stop	more	more	07:20
2	2=>1	10	pedals around the car back	less	at kerbstone	3=>1	5	stands at line of sight	less	0											07:44
3	2=>1	10	pedals around the car back	less	at kerbstone	3=>1	5	stands at line of sight	less	0											07:45
4	2=>1	7	stop pedalling	more	10m	1=>3	4	drives over	less	20											07:53
5	2=>1	10	pedals around the car back	less	in intersection	3=>2	5	stands at line of sight	less	0											08:24
6											2=>1	19	pedals over	more	17	3=>1	11	rolling, waiting	more	more	08:32
7	1=>2	10	pedals around the car back	less	in intersection	3=>1	5	rolls a little bit closer to the line of sight	less	5											13:45
8	1=>2	9	pedals over	less	0	1=>3	3	watching, accelerating	more	30											15:15
9	2=>1	6	stops	more	5	3=>1	5	stands at line of sight	less	0											15:53
10	1=>2	9	pedals over	less	0	1=>3	2	retarding, rolling	less	20											16:00
11											2=>1	16	stopping, watching	less	0	1=>3	14	drives over	less	0	16:20
12											1=>2	19	looks to the right, pedals over	less	12	1=>3	11	brake to stop	more	12	
13											1=>2	17	brakes to roll	less	14	1=>3	11	brake to stop	less	in curve	17:21
14	2=>1	9	pedals over	less	0	1=>3	3	accelerating	more	30											17:33
15	1=>2	7	stop pedal-ling, watch	more	10m	3=>1	2	ignores, rolls over	less	10											17:45

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
16	1=>2	7	stopped pedalling, looks to the left	more	6m	1=>3	4	no watch, drives over	more	25											17:47
17											1=>2	18	accelerating	less	15	2=>3	12	brakes to roll	less	in curve	17:47
18	2=>1	10	stopped pedalling, prepares to get off the bike, but cycles around the car back	more	10m	3=>1	2	rolls to the line of sight	less	10-15											17:48
19											1=>2	19	pedals over	less	15	1=>3	12	rolls	more	before the curve	18:12
20											1=>2	18	watches, accelerate	more	17	3=>1	12	brakes late and less	more	20	18:15
21											2=>1	19	cycle over	more	19	3=>1	12	brakes	less	5	11:00
22											1=>2	16	short stop on refuge, but than cycle over	less	15	3=>1	12	retarding to roll	less	10	11:12
23											1=>2	16	get off the bike	less	5	3=>1	12	brake	more	more	11:17
24											1=>2	19	cycle over	less	13	3=>1	12	rolls slowly but than suddenly braking	less	less	12:03
25											2=>1	19	cycle over	less	15	1=>3	12	rolls slowly	less	in curve	12:22
26											2=>1	19	cycle over	less	12	3=>1	11	waiting	more	more	12:28
27											1=>2	19	watch and than cycle over	less	14	1=>3	12	rolls	less	in curve	12:50
28	2=>1	6	stop pedalling, rolls to stop	more	12	3=>1	5	stands at line of sight	less	0											13:29
29	2=>1	7	stop pedalling, rolls	more	10	3=>1	3	accelerating	more	21											13:56
30											1=>2	19	pedals over	less	15	1=>3	12	pushing through provocational braking	less	less	13:58
31											1=>2	-	watch and cycle over	-	15	3=>1	-	braking (pushing)	-	less	13:59

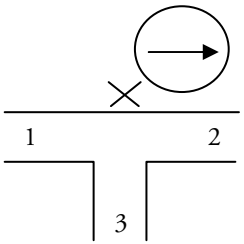
Appendix C: Behaviour study at Rudeboksvägen / Dösvägen

Observer: König Date: 2005-10-11 Time: 07:15 - 18:00

Town: Lund Place: Rudeboksvägen / Dösvägen

Weather: Sunny: X Cloudy: Rainy:

Roadway: Dry: X Wet:

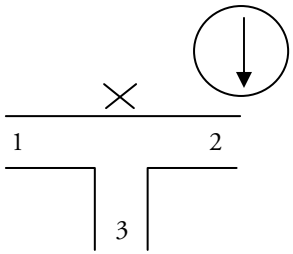


	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
1	2=>1	9	pedals over	less	0	3=>1	4	drives over	more	more											07:19
2	2=>1	7	little retarding	less	4	3=>1	2	rolls slowly forward	more	more											07:31
3											2=>1	19	pedals over	less	15	1=>3	12	retarding	more	before curve	07:31
4											2=>1	19	pedals over	less	less	2=>3	14	drives over	less	in curve	07:37
5	1=>2	7	slows down	more	more	3=>2	2	rolls slowly over	less	less											07:52
6											2=>1	19	pedals over	more	17	3=>1	12	retarding	more	15	08:05
7											1=>2	19	pedals over	less	15	1=>3	11	retarding and waiting	less	in curve	08:11
8											1=>2	16	retarding and stopping	less	15	3=>1	11	retarding and stopping	less	7	08:28
9											2=>1	17	retarding	less	10	1=>3	12	retarding	less	in curve	08:45
10	1=>2	7	stops pedalling	more	more	3=>1	4	drives over	less	less											13:55
11											2=>1	19	eye contact, pedals over	more	18	3=>1	12	retarding	less	10	14:50
12	1=>2	7	stops pedalling	more	more	3=>1	2	rolls slowly	less	less											14:50
13											1=>2	19	pedals over	more	17	3=>1	12	rolling	more	more	14:55
14											1=>2	19	pedals over	more	17	3=>1	12	slowly rolling	more	more	15:30
15	2=>1	7	slows down	more	10	1=>3	4	drives over	less	20											15:45
16											1=>2	19	eye contact, pedals over	more	22	3=>1	12	extreme slowly rolling	less	10	15:47
17											1=>2	19	eye contact, pedals over	less	15	1=>3	11	rolling until stop	more	before curve	15:55
18	2=>1	7	stops pedalling	more	10	1=>3	2	eye contact, rolls over	less	10											16:10
19											1=>2	19	swings to the right, pedals over	more	17	1=>3	12	retarding	less	late, but in curve	16:20
20											1=>2	19	pedals over	more	18	3=>1	11	retarding till stop	less	10	16:20
21											2=>1	19	pedals over	more	22	1=>3	11	retarding till stop	less	10	16:20

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
22											2=>1	17	stops pedalling, eye contact	more	20	1=>3	12	retarding, but rolling	more	before curve	16:22
23											1=>2	18	eye contact, stops pedalling, accelerating	more	16	1=>3	11	rolling, waving, retarding	less	in curve	16:31
24											1=>2	19	pedals over	more	17	3=>1	12	rolls slowly towards the crossing	more	more	16:35
25											1=>2	18	stops pedalling, eye contact, accelerating	less	15	3=>1	11	drives fast, stops suddenly in a short distance	less	less	16:39
26	2=>1	10	swings to the right in order to pass the car which is already staying on the hump	less	at the kerbstone	3=>1	2	rolls easy over the hump	less	10											16:41
27	2=>1	7	stops pedalling	more	10	1=>3	3	accelerating	less	15											16:52
28											1=>2	19	pedals over	more	18	1=>3	11	rolling till stop	less	in curve	17:00
29											1=>2	19	eye contact, pedals over	more	20	1=>3	12	short break	less	10	17:05
30	1=>2	10	right passing of the car	less	at the kerbstone	3=>2	2	rolls easy over hump	less	10											17:17
31											1=>2	-	pedals over	-	19	1=>3	-	rolling	-	in curve	17:21
32											2=>1	-	pedals over	-	17	1=>3	-	rolling	-	more	17:25

Appendix D: Behaviour Study at Baravägen / Margaretavägen

Observer: König Date: 2005-10-17 (Cloudy, Dry) Time: 12:00 - 13:00
2005-10-18 (Sunny, Dry) 16:00 - 18:00
2005-10-19 (Sunny, Dry) 15:00 - 16:00
2005-10-21 (Sunny, Dry) 12:00 - 13:00
2005-10-28 (Sunny, Dry) 15:15 - 17:30



Town: Lund Place: Baravägen / Margaretavägen

Weather: Sunny: X Cloudy: X Rainy:

Roadway: Dry: X Wet:

	Car first										Cycle first										
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		Time
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
1	1=>2	7	stop pedalling, watching, rolls over	more	20	3=>1	2	without braking rolling over	less	20											17.10.12:12
2											1=>2	17	turning backwards to the left, looks to the car, stops pedalling, pedals over	less	5	3=>2	12	suddenly braking	less	5	17.10.12:31
3											1=>2	17	looks, stopped pedalling, braking, pedals over	more	18	3=>1	11	watches, rolls to stop	less	10	17.10.12:47
4	1=>2	10	turns backwards to the left, stops pedalling, braking, rolls around the car back	more	20	3=>1	5	stands at the line of sight	less	0											17.10.12:54
5											1=>2	17	watching and rolling	less	15	3=>2	11	stop	less	5	18.10.
6											1=>2	19	pedals over	less	15	2=>3	12	rolling	less	10	18.10.
7											1=>2	19	look to the right, pedals over	less	5	1=>3	11	stop	less	10	18.10.
8											1=>2	19	pedals over	less	15	1=>3	12	rolling	more	15	18.10.
9											1=>2	19	pedals over	more	16	3=>1	11	stops correctly	more	more	19.10.15:16

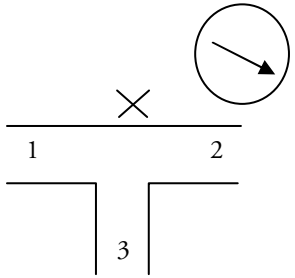
	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
10	1=>2	10	pedals around the car back	less	in intersection	3=>2	5	stops at zebra, accelerates, stops again at line of sight	less	5											19.10.15:40
11											1=>2	17	looks to the left, brakes heavy, rolls over	more	22	3=>1	11	fast driver, sudden brake, stands on the triangles	less	9,9	21.10.12:25
12	1=>2	7	stops pedalling	more	20	2=>3	4	drives over	more	more											21.10.12:28
13	1=>2	7	stops pedalling	more	17	3=>2	5	drives over, stops at the line of sight	less	10 (on zebra)											21.10.12:32
14	1=>2	7	watches, stops pedalling, rolls over	more	20	3=>1	3	stands on zebra, accelerates	less	0, then 10											21.10.12:39
15											1=>2	17	stops pedalling, brakes, rolls over	more	17	3=>1	11	sudden brake, stands half on zebra	less	3	21.10.12:43
16											1=>2	19	pedals over	more	20	2=>3	12	brakes to roll	more	more	21.10.12:49
17											1=>2	19	pedals over	more	20	3=>1	12	brakes to roll	less	in curve	21.10.12:49
18	1=>2	7	stops pedalling, rolls over	more	10	3=>2	4	drives over	more	25											28.10.15:25
19	1=>2	10	watches car, cycles over (behind the car)	more	15	3=>1	5	stands on zebra, at line of sight	less	0											28.10.15:31
20											1=>2	17	stops pedalling, rolls over and watches to the left and right	less	15	3=>2	12	very slow rolling	less	in curve	28.10.15:32
21	1=>2	7	stops pedalling, rolls over	more	20	3=>1	5	stands on zebra, at line of sight	less	0											28.10.15:40
22											1=>2	17	watches, then rolls over	more	20	3=>2	12	rolling	more	more	28.10.15:42
23	1=>2	10	cycles over (behind the car)	more	15	3=>2	5	stands on zebra, at line of sight	less	0											28.10.15:47
24											1=>2	20	eye contact, rolls over, cycles around the car front	more	17	3=>2	15	rolls, suddenly breaking to stop on the zebra, eye contact	less	on zebra	28.10.16:01

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
25	1=>2	7	stops pedalling, watches to the right, rolls over	more	15-20	3=>2	4	drives over	less	15											28.10.16:11
26	1=>2	10	pedals over, but cycles around the car back	less	on crossing	3=>1	5	stands at line of sight	less	0											28.10.16:13
27											1=>2	19	pedals over	more	18	3=>1	11	breaks suddenly to stop on zebra	less	7-8	28.10.16:17
28											1=>2	19	watches, cycles left turn, watches the car	less	15	3=>2	12	breaks suddenly to roll, just before zebra	less	5	28.10.16:26
29	1=>2	10	watches to the left, rolls behind the car	more	15	3=>1	2	rolls to line of sight	less	5											28.10.16:27
30											1=>2	17	stops pedalling, watches to the right, rolls over	less	13	3=>2	12	suddenly breaking to rolling	less	7	28.10.16:29
31	1=>2	7	watches to the right, stops pedalling, breaking, rolls over	more	10	3=>1	2	rolls over	less	15											28.10.16:47
32	1=>2	7	watches in front to the car, stops pedalling, rolls over	more	10	3=>1	3	drives fast towards junction, breaks suddenly on zebra, accelerates	more	25											28.10.16:54
33	1=>2	10	watches to the right, stops pedalling, rolls over behind the car back	more	10	3=>2	5	stands at line of sight	less	0											28.10.17:01
34											1=>2	17	rolls over	less	15	2=>3	12	rolls very slowly	more	before junction	28.10.17:10
35	1=>2	6	stops pedalling to stop, watches	more	15	3=>2	2	breaking to roll	less	10											28.10.17:11

Appendix E: Behaviour study at Fjelievägen / Bokbindaregatan

Observer: König Date: 2005-10-18 (Sunny, Dry) Time: 17:00 - 18:00
2005-10-20 (Cloudy, Dry) 15:00 - 18:00
2005-10-21 (Sunny, Dry) 16:00 - 18:00
2005-10-25 (Cloudy, Dry) 16:00 - 17:15

Town: Lund Place: Fjelievägen / Bokbindaregatan



Weather: Sunny: X Cloudy: Rainy:

Roadway: Dry: X Wet:

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
1	1=>2	10	cycles around the car front	less	in intersection	0	5	stands on the hump (on grey, red, grey)	less	0											18.10.17:04
2											3=>2	19	pedals over	more	17	0	11	waiting	less	10	18.10.17:16
3											3=>2	19	pedals over	more	17	1=>3	11	stands on first grey	less	0	18.10.17:17
4											3=>2	19	pedals over	more	19	1=>3	11	stands on first grey	less	0	18:10.17:19
5											3=>2	19	pedals over	more	20	0	11	stands on first grey	less	0	18:10.17:23
6	1=>2	10	cycles around the car back	more	20	3=>1	5	stands on the hump	less	0											18.10.17:23
7	3=>2	7	stops pedalling	more	15	3=>1	4	drives over	less	20											18:10.17:37
8											3=>2	19	cycles over and watches	less	15	0	11	rolls and stops suddenly	more	15	18:10.17:51
9	3=>2	7	stop pedalling	less	2	2=>3	4	drives over	less	20											20.10.
10											3=>2	16	stops shortly with braking	more	16	0	12	rolling	less	10	20.10.15:07
11											3=>2	19	watching + pedal over	more	22	2=>3	12	rolling	more	before curve	20.10.15:08
12											3=>2	20	cycles around the car front	more	20	1=>3	15	drives on the hump, stops half on red	less	0	20.10.15:23
13											3=>2	17	braking, but then pedals over	more	17	3=>1	15	drives on the hump, stops half on red	less	0	20.10.15:24
14											3=>2	19	braking and zikzack, watching, eye contact, pedals over while watching	more	17	1=>3	11	watching, eye contact, stops on hump with front in 1st grey	less	10	20.10.15:32

	Car first										Cycle first										
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		Time
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
15											3=>2	17	watching, eye contact, stops pedalling, but then pedals over	more	16	3=>1	15	stops suddenly on hump	more	35	20.10.15:37
16											3=>2	19	pedals over	more	17	1=>3	12	braking to roll	less	10 (in curve)	20.10.15.41
17	3=>2	7	stops pedalling to roll	less	2	0	4	drives over	less	10											20.10.16:04
18											3=>2	19	pedals over	more	18	0	12	pushing, rolling	less	5	20.10.16:07
19											3=>2	20	cycles around the car front	less	15	3=>1	15	stops suddenly on grey with front in red	less	2	20.10.17:20
20											3=>2	20	cycles around the car front	more	20	3=>1	15	stops suddenly on grey with front in red	less	2	20.10.17:20
21											3=>2	19	pedals over	more	22	0	12	braking to roll	less	10	20.10.18:00
22											3=>2	19	pedals over	more	17	0	12	braking to roll	less	10	21.10.16:00
23	3=>2	7	stops pedalling, rolls over	less	2	2=>3	4	drives over	less	14											21.10.16:03
24											3=>2	19	pedals over without watching	less	15	0	11	braking, rolling, standing in front of the hump	less	10	21.10.16:06
25	3=>2	7	stops pedalling, braking, eye contact	more	10	2=>3	2	rolls slowly over after braking, eye contact	less	10											21.10.16:22
26											3=>2	19	pedals over	more	16	3=>1	12	braking, rolls on the first grey	less	10	21.10..16:36
27											3=>2	17	looks, stops pedalling, pedals over	less	15	3=>1	11	stands in front of triangles	less	0	21.10.16:39
28											3=>2	19	eye contact, but pedals over	less	15	2=>3	12	rolling to hump	less	in curve	21.10.16:42
29	3=>2	10	stops pedalling, cycles around the car back while car is the last moment on the hump	more	10	2=>3	2	rolls comfortable over	less	10											21.10.16:46
30											3=>2	17	stops pedalling, rolls over, looks to the right	more	17	2=>3	12	braking to roll	more	before curve	21.10.16:53
31	3=>2	10	stops pedalling, cycles around car front	more	14	3=>1	5	stands on red part of hump	less	0											21.10.17:26
32											3=>2	19	watching, pedals over	more	18	3=>1	12	braking to roll	less	10	21.10.17:53

	Car first										Cycle first										Time
	CYCLE					CAR					CYCLE					CAR					
	Direction	Handling		Start of reaction <= / > 4m before crossing		Direction	Handling		>= / < 20km/h		Direction	Handling		>= / < 15km/h		Direction	Handling		Start of reaction <= / > 10m before crossing		
		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description		Code key	Description	Code key	Description	
33											3=>2	19	watching, pedals over	more	18	0	12	braking to roll	less	10	21.10.18:00
34											3=>2	19	pedals over but looks to the right in intersection	less	15 (in intersection)	0	12	rolling	more	more	25.10.16:10
35											3=>2	19	pedals over	less	15	0	15	rolls to line of sight but on hump recognizes bike to the left, stops with front in red	less	0	25.10.16:39
36											3=>2	-	pedals over	-	14	0	-	drives slowly to the line of sight	-	more	25.10.16:54
37											3=>2	-	pedals over but looks to the right in intersection	-	17	0	-	rolls over	-	2	25.10.16:56
38											3=>2	-	pedals over	-	17	2=>3	-	braking to roll	-	short before curve	25.10.17:15

Appendix F: Driver takes priority

code key	Driver's action	Rudeboksvägen / Gunnesbovägen [Number (%)]		Rudeboksvägen / Dösvägen [Number (%)]		Baravägen / Margaretavägen [Number (%)]		Fjelievägen / Bokbindaregatan [Number (%)]	
1	Retarding to stop before crossing	0	(0%)	0	(0%)	0	(0%)	0	(0%)
2	Retarding to roll	3	(21,4%)	6	(60%)	4	(23,5%)	2	(22,3%)
3	Accelerating	3	(21,4%)	1	(10%)	2	(11,8%)	0	(0%)
4	Drives over	2	(14,3%)	3	(30%)	3	(17,6%)	4	(44,4%)
5	Standing on the cycle crossing	6	(42,9%)	0	(0%)	8	(47,1%)	3	(33,3%)
Sum		14	(100%)	10	(100%)	17	(100%)	9	(100%)

code key	Cyclist's action	Rudeboksvägen / Gunnesbovägen [Number (%)]		Rudeboksvägen / Dösvägen [Number (%)]		Baravägen / Margaretavägen [Number (%)]		Fjelievägen / Bokbindaregatan [Number (%)]	
6	Stops pedalling and stops	2	(14,3%)	0	(0%)	1	(5,9%)	0	(0%)
7	Stops pedalling and rolls	4	(28,6%)	7	(70%)	9	(52,9%)	5	(55,6%)
8	Accelerating	0	(0%)	0	(0%)	0	(0%)	0	(0%)
9	Pedals over - no reaction	3	(21,4%)	1	(10%)	0	(0%)	0	(0%)
10	Pedals around the car	5	(35,7%)	2	(20%)	7	(41,2%)	4	(44,4%)
Sum		14	(100%)	10	(100%)	17	(100%)	9	(100%)

Appendix G: Cyclist takes priority

code key	Driver's action	Rudeboksvägen / Gunnesbovägen [Number (%)]		Rudeboksvägen / Dösvägen [Number (%)]		Baravägen / Margaretavägen [Number (%)]		Fjelievägen / Bokbindaregatan [Number (%)]	
11	Retarding to stop before crossing	5	(31,2%)	8	(40%)	7	(38,8%)	8	(30,8%)
12	Retarding to roll	10	(62,5%)	11	(55%)	10	(55,6%)	12	(46,1%)
13	Accelerating	0	(0%)	0	(0%)	0	(0%)	0	(0%)
14	Drives over	1	(6,3%)	1	(5%)	0	(0%)	0	(0%)
15	Standing on the cycle crossing	0	(0%)	0	(0%)	1	(5,6%)	6	(23,1%)
Sum		16	(100%)	20	(100%)	18	(100%)	26	(100%)
	Cyclist's action	Rudeboksvägen / Gunnesbovägen [Number (%)]		Rudeboksvägen / Dösvägen [Number (%)]		Baravägen / Margaretavägen [Number (%)]		Fjelievägen / Bokbindaregatan [Number (%)]	
16	Stops pedalling and stops	3	(18,7%)	1	(5%)	0	(0%)	1	(3,8%)
17	Stops pedalling and rolls	1	(6,3%)	2	(10%)	9	(50%)	4	(15,5%)
18	Accelerating	2	(12,5%)	2	(10%)	0	(0%)	0	(0%)
19	Pedals over	10	(62,5%)	15	(75%)	8	(44,4%)	18	(69,2%)
20	Pedals around the car	0	(0%)	0	(0%)	1	(5,6%)	3	(11,5%)
Sum		16	(100%)	20	(100%)	18	(100%)	26	(100%)

Appendix H: Traffic flows contributed in the behaviour study

Traffic flow	Rudeboksvägen / Gunnesbovägen		Rudeboksvägen / Dösvägen		Baravägen / Margaretavägen		Fjelievägen / Bokbindaregatan	
	Driver takes priority [Number]	Cyclist takes priority [Number]	Driver takes priority [Number]	Cyclist takes priority [Number]	Driver takes priority [Number]	Cyclist takes priority [Number]	Driver takes priority [Number]	Cyclist takes priority [Number]
3=>1	8	7	5	9	9	6	3	9
3=>2	1	0	2	0	7	7	2	11
Sums	9	7	7	9	16	13	5	20
	16		16		29		25	
1=>3	5	8	3	10	0	2	0	3
2=>3	0	1	0	1	1	3	4	3
Sums	5	9	3	11	1	5	4	6
	14		14		6		10	
Sum all	14	16	10	20	17	18	9	26

Appendix I: Interview - protocol

Intervju med cyklister

Intervjuare: Datum: Tid:

Stad: Plats:

Väderlek: solig: mulet: regnig:
Vägbana: torr: vat:

Lunds Tekniska Högskola,
Instutionen för Teknik och samhälle,
Trafik och väg

LUND UNIVERSITY

1. Minns du vilken färg har cykelöverfarten som du just passerade?

gul ☐ blå ☐ vit ☐ röd ☐ grå ☐ ingen aning ☐

2. Tror du att det är cyklister eller bilarna som har företräde på denna cykelöverfarten?

Cyklister ☐ Bilarna ☐ ingen aning ☐

3. Varför tror du att någon har företräde här?

.....

4. Hur säker känner du att cykla här i denna korsning? - Gör en kryss på linjen!

mycket osäkert ● ——— ● mycket säkert

5. Hur ofta cyklar du här?

Varje dag ☐ nån gång per vecka ☐ nån gång per månad ☐

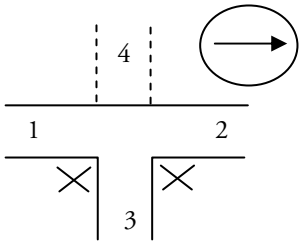
Tack så mycket för din hjälp.

Appendix J: Interviews at Rudeboksvägen / Gunnesbovägen

Interviewer: König Date: 2005-10-12 Time: 09:40 - 11:00
13:00 - 17:15

Town: Lund Place: Rudeboksvägen / Gunnesbovägen

Weather: Sunny: X Cloudy: Rainy:
Roadway: Dry: X Wet:

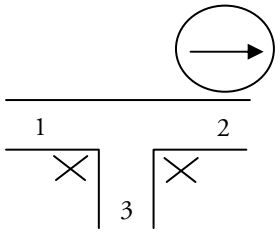


Interview no.	Question 1	Question 2	Question 3		Question 4	Question 5	Time	Gender	Age
			Key	Answer					
30	red	cyclists	7	Crossing is marked in red	58	each day	17:10	male	50
29	red	cyclists	8	Cars have to wait since there is a main direction before them	75	each day	17:00	male	18
28	white	cyclists	1	No idea	44	each day	16:55	male	45
27	white	cyclists	2	Pedestrians have priority	80	several times a week	16:50	female	18
26	grey	cyclists	8	Since this is a junction	67	each day	16:50	female	18
25	white	cars	2	It is a zebra	77	several times a week	16:50	male	45
24	no idea	cyclists	3	Traffic sign	49	each day	16:40	female	25
23	white	cyclists	2	Since this is a zebra	94	each day	16:30	female	25
22	white	cyclists	1	No idea	79	each day	16:25	female	45
21	red	cars	2	Drivers have not to give priority to cyclists, but they have to give priority to pedestrians. Cyclists have to give priority to driver.	66	several times a week	16:25	male	50
20	white	cyclists	2	Because of zebra	105	each day	16:05	female	20
19	white	cars	2	Drivers have to wait for pedestrians but not for cyclists.	71	each day	16:00	female	55
18	no idea	cars	4	The law	100	each day	15:55	male	50
17	white	cars	1	No idea	52	each day	15:45	female	50
16	white	cyclists	5	Marked cycle crossing	41	several times a week	15:30	female	35
15	white	cyclists	5	Since this is a crossing which is done for pedestrians and cyclists.	68	each day	15:30	male	16
14	yellow	cyclists	1	No idea	84	each day	15:25	female	15
13	no idea	cars	2	Zebra	102	each day	15:05	female	35
12	blue	cars	1	Do not know	71	each day	15:00	female	17
11	white	cars	1	No idea	54	each day	14:55	female	30
10	white	cars	8	Since cyclists have to cross a road	105	each day	14:50	female	20
9	blue	cyclists	8	There are more cyclists than cars	85	each day	14:45	male	61
8	white	cars	8	By this road users do not crash.	102	each day	14:40	male	17
7	blue	cars	8	Car is harder.	50	several times a week	09:50	male	35
6	white	cars	1	No idea	102	several times a month	09:40	male	25
5	red	cyclists	1	No idea	26	each day	14:30	female	20
4	no idea	cars	1	Do not know	66	each day	14:25	male	21
3	no idea	cyclists	1	No idea	23	each day	14:45	female	40
2	no idea	cyclists	1	No idea	75	each day	13:30	female	20
1	no idea	cars	1	No idea	105	several times a week	09:55	female	60

Appendix K: Interviews at Rudeboksvägen / Dösvägen

Interviewer: König Date: 2005-10-11 Time:09:35 - 12:00
13:00 - 16:00

Town: Lund Place: Rudeboksvägen / Dösvägen



Weather: Sunny: X Cloudy: Rainy:
Roadway: Dry: X Wet:

Interview no.	Question 1	Question 2	Question 3		Question 4	Question 5	Time	Gender	Age
			Key	Answer					
30	red	cars	2	Like zebra	67	each day	15:53	female	30
29	red	cars	1	No idea	100	several times a week	15:40	female	55
28	red	cyclists	1	No idea; dangerous traffic on the crossing as cars stop suddenly before the crossing - so cyclists cannot be sure about what the drivers really plan to do	9	each day	15:25	female	65
27	red	cyclists	5	Cycle path	105	each day	15:05	male	55
26	white	cyclists	6	Drivers have to wait since there is an elevation	56	each day	15:00	female	60
25	grey	cyclists	1	No idea	91	several times a week	15:00	female	19
24	yellow	cyclists	4	Swedish law	2	several times a week	14:45	male	65
23	no idea	cyclists	1	No idea	73	each day	14:40	male	16
22	no idea	cyclists	8	There are more cyclists than drivers	105	each day	14:30	male	17
21	white	cyclists	4	I think it is written in the law.	71	several times a week	14:30	female	24
20	white	cyclists	6	Since the cycle crossing is elevated.	98	several times a month	14:20	male	22
19	no idea	cars	8	Since cars have always priority.	42	several times a month	14:20	male	22
18	white	cyclists	8	It is the side street which crosses the cycle path.	83	several times a month	14:20	male	22
17	yellow	cyclists	1	No idea	92	each day	13:55	female	50
16	white	no idea	8	I do not think that someone has priority but one has to stand still.	73	each day	13:50	female	38
15	no idea	cars	8	No marking	55	several times a week	13:45	female	40
14	white	cars	4	After traffic law	85	several times a week	13:30	male	50
13	white	cyclists	1	no idea	71	several times a week	13:20	male	45
12	red	no idea	1	no idea	78	each day	11:20	male	18
11	white	cars	8	In order to facilitate traffic.	103	each day	11:05	male	19
10	red	cars	1	no idea	103	each day	11:00	female	62
9	red	cars	3	The cars have the traffic sign "give priority" behind the cycle crossing.	103	each day	10:55	female	35
8	no idea	cyclists	1	No idea	67	each day	10:40	male	25
7	white	cyclists	8	Since cyclists do not have so much safety.	57	each day	10:35	male	40
6	white	cyclists	8	Since cyclists do not have so much safety.	57	each day	10:35	female	35
5	red	cars	8	But cars have to drive with such a speed that there is no danger for cyclists.	58	several times a week	13:30	male	20
4	red	no idea	1	No idea	72	each day	09:55	male	27
3	no idea	no idea	1	No idea	42	each day	09:50	male	14
2	white	cyclists	1	No idea	53	several times a week	09:40	female	40
1	red	cyclists	1	No idea	52	several times a week	09:40	male	40

Appendix L: Interviews - Gender

	Female cyclists		Male cyclists		Sum	
	Number	%	Number	%	Number	%
Rudeboksvägen / Gunnesbovägen	18	60,0	12	40,0	30	100,0
Rudeboksvägen / Dösvägen	13	43,3	17	56,7	30	100,0
Both junctions	31	51,7	29	48,3	60	100,0

Appendix M: Interviews - Age

	Rudeboksvägen / Gunnesbovägen				Rudeboksvägen / Dösvägen				Both junctions			
	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%
under 18	1	3	4	13,3	0	3	3	10,0	1	6	7	11,7
18 - 60	16	9	25	83,4	12	13	25	83,3	28	22	50	83,3
over 60	1	0	1	3,3	1	1	2	6,7	2	1	3	5,0
Sum	18	12	30	100,0	13	17	30	100,0	31	29	60	100,0

Appendix N: Interviews - Frequency

	Rudeboksvägen / Gunnesbovägen				Rudeboksvägen / Dösvägen				Both junctions			
	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%
Each day	14	8	22	73,3	8	9	17	56,7	22	17	39	65
Several times a week	4	3	7	23,4	5	5	10	33,3	9	8	17	28,3
Several times a month	0	1	1	3,3	0	3	3	10,0	0	4	4	6,7
Sum	18	12	30	100,0	13	17	30	100,0	31	29	60	100,0

Appendix O: Interviews - Colours

	Rudeboksvägen / Gunnesbovägen				Rudeboksvägen / Dösvägen				Both junctions			
	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%
Yellow	1	0	1	3,3	1	1	2	6,7	2	1	3	5,0
Blue	1	2	3	10,0	0	0	0	0,0	1	2	3	5,0
White	9	5	14	46,7	5	6	11	36,7	14	11	25	41,7
Red	1	3	4	13,3	5	5	10	33,3	6	8	14	23,3
Grey	1	0	1	3,3	1	0	1	3,3	2	0	2	3,3
No idea	5	2	7	23,3	1	5	6	20,0	6	7	13	21,7
Sum	18	12	30	100,0	13	17	30	100,0	31	29	60	100,0

Appendix P: Interviews - Priority

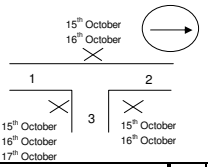
	Rudeboksvägen / Gunnesbovägen				Rudeboksvägen / Dösvägen				Both junctions			
	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%	Female cyclists	Male cyclists	Sum	%
Cyclists	11	5	16	53,3	7	10	17	56,7	18	15	33	55,0
Cars	7	7	14	46,7	5	4	9	30,0	12	11	23	38,3
No idea	0	0	0	0,0	1	3	4	13,3	1	3	4	6,7
Sum	18	12	30	100,0	13	17	30	100,0	31	29	60	100,0

Appendix Q: Measured speeds at Rudeboksvägen / Gunnesbovägen

Observer: König Date: 2005-10-15 (sunny, dry) 10:30 - 14:30
2005-10-16 (sunny, dry) 14:30 - 17:30
2005-10-17 (sunny, dry) 18:00 - 19:00

Town: Lund Place: Rudeboksvägen / Gunnesbovägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:



	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 2=>1						Bicycle 1=>2					
	40m - 50m before crossing			just before the crossing			40m - 50m before crossing			just before the crossing			40m - 50m before junction			at the level of junction			40m - 50m before junction			at the level of junction			just before the crossing			just before the crossing			40-50m before the crossing			at kerbstone			40-50m before the crossing			at kerbstone		
	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value
1	34	0	34	12	12	12	24	0	24	17	12	17	42	8	42	42	20	39	66	5	66	66	23	61	23	32	20	16	32	14	18	5	18	10	8	10	13	5	13	11	14	11
2	34	0	34	20	12	20	23	0	23	18	12	18	38	8	38	38	20	36	64	5	64	64	23	59	26	32	22	17	32	14	15	5	15	7	8	7	19	5	19	18	14	17
3	36	0	36	28	12	27	29	0	29	22	12	22	40	8	40	40	20	38	49	5	49	49	23	45	19	0	19	18	32	15	20	5	20	10	8	10	10	5	10	8	14	8
4	36	0	36	34	12	33							51	8	50	48	20	45	48	5	48	48	23	44	23	0	23	13	32	11	15	5	15	15	8	15	13	5	13	13	14	13
5	32	0	32	18	12	18							37	8	37	37	20	35	54	5	54	53	23	49				9	32	8	15	5	15	15	8	15	14	5	14	13	14	13
6	27	0	27	20	12	20							46	8	46	46	20	43	54	5	54	53	23	49				20	32	17	12	5	12	9	8	9	18	5	18	15	14	15
7	40	0	40	27	12	26							41	8	41	41	20	39	58	5	58	56	23	52				11	32	9	14	5	14	10	8	10	15	5	15	14	14	14
8	22	0	22	18	12	18							39	8	39	39	20	37	51	5	51	51	23	47				12	32	10	18	5	18	13	8	13	15	5	15	14	14	14
9	29	0	29	22	12	22							48	8	47	48	20	45	49	5	49	49	23	45				11	32	9	22	5	22	15	8	15	18	5	18	11	14	11
10	38	0	38	16	12	16							40	8	40	40	20	38	56	5	56	53	23	49				18	32	15	17	5	17	16	8	16	16	5	16	14	14	14
11	32	0	32	25	12	24							45	8	45	54	20	51	59	5	59	59	23	54				17	32	14	12	5	12	9	8	9	14	5	14	13	14	13
12	40	0	40	23	12	23							41	8	41	41	20	39	65	5	65	65	23	60				12	32	10	17	5	17	15	8	15	13	5	13	10	14	10
13	33	0	33	25	12	24							47	8	46	47	20	44	47	5	47	47	23	43				10	32	8	18	5	18	17	8	17	15	5	15	10	14	10
14	36	0	36	22	12	22							36	8	36	36	20	34	59	5	59	59	23	54				13	32	11	13	5	13	5	8	5	14	5	14	10	14	10
15	28	0	28	24	12	24							45	8	45	45	20	42	43	5	43	43	23	40				20	32	17	14	5	14	5	8	5	18	5	18	9	14	9
16	31	0	31	17	12	17							64	8	63	64	20	60	57	5	57	57	23	53				13	32	11	18	0	18	10	7	10	15	5	15	8	14	8
17	35	0	35	24	12	24							62	8	61	62	20	58	53	5	53	53	23	49				10	32	8	19	0	19	17	7	17	16	5	16	9	14	9
18	36	0	36	32	12	31							54	8	53	54	20	51	48	5	48	48	23	44				10	32	8	18	0	18	11	7	11	15	5	15	11	14	11
19	33	0	33	23	12	23							40	8	40	40	20	38	43	5	43	43	23	40				10	32	8	23	0	23	16	7	16	13	5	13	12	14	12
20	35	0	35	24	12	24							49	8	48	49	20	46	50	5	50	50	23	46				13	32	11	20	0	20	15	7	15	13	5	13	8	14	8
21	24	0	24	19	12	19							64	8	63	64	20	60	50	5	50	50	23	46				16	32	14	17	0	17	15	7	15	15	5	15	11	14	11
22	28	0	28	20	12	20							60	8	59	60	20	56	48	5	48	48	23	44				15	32	13	15	0	15	14	7	14	10	5	10	8	27	7
23	35	0	35	22	12	22							46	8	46	45	20	42	53	5	53	53	23	49				15	32	13	18	0	18	16	7	16	8	5	8	6	27	5
24	32	0	32	21	12	21							36	8	36	36	20	34	54	5	54	54	23	50				15	32	13	20	0	20	15	7	15	12	5	12	11	27	10
25	29	0	29	20	12	20							46	8	46	46	20	43	60	5	60	60	23	55				20	32	17	19	0	19	15	7	15	18	5	18	16	27	14
26	25	0	25	12	12	12							43	8	43	43	20	40	43	5	43	43	23	40				12	35	10	17	0	17	15	7	15	16	5	16	13	27	12
27	30	0	30	21	12	21							40	8	40	40	20	38	52	5	52	52	23	48				12	35	10	16	0	16	15	7	15	13	5	13	9	27	8
28	34	0	34	23	12	23							43	8	43	43	20	40	51	5	51	51	23	47				11	35	9	17	0	17	12	7	12	15	5	15	8	27	7
29	36	0	36	28	12	27							50	8	49	50	20	47	36	5	36	36	23	33				16	35	13	17	0	17	13	7	13	19	5	19	9	27	8
30	32	0	32	22	12	22							44	8	44	44	20	41	56	5	56	56	23	52				11	35	9	17	0	19	16	7	16	14	5	14	12	27	11
31	33	0	33	23	12	23							44	8	44	44	20	41	48	5	48	48	23	44				15	35	12							12	5	12	10	27	9
32	27	0	27	20	12	20							50	8	49	50	20	47	54	5	54	54	23	50				15	35	12							14	5	14	9	27	8
33	39	0	39	26	12	25							48	8	47	48	20	45	41	5	41	41	23	38				13	35	11							15	5	15	14	27	13
34	40	0	40	27	12	26							46	8	46	46	20	43	62	5	62	62	23	57				13	35	11							16	5	16	14	27	13
35	29	0	29	17	12	17							43	8	43	43	20	40	52	5	52	52	23	48				14	35	11							16	5	16	9	27	8
36	23	0	23	20	12	20							36	8	36	36	20	34	48	5	48	48	23	44				11	35	9							16	5	16	12	27	11
37	22	0	22	19	12	19							52	8	51	52	20	49	50	5	50	50	23	46				14	35	11							16	5	16	7	27	6
38	26	0	26	23	12	23							51	8	50	51	20	48	47	5	47	47	23	43				12	35	10							15	5	15	6	27	5
39	31	0	31	22	12	22							48	8	47	48	20	45	51	5	51	51	23	47				14	35	11							14	5	14	7	27	6
40	30	0	30	22	12	22							42	8	42	42	20	39	50	5	50	50	23	46				16	35	13							16	5	16	13	27	12
41	32	0	32	29	12	28							44	8	44	44	20	41	44	5	44	44	23	41				13	35	11							14	5	14	12	27	11
42	37	0	37	18	12	18							42	8	42	42	20	39	57	5	57	57	23	53				15	35	12												
43	39	0	39	26	12	25							46	8	46	46	20	43	47	5	47	47	23	43				10	35	8												
44	27	0	27	26	12	25							44	8	44	44	20	41	46	5	46	46	23	42				11	35	9												
45	36	0	36	26	12	25							45	8	45	45	20	42	62	5	62	62	23	57				10	35	8												
46	37	0	37	26	12	25							47	8	46	47	20	44	57	5	57	57	23	53				12	35	10												
47	30	0	30	12	12	12							45	8	45	45	20	42	62	5	62	62	23	57				10	35	8												
48	36	0	36	19	12	19							47	7	47	47	17	45	52	5	52	52	23	48				10	35	8												
49	38	0	38	24	12	24							50	7	50	50	17	48	43	5	43	43	23	40				9	35	7												
50	26	0	26	26	12	25							51	7	51	51	17	49	50	5	50	50	23	46				16	35	13												
51	35	0	35	22	12	22							50	7	50	50	17	48	45	5	45	45	23	42				14	35	11												
52	31	0	31	19	12	19							46	7	46	46	17	44	56	5	56	56	23	52				11	35	9												
53	29	0	29	19	12	19							52	7	52	52	17	50	53	5	53	53	23	49				9	35	7												
54	32	0	32	22	12	22							39	7	39	39	17	37	52	5	52	52	23	48				10	35	8												
55	35	0	35	16	12	16							51	7	51	51	17	49	60	5	60	60	23	55				11	35	9												
56	50	0	50	28	12	27							44	7	44	44	17	42	52	5	52	52	23	48				14	35	11												
57	40	0	40	26	12	25							45	7	45	45	17	43	57	5	57	57	23	53				12	35	10												
58	35	0	35	27	12	26							52	7	52	52	17	50	44	5	44	44	23	41				13	35	11												
59	21	0	21	19	12	19							53	7	53	53	17	51	59	5	59	59	23	54				6	35	5												
60	23	0	23	22	12	22							49	7	49	49	17	47	44	5	44	44	23	41				8	35	7												
61	24	0	24	18	12	18							45	7	45	45	17	43	48	5	48	48	23	44				13	35	11												
62	29	0	29	22	12	22							40	7	40	40	17	38	49	5	49	49	23	45				15	35	12												
63	44	0	44	30	12	29							57	7	57	57	17	54	49	5	49	49	23	45				13	35	11												
64	46	0	46	23	12	23							55	7	55	55	17	52	68	5	68	68	23	63				13	35	11												
65	37	0	37	15	12	15							50	7	50	50	17	48	57	5	57	57	23	53				12	35	10												
66	35	0	35	29	12	28							57	7	57	57	17	54	48	5	48	48	23	44				12	35	10												
67	25	0	25	13	12	13							36	7	36	36	17	34	48	5	48	48	23	44				10	35	8												
68	45	0	45	13	12	13							57	7	57	57	17	54	50	5	50	50	23	46				11	35	9												
69	26	0	26	17	12	17							64	7	64	64	17	61	50	5	50	50	23	46				13	35	11												

Evaluation of the effects of rebuilt bicycle paths at intersections on arterial streets in Lund
– a case study.

Observer: König Place: Rudeboksvägen / Gunnesbovägen

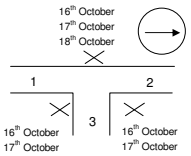
	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 2=>1						Bicycle 1=>2					
	Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before junction			at the level of junction			Date	40m - 50m before junction			at the level of junction			Date	just before the crossing			Date	just before the crossing			Date	40-50m before the crossing			at kerbstone			Date	40-50m before the crossing			at kerbstone		
		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
70	15.10.	42	0	42	21	12	21								16.10.	53	7	53	53	17	51	15.10.	53	5	53	53	23	49				16.10.	14	35	11															
71	15.10.	36	0	36	11	12	11								16.10.	68	7	67	68	17	65	15.10.	62	5	62	62	23	57				16.10.	13	35	11															
72	16.10.	35	10	34	26	39	20								16.10.	42	7	42	42	17	40	15.10.	55	5	55	55	23	51				16.10.	9	35	7															
73	16.10.	42	10	41	21	39	16								16.10.	59	7	59	59	17	56	15.10.	54	5	54	54	23	50				16.10.	13	35	11															
74	16.10.	36	10	35	16	39	12								16.10.	44	7	44	44	17	42	15.10.	57	5	57	57	23	53				16.10.	13	35	11															
75	16.10.	37	10	36	12	39	9								16.10.	54	7	54	54	17	52	15.10.	47	5	47	47	23	43				16.10.	14	35	11															
76	16.10.	30	10	30	19	39	15								16.10.	50	7	50	50	17	48	15.10.	55	5	55	55	23	51				16.10.	15	35	12															
77	16.10.	30	10	30	20	39	16								16.10.	54	7	54	54	17	52	15.10.	46	5	46	46	23	42				16.10.	13	35	11															
78	16.10.	27	10	27	22	39	17								16.10.	50	7	50	50	17	48	15.10.	44	5	44	44	23	41				16.10.	13	35	11															
79	16.10.	30	10	30	11	39	9								16.10.	52	7	52	52	17	50	15.10.	60	5	60	60	23	55				16.10.	15	35	12															
80	16.10.	44	10	43	14	39	11								16.10.	56	7	56	56	17	53	15.10.	54	5	54	54	23	50				16.10.	16	35	13															
81	16.10.	38	10	37	17	39	13								16.10.	48	7	48	48	17	46	15.10.	57	5	57	57	23	53				16.10.	13	35	11															
82	16.10.	28	10	28	24	39	19								16.10.	50	7	50	50	17	48	15.10.	54	5	54	54	23	50				16.10.	14	35	11															
83	16.10.	33	10	32	22	39	17								16.10.	47	7	47	47	17	45	15.10.	56	5	56	56	23	52				16.10.	17	35	14															
84	16.10.	33	10	32	17	39	13								16.10.	50	7	50	50	17	48	15.10.	51	5	51	51	23	47				16.10.	15	35	12															
85	16.10.	23	10	23	18	39	14								16.10.	47	7	47	47	17	45	15.10.	53	5	53	53	23	49				16.10.	24	35	20															
86	16.10.	32	10	31	24	39	19								16.10.	52	7	52	52	17	50	15.10.	59	5	59	59	23	54				16.10.	11	35	9															
87	16.10.	20	10	20	19	39	15								16.10.	43	7	43	43	17	41	15.10.	46	5	46	46	23	42				16.10.	12	35	10															
88	16.10.	23	10	23	16	39	12								16.10.	52	7	52	52	17	50	15.10.	39	5	39	39	23	36				16.10.	14	35	11															
89	16.10.	37	10	36	22	39	17								16.10.	47	7	47	47	17	45	15.10.	58	5	58	58	23	53				16.10.	14	35	11															
90	16.10.	35	10	34	18	39	14								16.10.	52	7	52	52	17	50	15.10.	53	5	53	53	23	49				16.10.	11	35	9															
91	16.10.	28	10	28	20	39	16								16.10.	50	7	50	50	17	48	15.10.	51	5	51	51	23	47				16.10.	14	35	11															
92	16.10.	37	10	36	17	39	13								16.10.	44	7	44	44	17	42	15.10.	44	5	44	44	23	41				16.10.	20	35	16															
93	16.10.	34	10	33	17	39	13								16.10.	49	7	49	49	17	47	15.10.	57	5	57	57	23	53				16.10.	10	35	8															
94	16.10.	48	10	47	27	39	21								16.10.	43	7	43	43	17	41	15.10.	52	5	52	52	23	48				16.10.	25	35	20															
95	16.10.	29	10	29	17	39	13								16.10.	50	7	50	50	17	48	15.10.	62	5	62	62	23	57				16.10.	12	35	10															
96	16.10.	15	10	15	7	39	5								16.10.	54	7	54	54	17	52	15.10.	55	5	55	55	23	51				16.10.	15	35	12															
97	16.10.	26	10	26	15	39	12								16.10.	53	7	53	53	17	51	15.10.	51	5	51	51	23	47				16.10.	14	35	11															
98	16.10.	27	10	27	12	39	9								16.10.	51	7	51	51	17	49	15.10.	51	5	51	51	23	47				16.10.	15	35	12															
99	16.10.	45	10	44	12	39	9								16.10.	49	7	49	49	17	47	15.10.	50	5	50	50	23	46				16.10.	12	35	10															
100	16.10.	36	10	35	18	39	14								16.10.	45	7	45	45	17	43	15.10.	53	5	53	53	23	49				16.10.	10	35	8															
101	16.10.	39	10	38	22	39	17								16.10.	43	7	43	43	17	41	15.10.	48	5	48	48	23	44																				
102															16.10.	54	7	54	54	17	52	15.10.	51	5	51	51	23	47																				
103															16.10.	52	7	52	52	17	50																										
104															16.10.	51	7	51	51	17	49																										
105															16.10.	57	7	57	57	17	54																										
106															16.10.	56	7	56	56	17	53																										
107															16.10.	55	7	55	55	17	52																										
108															16.10.	47	7	47	47	17	45																										
109															16.10.	60	7	60	60	17	57																										
110															16.10.	57	7	57	57	17	54																										
111															16.10.	55	7	55	55	17	52																										
112															16.10.	52	7	52	52	17	50																										
113															16.10.	47	7	47	47	17	45																										
114															16.10.	50	7	50	50	17	48																										
115															16.10.	49	7	49	49	17	47																										
116															16.10.	50	7	50	50	17	48																										
117															16.10.	47	7	47	47	17	45																										
118															16.10.	68	7	67	68	17	65																										
119															16.10.	35	7	35	35	17	33																										
120															16.10.	63	7	63	63	17	60																										
121															16.10.	56	7	56	56	17	53																										
122															16.10.	51	7	51	51	17	49																										
123															16.10.	44	7	44	44	17	42																										
124															16.10.	38	7	38	38	17	36																										
125															16.10.	50	7	50	50	17	48																										
126															16.10.	49	7	49	49	17	47																										
127															16.10.	49	7	49	49	17	47																										
128															16.10.	62	7	62	62	17	59																										
129															16.10.	48	7	48	48	17	46																										
130															16.10.	48	7	48	48	17	46																										
131															16.10.	67	7	66	67	17	64																										
132															16.10.	45	7	45	45	17	43																										
133															16.10.	59	7	59	59	17	56																										
134															16.10.	54	7	54	54	17	52																										
135															16.10.	61	7	61	61	17	58																										
136															16.10.	47	7	47	47	17	45																										
137															16.10.	55	7	55	55	17	52																										
138															16.10.	49	7	49	49	17	47																										
139															16.10.	53	7	53	53	17	51																										
140															16.10.	65	7	65	65	17	62																										
141															16.10.	56	7	56	56	17	53																										
142															16.10.	52	7	52	52	17	50																										
143															16.10.	47	7	47	47	17	45																										
144															16.10.	54	7	54	54	17	52																										
145															16.10.	52	7	52	52	17	50																										
146															16.10.	46	7	46	46	17	44																										
147															16.10.	52	7	52	52	17	50																										
148															16.10.	52	7	52	52	17	50																										

Appendix R: Measured speeds at Rudeboksvägen / Dösvägen

Observer: Könige Date: 2005-10-16 (sunny, dry) 17:30 - 18:30
2005-10-17 (sunny, dry) 14:00 - 18:00
2005-10-18 (sunny, dry) 07:00 - 09:00

Town: Lund Place: Rudeboksvägen / Dösvägen

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:

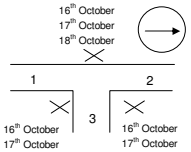


	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 2=>1						Bicycle 1=>2					
	40m - 50m before hump			just before the hump			40m - 50m before hump			just before the hump			40m - 50m before junction			at the level of junction			40m - 50m before junction			at the level of junction			just before the hump			just before the hump			40-50m before the crossing			at kerbstone			40-50m before the crossing			at kerbstone		
	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value	measured	angle	corrected value
1	30	12	29	14	32	12	10	0	10	5	0	5	35	0	35	35	0	35	51	3	51	51	8	51	17	0	17	10	32	9	14	4	14	13	14	13	20	4	20	12	9	12
2	22	12	22	12	32	10							50	0	50	50	0	50	54	3	54	54	8	54	15	0	15	11	32	9	14	4	14	13	14	13	21	4	21	19	9	19
3	29	12	28	14	32	12							42	0	42	42	0	42	52	3	52	52	8	52	21	0	21	9	32	8	17	4	17	15	14	15	15	4	15	15	9	15
4	12	12	12	0	32	0							46	0	46	46	0	46	50	3	50	50	8	50	20	0	20	7	32	6	17	4	17	14	14	14	15	4	15	15	9	15
5	25	12	24	9	32	8							54	0	54	54	0	54	54	3	54	54	8	54				7	32	6	18	4	18	17	11	17	15	4	15	15	9	15
6	15	12	15	10	32	8							65	0	65	65	0	65	57	3	57	57	8	56				8	32	7	18	4	18	17	11	17	16	4	16	15	9	15
7	8	12	8	8	32	7							58	0	58	58	0	58	49	3	49	49	8	49				12	32	10	20	4	20	20	11	20	18	7	18	18	11	18
8	30	0	30	14	0	14							43	0	43	43	0	43	52	3	52	52	8	52				6	32	5	13	4	13	13	11	13	20	7	20	19	11	19
9	10	0	10	3	0	3							48	0	48	48	0	48	66	3	66	66	8	65				11	32	9	18	4	18	18	11	18	17	7	17	17	11	17
10	21	0	21	5	0	5							48	0	48	48	0	48	38	3	38	38	8	38				12	32	10	21	4	21	21	11	21	16	7	16	15	11	15
11	37	0	37	17	0	17							45	0	45	45	0	45	52	3	52	52	8	52				7	32	6	21	4	21	21	11	21	14	7	14	15	11	15
12	9	0	9	6	0	6							59	0	59	59	0	59	56	3	56	56	8	56				8	32	7	18	4	18	17	11	17	14	7	14	12	11	12
13	12	0	12	8	0	8							55	0	55	55	0	55	55	3	55	55	8	55				9	32	8	19	4	19	19	11	19	16	7	16	15	11	15
14	11	0	11	9	0	9							59	0	59	59	0	59	54	3	54	54	8	54				9	32	8	24	4	24	23	11	23	16	7	16	14	11	14
15	13	0	13	9	0	9							59	0	59	59	0	59	70	3	70	70	8	69				10	32	9	17	4	17	16	11	16	21	7	21	18	11	18
16	6	0	6	3	0	3							49	0	49	49	0	49	45	3	45	45	8	45				9	32	8	17	4	17	16	11	16	17	7	17	16	11	16
17	14	0	14	9	0	9							44	0	44	44	0	44	62	3	62	62	8	61				8	32	7	22	4	22	19	11	19	22	7	22	22	11	22
18	15	0	15	11	0	11							43	0	43	43	0	43	53	3	53	53	8	53				9	32	8	19	4	19	18	11	18	16	7	16	16	11	16
19	10	0	10	5	0	5							64	0	64	64	0	64	51	3	51	51	8	51				15	32	13	21	4	21	21	11	21	17	7	17	16	11	16
20	20	0	20	9	0	9							39	0	39	39	0	39	51	3	51	51	8	51				9	32	8	23	4	23	21	11	21	21	7	21	20	11	20
21	30	0	30	8	0	8							35	0	35	35	0	35	62	3	62	62	8	61				5	32	4	18	4	18	20	11	20	15	7	15	13	11	13
22	25	0	25	9	0	9							65	0	65	65	0	65	57	3	57	57	8	56				7	32	6	23	4	23	20	11	20	19	7	19	16	11	16
23	25	0	25	14	0	14							64	0	64	64	0	64	61	3	61	61	8	60				11	32	9	19	4	19	16	11	16	19	7	19	17	11	17
24	15	0	15	5	0	5							48	0	48	48	0	48	52	3	52	52	8	52				8	32	7	20	4	20	20	11	20	18	7	18	15	11	15
25	26	0	26	6	0	6							40	0	40	40	0	40	49	3	49	49	8	49				11	32	9	23	4	23	20	11	20	17	7	17	15	11	15
26	21	0	21	5	0	5							57	0	57	57	0	57	47	3	47	47	8	47				7	32	6	19	4	19	18	11	18	16	7	16	15	11	15
27	6	0	6	5	0	5							56	0	56	56	0	56	46	3	46	46	8	46				8	32	7	17	4	17	16	11	16	17	7	17	15	11	15
28	8	0	8	5	0	5							52	0	52	52	0	52	47	3	47	47	8	47				12	32	10	23	4	23	23	11	23	20	7	20	20	11	20
29	9	0	9	6	0	6							55	0	55	55	0	55	59	3	59	59	8	58				10	32	9	13	4	13	14	11	14	20	7	20	20	11	20
30	13	0	13	8	0	8							41	0	41	41	0	41	62	3	62	62	8	61				12	32	10	22	4	22	21	11	21	18	7	18	18	11	18
31	15	0	15	9	0	9							41	0	41	41	0	41	50	3	50	50	8	50				11	32	9	19	4	19	19	11	19	20	7	20	17	11	17
32	15	0	15	8	0	8							48	0	48	48	0	48	56	3	56	56	8	56				7	32	6	17	4	17	15	11	15	18	7	18	16	11	16
33	11	0	11	9	0	9							35	0	35	35	0	35	66	3	66	66	8	65				14	32	12	17	4	17	15	11	15	19	7	19	15	11	15
34	18	0	18	12	0	12							59	0	59	59	0	59	47	3	47	47	8	47				11	32	9	18	4	18	17	11	17	18	7	18	17	11	17
35	13	0	13	5	0	5							45	0	45	45	0	45	67	3	67	67	8	66				7	32	6	21	4	21	20	11	20	16	7	16	15	11	15
36	4	0	4	4	0	4							40	0	40	40	0	40	53	3	53	53	8	53				12	32	10	13	4	13	14	11	14	13	7	13	14	11	14
37	31	0	31	8	0	8							50	0	50	50	0	50	68	3	68	68	8	67				8	32	7	24	4	24	23	11	23	17	7	17	15	11	15
38	22	0	22	8	0	8							34	0	34	34	0	34	36	3	36	36	8	36				9	32	8	20	4	20	20	11	20	20	7	20	14	11	14
39	11	0	11	8	0	8							42	0	42	42	0	42	50	3	50	50	8	50				5	32	4	17	4	17	18	11	18	18	7	18	16	11	16
40	11	0	11	9	0	9							52	0	52	52	0	52	63	3	63	63	8	62				10	32	9	22	4	22	20	11	20	23	7	23	21	11	21
41	11	0	11	9	0	9							52	0	52	52	0	52	49	3	49	49	8	49				7	32	6	18	4	18	18	11	18	19	7	19	18	11	18
42	9	0	9	8	0	8							50	0	50	50	0	50	35	3	35	35	8	35				4	32	3	17	4	17	18	11	18	14	7	14	6	11	6
43	18	0	18	6	0	6							52	0	52	52	0	52	48	3	48	48	8	48				4	32	3	20	4	20	20	11	20	21	7	21	18	11	18
44	24	0	24	13	0	13							47	0	47	47	0	47	46	3	46	46	8	46				8	32	7	16	4	16	16	11	16	22	7	22	18	11	18
45	11	0	11	8	0	8							38	0	38	38	0	38	57	3	57	57	8	56				14	32	12	21	4	21	20	11	20	13	7	13	6	11	6
46	9	0	9	6	0	6							41	0	41	41	0	41	45	3	45	45	8	45				10	32	9	19	4	19	19	11	19	13	7	13	6	11	6
47	6	0	6	5	0	5							40	0	40	40	0	40	72	3	72	72	8	71				13	32	11	17	4	17	17	11	17	15	7	15	16	11	16
48	30	0	30	8	0	8							45	0	45	45	0	45	52	3	52	52	8	52				9	32	8	22	4	22	21	11	21	18	7	18	13	11	13
49	7	0	7	6	0	6							46	0	46	46	0	46	55	3	55	55	8	55				12	32	10	18	4	18	17	11	17	19	7	19	17	11	17
50	15	0	15	11	0	11							55	0	55	55	0	55	31	3	31	31	8	31				9	32	8	16	4	16	16	11	16	16	7	16	14	11	14
51													46	0	46	46	0	46	35	3	35	35	8	35				7	32	6	16	4	16	15	11	15	18	7	18	18	11	18
52													43	0	43	43	0	43	41	3	41	41	8	41							15	4	15	13	11	13	18	7	18	18	11	18
53													42	0	42	42	0	42	40	3	40	40	8	40							23	4	23	19	11	19	14	7	14	12	11	12
54													39	0	39	39	0	39	57	3	57	57	8	56							18	4	18	14	11	14	16	7	16	14	11	14
55													47	0	47	47	0	47	55	3	55	55	8	55							10	4	10	10	11	10	16	7	16	13	11	13
56													48	0	48	48	0	48	55	3	55	55	8	55							17	4	17	17	11	17	16	7	16	13	11	13
57													49	0	49	49	0	49	47	3	47	47	8	47							21	4	21	21	11	21	19	7	19	18	11	18
58													46	0	46	46	0	46	64	3	64	64	8	63													19	7	19	18	11	18
59													51	0	51	51	0	51	61	3	61	61	8	60													13	7	13	11	11	11
60													45	0	45	45	0	45	48	3	48	48	8	48													18	7	18	15	11	15
61													59	0	59	59	0	59	56	3	56	56	8	56													21	7	21	16	11	16
62													49	0	49	49	0	49	45	3	45	45	8	45													15	7	15	15	11	15
63													47	0	47	47	0	47	40	3	40	40	8	40													15	7	15	14	11	14
64													45	0	45	45	0	45	56	3	56	56	8	56													15	7	15	15	11	15
65													47	0	47	47	0	47	42	3	42	42	8	42													20	7	20	18	11	18
66													45	0	45	45	0	45	61	3	61	61	8	60													10	7	10	8	11	8
67													50	0	50	50	0	50	55	3	55	55	8	55													10	7	10	8	11	8
68													44	0	44	44	0	44	46	3	46	46	8	46													15	7	15	11	11	11
69													48	0	48	48	0	48	59	3	59	59	8	58													19	7	19	17	11	17

Observer: Könıg Date: 2005-10-16 (sunny, dry) 17:30 - 18:30
2005-10-17 (sunny, dry) 14:00 - 18:00
2005-10-18 (sunny, dry) 07:00 - 09:00

Town: Lund Place: Rudeboksvägen / Dösvägen

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:



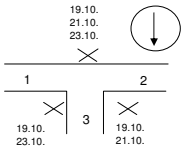
	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 2=>1						Bicycle 1=>2					
	Date	40m - 50m before hump			just before the hump			Date	40m - 50m before hump			just before the hump			Date	40m - 50m before junction			at the level of junction			Date	40m - 50m before junction			at the level of junction			Date	just before the hump			Date	just before the hump			Date	40-50m before the crossing			at kerbstone			Date	40-50m before the crossing			at kerbstone		
		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
70															16.10.	55	0	55	55	0	55	16.10.	59	3	59	59	8	58																	17.10.	15	7	15	12	11	12
71															16.10.	56	0	56	56	0	56	16.10.	42	3	42	42	8	42																						
72															16.10.	40	0	40	40	0	40	16.10.	57	3	57	57	8	56																						
73															16.10.	48	0	48	48	0	48	16.10.	57	3	57	57	8	56																						
74															16.10.	50	0	50	50	0	50	16.10.	44	3	44	44	8	44																						
75															16.10.	39	0	39	39	0	39	17.10.	51	3	51	51	8	51																						
76															16.10.	50	0	50	50	0	50	17.10.	35	3	35	35	8	35																						
77															16.10.	49	0	49	49	0	49	17.10.	59	3	59	59	8	58																						
78															16.10.	51	0	51	51	0	51	17.10.	66	3	66	66	8	65																						
79															16.10.	45	0	45	45	0	45	17.10.	42	3	42	42	8	42																						
80															16.10.	45	0	45	45	0	45	17.10.	42	3	42	42	8	42																						
81															16.10.	53	0	53	53	0	53	17.10.	50	3	50	50	8	50																						
82															16.10.	59	0	59	59	0	59	17.10.	66	3	66	66	8	65																						
83															16.10.	50	0	50	50	0	50	17.10.	48	3	48	48	8	48																						
84															16.10.	45	0	45	45	0	45	17.10.	56	3	56	56	8	56																						
85															16.10.	48	0	48	48	0	48	17.10.	44	3	44	44	8	44																						
86															16.10.	46	0	46	46	0	46	17.10.	65	3	65	65	8	64																						
87															16.10.	51	0	51	51	0	51	17.10.	56	3	56	56	8	56																						
88															16.10.	50	0	50	50	0	50	17.10.	45	3	45	45	8	45																						
89															16.10.	44	0	44	44	0	44	17.10.	34	3	34	34	8	34																						
90															16.10.	58	0	58	58	0	58	17.10.	50	3	50	50	8	50																						
91															16.10.	60	0	60	60	0	60	17.10.	42	3	42	42	8	42																						
92															16.10.	41	0	41	41	0	41	17.10.	51	3	51	51	8	51																						
93															16.10.	68	0	68	68	0	68	17.10.	47	3	47	47	8	47																						
94															16.10.	42	0	42	42	0	42	17.10.	45	3	45	45	8	45																						
95															16.10.	45	0	45	45	0	45	17.10.	47	3	47	47	8	47																						
96															16.10.	36	0	36	36	0	36	17.10.	41	3	41	41	8	41																						
97															16.10.	52	0	52	52	0	52	17.10.	46	3	46	46	8	46																						
98															16.10.	49	0	49	49	0	49	17.10.	57	3	57	57	8	56																						
99															16.10.	47	0	47	47	0	47	17.10.	49	3	49	49	8	49																						
100															16.10.	50	0	50	50	0	50	17.10.	53	3	53	53	8	53																						
101																						17.10.	57	3	57	57	8	56																						
102																						17.10.	45	3	45	45	8	45																						
103																						17.10.	51	3	51	51	8	51																						
104																						17.10.	47	3	47	47	8	47																						
105																						17.10.	54	3	54	54	8	54																						
106																						17.10.	57	3	57	57	8	56																						
107																						17.10.	46	3	46	46	8	46																						
108																						17.10.	51	3	51	51	8	51																						
109																						17.10.	48	3	48	48	8	48																						
110																						17.10.	50	3	50	50	8	50																						

Appendix S: Measured speeds at Baravägen / Margaretavägen

Observer: Könia Date: 2005-10-19 (sunny, dry) 15:00 - 18:30
2005-10-21 (sunny, dry) 07:00 - 13:00
2005-10-23 (sunny, dry) 15:30 - 18:00
2005-10-24 (sunny, dry) 08:40 - 09:00

Town: Lund Place: Baravägen / Margaretavägen

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:



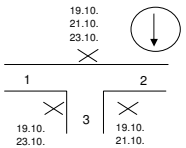
	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 1=>2					
	Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before junction			at the level of junction			Date	40m - 50m before junction			at the level of junction			Date	just before the crossing			Date	just before the crossing			Date	40-50m before the crossing			at kerbstone		
		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
1	19.10.	21	12	21	7	14	7	19.10.	14	12	14	5	14	5	19.10.	45	2	45	45	5	45	19.10.	49	0	49	49	11	48	19.10.	14	0	14	19.10.	9	22	8	19.10.	18	1	18	13	10	13
2	19.10.	18	12	18	9	14	9	19.10.	20	12	20	17	14	16	19.10.	46	2	46	46	5	46	19.10.	43	0	43	43	11	42	19.10.	14	0	14	19.10.	14	22	13	19.10.	25	1	25	22	10	22
3	19.10.	21	12	21	13	14	13	19.10.	18	12	18	11	14	11	19.10.	53	2	53	53	5	53	19.10.	43	0	43	43	11	42	19.10.	20	0	20	19.10.	4	22	4	19.10.	21	1	21	18	10	18
4	19.10.	24	12	23	17	14	16	19.10.	18	12	18	15	14	15	19.10.	54	2	54	54	5	54	19.10.	43	0	43	43	11	42	19.10.	19	0	19	19.10.	23	22	21	19.10.	22	1	22	14	10	14
5	19.10.	23	12	23	13	14	13	19.10.	17	12	17	13	14	13	19.10.	46	2	46	46	5	46	19.10.	69	0	69	69	11	68	19.10.	11	0	11	19.10.	23	22	21	19.10.	20	1	20	17	10	17
6	19.10.	44	12	43	12	14	12	19.10.	25	12	24	22	14	21	19.10.	50	2	50	50	5	50	19.10.	48	0	48	48	11	47	19.10.	9	0	9	19.10.	14	22	13	19.10.	20	1	20	18	10	18
7	19.10.	20	12	20	12	14	12	19.10.	37	12	36	16	14	16	19.10.	57	2	57	57	5	57	19.10.	63	0	63	63	11	62	19.10.	20	0	20	19.10.	15	22	14	19.10.	19	1	19	19	10	19
8	19.10.	23	12	23	19	14	18	19.10.	18	12	18	12	14	12	19.10.	44	2	44	44	5	44	19.10.	47	0	47	47	11	46	19.10.	18	0	18	19.10.	8	22	7	19.10.	20	1	20	19	10	19
9	19.10.	29	12	28	22	14	21	19.10.	13	12	13	9	14	9	19.10.	45	2	45	45	5	45	19.10.	43	0	43	43	11	42	19.10.	19	0	19	19.10.	8	22	7	19.10.	22	1	22	16	10	16
10	19.10.	25	12	24	13	14	13	19.10.	33	4	33	17	10	17	19.10.	47	2	47	47	5	47	19.10.	43	0	43	43	11	42	19.10.	14	0	14	19.10.	12	22	11	19.10.	24	1	24	25	10	25
11	19.10.	16	12	16	13	14	13	19.10.	21	4	21	14	10	14	19.10.	40	2	40	40	5	40	19.10.	42	0	42	42	11	41	19.10.	16	0	16	19.10.	11	22	10	19.10.	15	1	15	15	10	15
12	19.10.	33	12	32	16	14	16	19.10.	21	4	21	12	10	12	19.10.	43	2	43	43	5	43	19.10.	42	0	42	42	11	41	19.10.	12	0	12	19.10.	24	22	22	19.10.	21	1	21	17	10	17
13	19.10.	33	12	32	15	14	15	19.10.	14	4	14	14	10	14	19.10.	43	2	43	43	5	43	19.10.	58	0	58	58	11	57	19.10.	17	0	17	19.10.	10	22	9	19.10.	23	1	23	22	10	22
14	19.10.	18	12	18	13	14	13	19.10.	22	4	22	17	10	17	19.10.	48	2	48	48	5	48	19.10.	41	0	41	41	11	40	19.10.	13	0	13	19.10.	11	22	10	19.10.	27	1	27	24	10	24
15	19.10.	21	12	21	16	14	16	19.10.	39	4	39	10	10	10	19.10.	48	2	48	48	5	48	19.10.	48	0	48	48	11	47	19.10.	17	0	17	19.10.	13	22	12	19.10.	29	1	29	23	10	23
16	19.10.	34	12	33	19	14	18	19.10.	24	4	24	18	10	18	19.10.	47	2	47	47	5	47	19.10.	49	0	49	49	11	48	19.10.	16	0	16	19.10.	23	22	21	19.10.	19	1	19	19	10	19
17	19.10.	16	12	16	15	14	15	19.10.	24	4	24	15	10	15	19.10.	36	2	36	36	5	36	19.10.	53	0	53	53	11	52	19.10.	9	0	9	19.10.	11	22	10	19.10.	20	1	20	18	10	18
18	19.10.	20	12	20	15	14	15	19.10.	34	4	34	14	10	14	19.10.	56	2	56	56	5	56	19.10.	56	0	56	56	11	55	19.10.	17	0	17	19.10.	11	22	10	19.10.	19	1	19	17	10	17
19	19.10.	15	12	15	14	14	14	19.10.	29	4	29	12	10	12	19.10.	56	2	56	56	5	56	19.10.	50	0	50	50	11	49	19.10.	16	0	16	19.10.	10	22	9	19.10.	24	1	24	21	10	21
20	19.10.	21	4	21	13	10	13	19.10.	38	4	38	14	10	14	19.10.	55	2	55	55	5	55	19.10.	39	0	39	39	11	38	19.10.	15	0	15	19.10.	15	22	14	19.10.	20	1	20	19	10	19
21	19.10.	40	4	40	14	10	14	19.10.	35	4	35	14	10	14	19.10.	47	2	47	47	5	47	19.10.	45	0	45	45	11	44	19.10.	21	0	21	19.10.	14	22	13	19.10.	19	1	19	18	10	18
22	19.10.	28	4	28	12	10	12	19.10.	25	4	25	12	10	12	19.10.	49	2	49	49	5	49	19.10.	33	0	33	33	11	32	19.10.	19	0	19	19.10.	12	22	11	19.10.	19	1	19	18	10	18
23	19.10.	24	4	24	15	10	15	19.10.	21	4	21	11	10	11	19.10.	50	2	50	50	5	50	19.10.	39	0	39	39	11	38	19.10.	16	0	16	19.10.	15	22	14	19.10.	26	1	26	24	10	24
24	19.10.	18	4	18	15	10	15	19.10.	22	4	22	17	10	17	19.10.	51	2	51	51	5	51	19.10.	45	0	45	45	11	44	19.10.	16	0	16	19.10.	16	22	15	19.10.	23	1	23	23	10	23
25	19.10.	27	4	27	14	10	14	19.10.	38	4	38	10	10	10	19.10.	45	2	45	45	5	45	19.10.	44	0	44	44	11	43	23.10.	22	0	22	19.10.	10	22	9	19.10.	28	1	28	23	10	23
26	19.10.	44	4	44	15	10	15	19.10.	21	4	21	13	10	13	19.10.	47	2	47	47	5	47	21.10.	45	0	45	44	11	43	23.10.	16	0	16	19.10.	12	22	11	19.10.	26	1	26	26	10	26
27	19.10.	43	4	43	20	10	20	19.10.	29	4	29	12	10	12	19.10.	42	2	42	42	5	42	21.10.	45	0	45	44	11	43	23.10.	19	0	19	19.10.	10	22	9	19.10.	26	1	26	23	10	23
28	19.10.	27	4	27	16	10	16	19.10.	25	4	25	12	10	12	19.10.	42	2	42	42	5	42	21.10.	48	0	48	40	11	39	23.10.	17	0	17	19.10.	16	22	15	19.10.	19	1	19	11	10	11
29	19.10.	30	4	30	12	10	12	19.10.	24	4	24	13	10	13	19.10.	40	2	40	40	5	40	21.10.	47	0	47	42	11	41	23.10.	15	0	15	19.10.	12	22	11	19.10.	23	1	23	18	10	18
30	19.10.	20	4	20	12	10	12	19.10.	25	4	25	7	10	7	19.10.	49	2	49	49	5	49	21.10.	56	0	56	50	11	49	23.10.	19	0	19	19.10.	14	22	13	19.10.	25	1	25	23	10	23
31	19.10.	20	4	20	0	10	0	19.10.	28	4	28	11	10	11	19.10.	47	2	47	47	5	47	21.10.	53	0	53	43	11	42	23.10.	22	0	22	19.10.	23	22	21	19.10.	24	1	24	19	10	19
32	19.10.	27	4	27	15	10	15	19.10.	20	4	20	13	10	13	19.10.	45	2	45	45	5	45	21.10.	51	0	51	45	11	44	24.10.	17	0	17	19.10.	15	22	14	19.10.	18	1	18	19	10	19
33	19.10.	20	4	20	15	10	15	19.10.	15	4	15	16	10	16	19.10.	48	2	48	48	5	48	21.10.	51	0	51	47	11	46	24.10.	15	0	15	19.10.	24	22	22	19.10.	31	1	31	29	10	29
34	19.10.	28	4	28	20	10	20	19.10.	24	4	24	14	10	14	19.10.	50	2	50	50	5	50	21.10.	53	0	53	47	11	46	24.10.	10	0	10	19.10.	13	22	12	19.10.	28	1	28	27	10	27
35	19.10.	20	4	20	15	10	15	19.10.	39	4	39	18	10	18	19.10.	52	2	52	52	5	52	21.10.	48	0	48	46	11	45	24.10.	16	0	16	19.10.	13	22	12	19.10.	23	1	23	22	10	22
36	19.10.	26	4	26	12	10	12	19.10.	36	4	36	17	10	17	19.10.	42	2	42	42	5	42	21.10.	42	0	42	37	11	36	24.10.	12	0	12	19.10.	12	22	11	19.10.	28	1	28	27	10	27
37	19.10.	33	4	33	17	10	17	19.10.	22	4	22	14	10	14	19.10.	50	2	50	50	5	50	21.10.	51	0	51	45	11	44	24.10.	15	0	15	23.10.	14	4	14	19.10.	23	1	23	18	10	18
38	19.10.	22	4	22	17	10	17	19.10.	45	4	45	19	10	19	19.10.	42	2	42	42	5	42	21.10.	49	0	49	48	11	47	24.10.	23	0	23	23.10.	15	4	15	19.10.	25	1	25	22	10	22
39	19.10.	23	4	23	0	10	0	19.10.	28	4	28	14	10	14	19.10.	42	2	42	42	5	42	21.10.	58	0	58	42	11	41	24.10.	20	0	20	23.10.	14	4	14	19.10.	22	1	22	22	10	22
40	19.10.	23	4	23	13	10	13	21.10.	22	4	22	15	10	15	19.10.	46	2	46	46	5	46	21.10.	50	0	50	40	11	39	24.10.	22	0	22	23.10.	13	4	13	19.10.	23	1	23	17	10	17
41	19.10.	25	4	25	16	10	16	21.10.	31	4	31	13	10	13	19.10.	52	2	52	52	5	52	21.10.	44	0	44	44	11	43	24.10.	14	0	14	23.10.	13	4	13	19.10.	15	1	15	15	10	15
42	19.10.	38	4	38	16	10	16	21.10.	40	4	40	19	10	19	19.10.	50	2	50	50	5	50	21.10.	53	0	53	49	11	48	24.10.	20	0	20	23.10.	12	4	12	19.10.	15	1	15	15	10	15
43	19.10.	29	4	29	19	10	19	21.10.	21	4	21	21	10	21	19.10.	48	2	48	48	5	48	21.10.	48	0	48	42	11	41	24.10.	14	0	14	23.10.	19	4	19	19.10.	20	1	20	15	10	15
44	19.10.	38	4	38	21	10	21	21.10.	30	4	30	15	10	15	19.10.	53	2	53	53	5	53	21.10.	45	0	45	40	11	39	24.10.	18	0	18	23.10.	16	4	16	19.10.	20	1	20	16	10	16
45	19.10.	35	4	35	15	10	15	21.10.	18	4	18	9	10	9	19.10.	43	2	43	43	5	43	21.10.	48	0	48	40	11	39	24.10.	14	0	14	23.10.	16	4	16	19.10.	24	1	24	16	10	16
46	19.10.	38	4	38	14	10	14	21.10.	35	4	35	18	10	18	19.10.	44	2	44	44	5	44	21.10.	45	0	45	43	11	42	24.10.	24	0	24	23.10.	12	4	12	19.10.	23	1	23	23	10	23
47	19.10.	35	4	35	14	10	14	21.10.	34	4	34	18	10	18	19.10.	47	2	47	47	5	47	21.10.	44	0	44	37	11	36	24.10.	23	0	23	23.10.	12	4	12	19.10.	14	1	14	14	10	14
48	19.10.	34	4	34	21	10	21	21.10.	20	4	20	15	10	15	19.10.	41	2	41	41	5	41	21.10.	48	0	48	42	11	41	24.10.	14	0	14	24.10.	17	22	16	19.10.	19	1	19	18	10	18
49	21.10.	38	4	38	16	10	16	21.10.	30	4	30	18	10	18	19.10.	49	2	49	49	5	49	21.10.	46	0	46	39	11	38	24.10.	21	0	21	24.10.	10	22	9	19.10.	20	1	20	20	10	20
50	21.10.	21	4	21	10	10	10	21.10.	26	4	26	17	10	17	19.10.	59	2	59	59	5	59	21.10.	43	0	43	39	11	38	24.10.	20	0	20	24.10.	17	22	16	19.10.	17	1	17	15	10	15
51	21.10.	21	4	21	13	10	13	21.10.	34	4	34	19	10	19	19.10.	49	2	49	49	5	49	21.10.	41	0	41	40	11	39	21.10.	20	4	20	24.10.	11	22	10	19.10.	24	1	24	22	10	22
52	21.10.	37	4	37	16	10	16	21.10.	39	4	39	11	10	11	19.10.	51	2	51	51	5	51	21.10.	50	0	50	44	11	43	21.10.	21	4	21	21.10.	18	4	18	19.10.	17	1	17	17	10	17
53	21.10.	18	4	18	10	10	10	21.10.	38	4	38	17	10	17	19.10.	49	2	49	49	5	49	21.10.	58	0	58	45	11	44	21.10.	18	4	18	21.10.	23	4	23	19.10.	16	1	16	18	10	18
54	21.10.	31	4	31	13	10	13	21.10.	29	4	29	18	10	18	19.10.	40	2	40	40	5	40	21.10.	53	0	53	44	11	43	21.10.	24	4	24	21.10.	20	4	20	19.10.	25	1	25	25	10	25
55	21.10.	36	4	36	16	10	16	21.10.	28	4	28	20	10	20	19.10.	35	2	35	35	5	35	21.10.	51	0	51	45	11	44	21.10.	17	4	17	21.10.	17	4	17	19.10.	25	1	25	21	10	21
56	21.10.	26	4	26	17	10	17	21.10.	40	4	40	13	10	13	19.10.	50	2	50	50	5	50	21.10.	47	0	47	41	11	40	21.10.	17	4	17	21.10.	24	4	24	19.10.	22	1	22	21	10	21
57	21.10.	29	4	29	13	10	13	21.10.	25	4	25	18	10	18	19.10.	48	2	48	48	5	48	21.10.	53	0	53	49	11	48	21.10.	29	4	29	21.10.	24	4	24	19.10.	20	1	20	17	10	17
58	21.10.	21	4	21	18	10	18	21.10.	29	4	29	13	10	13	19.10.	50	2	50	50	5	50	21.10.	53	0	53	35	11	34	21.10.	17	4	17	21.10.	24	4	24	19.10.	22	1	22	17	10	17
59	21.10.	28	4	28	19	10	19	21.10.	22	4	22	16	10	16	19.10.	46	2	46	46	5	46	21.10.	51	0	51	40	11	39	21.10.	15	4	15	21.10.	24	4	24	19.10.	21	1	21	19	10	19
60	21.10.	25	4	25	13	10	13	21.10.	31	4	31	21	10	21	19.10.	53	2	53	53	5	53	21.10.	63	0	63	59	11	58	21.10.	20	4	20	21.10.	30	4	30	19.10.	23	1	23	21	10	21
61	21.10.	33	4	33	22	10	22	21.10.	32	4	32	13	10	13	19.10.	52	2	52	52	5	52	21.10.	60	0	60	54	11	53	21.10.	24	4	24	21.10.	24	4	24	19.10.	26	1	26	26	10	26
62	21.10.	41	4	41	20	10	20	21.10.	30	4	30	17	10	17	19.10.	45	2	45	45	5	45	21.10.	60	0	60	57	11	56	21.10.	15	4	15	21.10.	16	4	16	19.10.	20	1	20	19	10	19
63	21.10.	22	4	22	18	10	18	21.10.	28	4	28	16	10	16	19.10.	50	2	50	50	5	50	21.10.	49	0	49	44	11	43	21.10.	26	4	26	21.10.	21	4	21	19.10.	23	1	23	19	10	19
64	21.10.	29	4	29	14	10	14	21.10.	29	4	29	16	10	16	19.10.	50	2	50	50	5	50	21.10.	54	0	54	52	11	51	21.10.	22	4	22	21.10.	31	4	31	19.10.	20	1	20	12	10	12
65	21.10.	39	4	39	11	10	11	21.10.	22	4	22	16	10	16	19.10.	50	2	50	50	5	50	21.10.	55	0	55	53	11	52	21.10.	31	4	31	21.10.	32	4	32	19.10.	20	1	20	14	10	14
66	21.10.	26	4	26	16	10	16	21.10.	26	4	26	19	10	19	19.10.	46	2	46	46	5	46	21.10.	47	0	47	40	11	39	21.10.	17	4	17	21.10.	26	4	26	19.10.	18	1	18	17	10	17
67	21.10.	36	4	36	21	10	21	23.10.	18	4	18	15	10	15	19.10.	50	2	50	50	5	50	21.10.	56	0	56	53	11	52	21.10.	29	4	29	21.10.	17	4	17	19.10.	18	1	18	17	10	17
68	21.10.	32	4	32	15	10	15	23.10.	39	4	39	27	10	27	19.10.	46	2	46	46	5	46	21.10.	46	0	46	41	11	40	21.10.	22	4	22	21.10.	24	4	24	19.10.	22	1	22	18	10	18
69	21.10.	21	4	21	14	10	14	23.10.	17	4	17	11	10	11	19.10.	58	2	58	58	5	58	21.10.	59	0	59	54	11	53	21.10.	21	4	21	21.10.	25	4	25	19.10.	19	1	19	11	10	11

Observer: König

Date:			
	2005-10-19	(sunny, dry)	15:00 - 18:30
	2005-10-21	(sunny, dry)	07:00 - 13:00
	2005-10-23	(sunny, dry)	15:30 - 18:00
	2005-10-24	(sunny, dry)	08:40 - 09:00

Town: Lund Place: Baravägen / Margaretavägen

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:



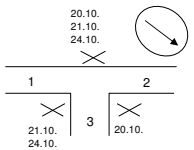
	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 1=>2					
	Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before crossing			just before the crossing			Date	40m - 50m before junction			at the level of junction			Date	40m - 50m before junction			at the level of junction			Date	just before the crossing			Date	just before the crossing			Date	40-50m before the crossing			at kerbstone		
		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
70	21.10.	35	4	35	17	10	17	23.10.	31	4	31	12	10	12	19.10.	39	2	39	39	5	39	21.10.	52	0	52	49	11	48	21.10.	27	4	27	21.10.	25	4	25	19.10.	26	1	26	26	10	26
71	21.10.	32	4	32	12	10	12	23.10.	44	4	44	23	10	23	19.10.	49	2	49	49	5	49	21.10.	57	0	57	50	11	49	21.10.	23	4	23	21.10.	17	4	17	19.10.	19	1	19	20	10	20
72	21.10.	22	4	22	14	10	14	23.10.	30	4	30	18	10	18	19.10.	54	2	54	54	5	54	21.10.	53	0	53	43	11	42	21.10.	22	4	22	21.10.	28	4	28	19.10.	22	1	22	22	10	22
73	21.10.	26	4	26	16	10	16	23.10.	41	4	41	18	10	18	19.10.	47	2	47	47	5	47	21.10.	54	0	54	52	11	51	21.10.	27	4	27	21.10.	28	4	28	19.10.	24	1	24	25	10	25
74	21.10.	30	4	30	18	10	18	23.10.	37	4	37	18	10	18	19.10.	48	2	48	48	5	48	21.10.	46	0	46	41	11	40	21.10.	22	4	22	21.10.	17	4	17	19.10.	24	1	24	24	10	24
75	21.10.	32	4	32	11	10	11	23.10.	32	4	32	20	10	20	19.10.	50	2	50	50	5	50	21.10.	55	0	55	50	11	49	21.10.	17	4	17	21.10.	18	4	18	19.10.	22	1	22	18	10	18
76	21.10.	27	4	27	14	10	14	23.10.	34	4	34	17	10	17	19.10.	50	2	50	50	5	50	21.10.	56	0	56	50	11	49	21.10.	20	4	20	21.10.	20	4	20	19.10.	22	1	22	23	10	23
77	21.10.	48	4	48	22	10	22	23.10.	37	4	37	19	10	19	19.10.	51	2	51	51	5	51	21.10.	60	0	60	40	11	39	23.10.	28	4	28	21.10.	18	4	18	19.10.	25	1	25	20	10	20
78	21.10.	41	4	41	15	10	15	23.10.	54	4	54	23	10	23	19.10.	47	2	47	47	5	47	21.10.	46	0	46	43	11	42	23.10.	24	4	24	21.10.	19	4	19	19.10.	20	1	20	20	10	20
79	21.10.	24	4	24	20	10	20	23.10.	28	4	28	10	10	10	19.10.	47	2	47	47	5	47	21.10.	55	0	55	53	11	52	23.10.	21	4	21	21.10.	22	4	22	19.10.	20	1	20	19	10	19
80	21.10.	23	4	23	14	10	14	23.10.	22	4	22	17	10	17	19.10.	55	2	55	55	5	55	21.10.	62	0	62	55	11	54	23.10.	16	4	16	23.10.	28	4	28	19.10.	22	1	22	21	10	21
81	21.10.	37	4	37	17	10	17	23.10.	35	4	35	13	10	13	19.10.	49	2	49	49	5	49	21.10.	47	0	47	40	11	39	23.10.	27	4	27	23.10.	23	4	23	19.10.	20	1	20	15	10	15
82	21.10.	30	4	30	16	10	16	23.10.	33	4	33	16	10	16	19.10.	41	2	41	41	5	41	21.10.	56	0	56	46	11	45	23.10.	24	4	24	23.10.	17	4	17	19.10.	24	1	24	23	10	23
83	21.10.	27	4	27	14	10	14	23.10.	43	4	43	16	10	16	19.10.	53	2	53	53	5	53	21.10.	60	0	60	50	11	49	23.10.	23	4	23	23.10.	24	4	24	19.10.	23	1	23	24	10	24
84	21.10.	44	4	44	17	10	17	23.10.	25	4	25	12	10	12	19.10.	51	2	51	51	5	51	21.10.	59	0	59	49	11	48	23.10.	24	4	24	23.10.	20	4	20	19.10.	26	1	26	26	10	26
85	21.10.	26	4	26	17	10	17	23.10.	18	4	18	12	10	12	19.10.	48	2	48	48	5	48	21.10.	54	0	54	56	11	55	23.10.	20	4	20	23.10.	25	4	25	19.10.	20	1	20	19	10	19
86	21.10.	27	4	27	16	10	16	23.10.	31	4	31	15	10	15	19.10.	41	2	41	41	5	41	21.10.	56	0	56	46	11	45	23.10.	18	4	18	23.10.	29	4	29	19.10.	19	1	19	20	10	20
87	21.10.	15	4	15	11	10	11	23.10.	33	4	33	15	10	15	19.10.	33	2	33	33	5	33	21.10.	35	0	35	30	11	29	23.10.	28	4	28	23.10.	19	4	19	19.10.	24	1	24	20	10	20
88	23.10.	17	4	17	12	10	12	23.10.	31	4	31	15	10	15	19.10.	63	2	63	63	5	63	21.10.	43	0	43	37	11	36	23.10.	21	4	21	23.10.	26	4	26	19.10.	26	1	26	24	10	24
89	23.10.	29	4	29	20	10	20	23.10.	23	4	23	23	10	23	19.10.	57	2	57	57	5	57	21.10.	53	0	53	48	11	47	23.10.	23	4	23	23.10.	23	4	23	19.10.	23	8	23	18	21	17
90	23.10.	38	4	38	15	10	15	23.10.	27	4	27	18	10	18	19.10.	55	2	55	55	5	55	21.10.	44	0	44	44	11	43	23.10.	30	4	30	23.10.	25	4	25	19.10.	22	8	22	20	21	19
91	23.10.	36	4	36	17	10	17	23.10.	32	4	32	14	10	14	19.10.	47	2	47	47	5	47	21.10.	44	0	44	41	11	40	23.10.	23	4	23	23.10.	23	4	23	19.10.	21	8	21	20	21	19
92	23.10.	45	4	45	21	10	21	23.10.	32	4	32	15	10	15	19.10.	54	2	54	54	5	54	21.10.	57	0	57	50	11	49	23.10.	25	4	25	23.10.	27	4	27	19.10.	21	8	21	19	21	18
93	23.10.	32	4	32	20	10	20	23.10.	35	4	35	19	10	19	19.10.	48	2	48	48	5	48	21.10.	55	0	55	52	11	51	23.10.	17	4	17	23.10.	28	4	28	19.10.	22	8	22	19	21	18
94	23.10.	34	4	34	16	10	16	23.10.	34	4	34	19	10	19	19.10.	45	2	45	45	5	45	21.10.	49	0	49	41	11	40	23.10.	20	4	20	23.10.	23	4	23	19.10.	15	8	15	15	21	14
95	23.10.	35	4	35	17	10	17	23.10.	40	4	40	18	10	18	19.10.	50	2	50	50	5	50	21.10.	40	0	40	35	11	34	23.10.	23	4	23	23.10.	19	4	19	19.10.	17	8	17	15	21	14
96	23.10.	36	4	36	16	10	16	23.10.	46	4	46	20	10	20	19.10.	56	2	56	56	5	56	21.10.	42	0	42	39	11	38	23.10.	27	4	27	23.10.	27	4	27	19.10.	17	8	17	15	21	14
97	23.10.	39	4	39	14	10	14	23.10.	35	4	35	22	10	22	19.10.	50	2	50	50	5	50	21.10.	57	0	57	46	11	45	23.10.	19	4	19	23.10.	27	4	27	19.10.	19	8	19	17	21	16
98	23.10.	45	4	45	23	10	23	23.10.	27	4	27	19	10	19	19.10.	49	2	49	49	5	49	21.10.	56	0	56	46	11	45	23.10.	15	4	15	23.10.	22	4	22	19.10.	23	8	23	21	21	20
99	23.10.	31	4	31	10	10	10	23.10.	25	4	25	15	10	15	19.10.	61	2	61	61	5	61	21.10.	62	0	62	57	11	56	23.10.	21	4	21	23.10.	32	4	32	19.10.	29	8	29	29	21	27
100	23.10.	36	4	36	15	10	15	23.10.	37	4	37	15	10	15	19.10.	54	2	54	54	5	54	21.10.	46	0	46	45	11	44	23.10.	27	4	27	23.10.	15	4	15	19.10.	22	8	22	21	21	20
101	23.10.	44	4	44	12	10	12	23.10.	37	4	37	16	10	16	21.10.	47	1	47	49	2	49	21.10.	50	0	50	47	11	46					23.10	23	4	23								
102	23.10.	24	4	24	16	10	16	23.10.	27	4	27	17	10	17	21.10.	46	1	46	45	2	45	21.10.	51	0	51	47	11	46					23.10	25	4	25								
103	23.10.	28	4	28	13	10	13								21.10.	56	1	56	54	2	54	21.10.	54	0	54	51	11	50																
104	23.10.	31	4	31	12	10	12								21.10.	43	1	43	43	2	43	21.10.	46	0	46	43	11	42																
105	23.10.	38	4	38	9	10	9								21.10.	47	1	47	46	2	46	21.10.	47	0	47	42	11	41																
106	23.10.	44	4	44	12	10	12								21.10.	55	1	55	55	2	55	21.10.	49	0	49	44	11	43																
107	23.10.	36	4	36	12	10	12								21.10.	56	1	56	55	2	55	21.10.	52	0	52	43	11	42																
108	23.10.	33	4	33	21	10	21								21.10.	51	1	51	51	2	51	21.10.	57	0	57	49	11	48																
109	23.10.	40	4	40	17	10	17								21.10.	61	1	61	60	2	60	21.10.	56	0	56	48	11	47																
110	23.10.	37	4	37	12	10	12								21.10.	49	1	49	48	2	48	21.10.	50	0	50	46	11	45																
111	23.10.	35	4	35	15	10	15								21.10.	42	1	42	42	2	42	21.10.	49	0	49	45	11	44																
112	23.10.	35	4	35	16	10	16								21.10.	53	1	53	54	2	54	21.10.	50	0	50	45	11	44																
113	23.10.	40	4	40	16	10	16								21.10.	57	1	57	58	2	58	21.10.	49	0	49	49	11	48																
114	23.10.	37	4	37	12	10	12								21.10.	51	1	51	51	2	51	21.10.	46	0	46	43	11	42																
115	23.10.	33	4	33	7	10	7								21.10.	43	1	43	39	2	39	21.10.	41	0	41	39	11	38																
116	23.10.	24	4	24	16	10	16								21.10.	49	1	49	49	2	49	21.10.	51	0	51	44	11	43																
117	23.10.	37	4	37	21	10	21								21.10.	45	1	45	43	2	43	21.10.	53	0	53	45	11	44																
118	23.10.	32	4	32	18	10	18								21.10.	57	1	57	56	2	56	21.10.	61	0	61	56	11	55																
119															21.10.	46	1	46	47	2	47	21.10.	66	0	66	53	11	52																
120															21.10.	59	1	59	60	2	60	21.10.	56	0	56	52	11	51																
121															21.10.	42	1	42	43	2	43	21.10.	50	0	50	47	11	46																
122															21.10.	50	1	50	50	2	50	21.10.	44	0	44	42	11	41																
123															21.10.	49	1	49	50	2	50	21.10.	50	0	50	46	11	45																
124															21.10.	46	1	46	45	2	45	21.10.	54	0	54	50	11	49																
125															21.10.	56	1	56	57	2	57	21.10.	48	0	48	46	11	45																
126															21.10.	42	1	42	42	2	42																						
127															21.10.	51	1	51	51	2	51																						
128															21.10.	56	1	56	57	2	57																						
129															21.10.	44	1	44	47	2	47																						
130															21.10.	51	1	51	50	2	50																						

Appendix T: Measured speeds at Fjelievägen / Bokbindaregatan

Observer: Kőnig Date: 2005-10-20 (sunny, dry) 07:00 - 13:00
2005-10-20 (sunny, dry) 14:00 - 18:00
2005-10-21 (sunny, dry) 15:00 - 18:00
2005-10-24 (sunny, dry) 07:00 - 08:30

Town: Lund Place: Fjelivägen / Bokbindaregatan

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:

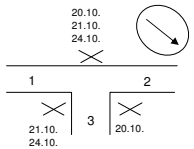


	car 3=>1						car 3=>2						car 1=>2						car 2=>1						car 2=>3			car 1=>3			Bicycle 1=>2					
	Date	40m - 50m before hump			just before the hump			Date	40m - 50m before hump			just before the hump			Date	40m - 50m before junction			at the level of junction			Date	40m - 50m before junction			at the level of junction			Date	just before the hump			Date	just before the hump			Date	40-50m before the crossing			at kerbstone		
		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
1	20.10.	18	0	18	5	17	5	20.10.	37	0	37	6	17	6	20.10.	41	3	41	40	7	40	20.10.	65	3	65	65	7	65	21.10.	11	0	11	21.10.	3	33	3	20.10.	19	0	19	18	0	18
2	20.10.	18	0	18	11	17	11	20.10.	26	0	26	8	17	8	20.10.	56	3	56	59	7	59	20.10.	43	3	43	43	7	43	21.10.	9	0	9	21.10.	7	33	6	20.10.	19	0	19	18	0	18
3	20.10.	37	0	37	14	17	13	20.10.	33	0	33	8	17	8	20.10.	54	3	54	55	7	55	20.10.	44	3	44	44	7	44	21.10.	11	0	11	21.10.	7	33	6	20.10.	16	0	16	16	0	16
4	20.10.	30	0	30	17	17	16	20.10.	32	0	32	16	17	15	20.10.	49	3	49	53	7	53	20.10.	41	3	41	43	7	43	21.10.	14	0	14	24.10.	3	33	3	20.10.	15	0	15	15	0	15
5	20.10.	40	0	40	14	17	13	20.10.	26	0	26	7	17	7	20.10.	56	3	56	56	7	56	20.10.	36	3	36	37	7	37	21.10.	14	0	14					20.10.	17	0	17	16	0	16
6	20.10.	20	0	20	11	17	11	20.10.	31	0	31	3	17	3	20.10.	41	3	41	44	7	44	20.10.	50	3	50	50	7	50	21.10.	10	0	10					20.10.	21	0	21	21	0	21
7	20.10.	20	0	20	6	17	6	20.10.	25	0	25	8	17	8	20.10.	50	3	50	52	7	52	20.10.	37	3	37	37	7	37	21.10.	16	0	16					20.10.	22	0	22	22	0	22
8	20.10.	20	0	20	6	17	6	20.10.	20	0	20	0	17	0	20.10.	40	3	40	40	7	40	20.10.	43	3	43	41	7	41	21.10.	15	0	15					20.10.	18	0	18	18	0	18
9	20.10.	26	0	26	9	17	9	20.10.	26	0	26	8	17	8	20.10.	49	3	49	50	7	50	20.10.	51	3	51	52	7	52	21.10.	14	0	14					20.10.	18	0	18	18	0	18
10	20.10.	22	0	22	8	17	8	20.10.	15	0	15	6	17	6	20.10.	53	3	53	55	7	55	20.10.	36	3	36	36	7	36	21.10.	14	0	14					20.10.	20	0	20	19	0	19
11	20.10.	19	0	19	8	17	8	20.10.	13	0	13	4	17	4	20.10.	45	3	45	45	7	45	20.10.	48	3	48	48	7	48	21.10.	12	0	12					20.10.	14	0	14	15	0	15
12	20.10.	17	0	17	4	17	4	20.10.	28	0	28	8	17	8	20.10.	42	3	42	46	7	46	20.10.	53	3	53	51	7	51	21.10.	11	0	11					20.10.	16	0	16	16	0	16
13	20.10.	28	0	28	5	17	5	20.10.	32	0	32	8	17	8	20.10.	48	3	48	47	7	47	20.10.	50	3	50	49	7	49	21.10.	10	0	10					20.10.	18	0	18	20	0	20
14	20.10.	21	0	21	8	17	8	20.10.	32	0	32	6	17	6	20.10.	36	3	36	39	7	39	20.10.	46	3	46	45	7	45	21.10.	11	0	11					20.10.	20	0	20	21	0	21
15	20.10.	23	0	23	9	17	9	20.10.	28	0	28	7	17	7	20.10.	51	3	51	50	7	50	20.10.	41	3	41	40	7	40	21.10.	15	0	15					20.10.	18	0	18	17	0	17
16	20.10.	16	0	16	4	17	4	20.10.	28	0	28	9	17	9	20.10.	46	3	46	49	7	49	20.10.	44	3	44	43	7	43	21.10.	11	0	11					20.10.	16	0	16	15	0	15
17	20.10.	29	0	29	5	17	5	20.10.	20	0	20	3	17	3	20.10.	43	3	43	46	7	46	20.10.	51	3	51	50	7	50	21.10.	13	0	13					20.10.	24	0	24	24	0	24
18	20.10.	21	0	21	6	17	6	20.10.	23	0	23	10	17	10	20.10.	41	3	41	42	7	42	20.10.	47	3	47	48	7	48	21.10.	18	0	18					20.10.	19	0	19	18	0	18
19	21.10.	23	4	23	6	3	6	20.10.	20	0	20	4	17	4	20.10.	43	3	43	46	7	46	20.10.	47	3	47	45	7	45	21.10.	9	0	9					20.10.	19	0	19	19	0	19
20	21.10.	16	4	16	5	3	5	20.10.	29	0	29	10	17	10	20.10.	51	3	51	53	7	53	20.10.	51	3	51	51	7	51	21.10.	14	0	14					20.10.	18	0	18	18	0	18
21	21.10.	23	4	23	9	3	9	20.10.	20	0	20	3	17	3	20.10.	38	3	38	42	7	42	20.10.	52	3	52	50	7	50	21.10.	13	0	13					20.10.	19	0	19	20	0	20
22	21.10.	25	4	25	7	3	7	20.10.	30	0	30	7	17	7	20.10.	50	3	50	50	7	50	20.10.	44	3	44	44	7	44	21.10.	10	0	10					20.10.	14	0	14	16	0	16
23	21.10.	25	4	25	8	3	8	20.10.	25	0	25	9	17	9	20.10.	47	3	47	49	7	49	20.10.	54	3	54	54	7	54	24.10.	13	0	13					20.10.	19	0	19	21	0	21
24	21.10.	27	4	27	6	3	6	20.10.	34	0	34	9	17	9	20.10.	53	3	53	55	7	55	20.10.	52	3	52	50	7	50	24.10.	15	0	15					20.10.	19	0	19	20	0	20
25	21.10.	21	4	21	8	3	8	20.10.	21	0	21	3	17	3	20.10.	57	3	57	55	7	55	20.10.	56	3	56	55	7	55	24.10.	9	0	9					20.10.	18	0	18	19	0	19
26	21.10.	36	4	36	7	3	7	20.10.	33	0	33	7	17	7	20.10.	49	3	49	50	7	50	20.10.	53	3	53	53	7	53	24.10.	10	0	10					20.10.	21	0	21	22	0	22
27	21.10.	21	4	21	4	3	4	20.10.	20	0	20	8	17	8	20.10.	40	3	40	44	7	44	20.10.	42	3	42	40	7	40	24.10.	12	0	12					20.10.	9	0	9	9	0	9
28	24.10.	19	4	19	9	3	9	20.10.	27	0	27	9	17	9	20.10.	42	3	42	49	7	49	20.10.	40	3	40	40	7	40	24.10.	9	0	9					20.10.	13	0	13	13	0	13
29	24.10.	23	4	23	5	3	5	20.10.	31	0	31	10	17	10	20.10.	54	3	54	54	7	54	20.10.	48	3	48	48	7	48	24.10.	15	0	15					20.10.	14	0	14	14	0	14
30	24.10.	28	4	28	9	3	9	20.10.	27	0	27	10	17	10	20.10.	45	3	45	47	7	47	20.10.	57	3	57	56	7	56	24.10.	10	0	10					20.10.	22	0	22	21	0	21
31	24.10.	24	4	24	3	3	3	20.10.	23	0	23	8	17	8	20.10.	50	3	50	49	7	49	20.10.	42	3	42	43	7	43									20.10.	17	0	17	17	0	17
32	24.10.	27	4	27	5	3	5	20.10.	26	0	26	7	17	7	20.10.	52	3	52	52	7	52	20.10.	49	3	49	49	7	49									20.10.	12	0	12	13	0	13
33								20.10.	32	0	32	8	17	8	20.10.	46	3	46	46	7	46	20.10.	43	3	43	43	7	43									20.10.	19	0	19	19	0	19
34								20.10.	16	0	16	7	17	7	20.10.	50	3	50	58	7	58	20.10.	47	3	47	46	7	46									20.10.	19	0	19	20	0	20
35								20.10.	32	0	32	10	17	10	20.10.	50	3	50	58	7	58	20.10.	52	3	52	52	7	52									20.10.	21	0	21	20	0	20
36								20.10.	25	0	25	7	17	7	20.10.	49	3	49	49	7	49	20.10.	51	3	51	51	7	51									20.10.	19	0	19	19	0	19
37								20.10.	26	0	26	7	17	7	20.10.	48	3	48	50	7	50	20.10.	45	3	45	44	7	44									20.10.	19	0	19	19	0	19
38								20.10.	23	0	23	4	17	4	20.10.	48	3	48	50	7	50	20.10.	52	3	52	51	7	51									20.10.	21	0	21	21	0	21
39								20.10.	33	0	33	6	17	6	20.10.	50	3	50	55	7	55	20.10.	41	3	41	41	7	41									20.10.	19	0	19	19	0	19
40								20.10.	24	0	24	10	17	10	20.10.	43	3	43	43	7	43	20.10.	47	3	47	45	7	45									20.10.	20	0	20	19	0	19
41								20.10.	27	0	27	3	17	3	20.10.	46	3	46	46	7	46	20.10.	61	3	61	60	7	60									20.10.	15	0	15	18	0	18
42								20.10.	20	0	20	9	17	9	20.10.	48	3	48	54	7	54	20.10.	45	3	45	45	7	45									20.10.	17	0	17	17	0	17
43								20.10.	24	0	24	8	17	8	20.10.	52	3	52	54	7	54	20.10.	46	3	46	46	7	46									20.10.	20	0	20	19	0	19
44								20.10.	27	0	27	9	17	9	20.10.	46	3	46	49	7	49	20.10.	53	3	53	52	7	52									20.10.	19	0	19	19	0	19
45								20.10.	29	0	29	10	17	10	20.10.	43	3	43	49	7	49	20.10.	57	3	57	55	7	55									20.10.	19	0	19	19	0	19
46								20.10.	32	0	32	3	17	3	20.10.	53	3	53	54	7	54	20.10.	53	3	53	53	7	53									20.10.	17	0	17	17	0	17
47								20.10.	27	0	27	4	17	4	20.10.	44	3	44	46	7	46	20.10.	50	3	50	49	7	49									20.10.	14	0	14	14	0	14
48								20.10.	33	0	33	6	17	6	20.10.	50	3	50	54	7	54	20.10.	47	3	47	47	7	47									20.10.	16	0	16	17	0	17
49								20.10.	26	0	26	9	17	9	20.10.	46	3	46	46	7	46	20.10.	47	3	47	47	7	47									20.10.	17	0	17	17	0	17
50								21.10.	24	4	24	7	3	7	20.10.	43	3	43	45	7	45	20.10.	47	3	47	46	7	46									20.10.	20	0	20	20	0	20
51								21.10.	34	4	34	12	3	12	20.10.	50	3	50	57	7	57	20.10.	49	3	49	49	7	49									20.10.	18	10	18	18	27	16
52								21.10.	27	4	27	8	3	8	20.10.	48	3	48	48	7	48	20.10.	49	3	49	48	7	48									20.10.	17	10	17	14	27	13
53								21.10.	27	4	27	5	3	5	20.10.	38	3	38	40	7	40	20.10.	51	3	51	51	7	51									20.10.	17	10	17	17	27	15
54								21.10.	26	4	26	10	3	10	20.10.	52	3	52	50	7	50	20.10.	53	3	53	52	7	52									20.10.	12	10	12	12	27	11
55								21.10.	29	4	29	16	3	16	20.10.	47	3	47	53	7	53	20.10.	46	3	46	45	7	45									20.10.	14	10	14	13	27	12
56								21.10.	17	4	17	7	3	7	20.10.	48	3	48	54	7	54	20.10.	51	3	51	49	7	49									20.10.	16	10	16	16	27	14
57								21.10.	28	4	28	9	3	9	20.10.	44	3	44	45	7	45	20.10.	48	3	48	47	7	47									20.10.	13	10	13	13	27	12
58								21.10.	30	4	30	8	3	8	20.10.	48	3	48	49	7	49	20.10.	45	3	45	44	7	44									20.10.	26	10	26	26	27	23
59								21.10.	25	4	25	6	3	6	20.10.	42	3	42	44	7	44	20.10.	42	3	42	41	7	41									20.10.	19	10	19	19	27	17
60								21.10.	31	4	31	4	3	4	20.10.	45	3	45	46	7	46	20.10.	52	3	52	55	7	55									20.10.	18	10	18	16	27	14
61								21.10.	30	4	30	7	3	7	20.10.	37	3	37	38	7	38	20.10.	47	3	47	46	7	46									20.10.	21	10	21	21	27	19
62								21.10.	29	4	29	11	3	11	20.10.	50	3	50	57	7	57	20.10.	46	3	46	46	7	46									20.10.	15	10	15	15	27	13
63								21.10.	18	4	18	5	3	5	20.10.	58	3	58	60	7	60	20.10.	50	3	50	48	7	48									20.10.	18	10	18	18	27	16
64								21.10.	26	4	26	6	3	6	20.10.	55	3	55	55	7	55	20.10.	50	3	50	49	7	49									20.10.	17	10	17	16	27	14
65								21.10.	28	4	28	10	3	10	20.10.	40	3	40	45	7	45	20.10.	55	3	55	54	7	54									20.10.	12	10	12	13	27	12
66								21.10.	20	4	20	9	3	9	20.10.	53	3	53	53	7	53	20.10.	46	3	46	46	7	46									20.10.	14	10	14	14	27	13
67								21.10.	23	4	23	9	3	9	20.10.	47	3	47	47	7	47	20.10.	45	3	45	45	7	45									20.10.	16	10	16	14	27	13

Observer: König Date: 2005-10-20 (sunny, dry) 07:00 - 13:00
2005-10-20 (sunny, dry) 14:00 - 18:00
2005-10-21 (sunny, dry) 15:00 - 18:00
2005-10-24 (sunny, dry) 07:00 - 08:30

Town: Lund Place: Fjelivågen / Bokbindaregatan

weather: sunny: X cloudy: rainy:
roadway: dry: X wet:



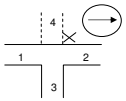
	car 3=>1						Date	car 3=>2						Date	car 1=>2						Date	car 2=>1						Date	car 2=>3			Date	car 1=>3			Date	Bicycle 1=>2					
	40m - 50m before hump			just before the hump				40m - 50m before hump			just before the hump				40m - 50m before junction			at the level of junction				40m - 50m before junction			at the level of junction				just before the hump				just before the hump				40-50m before the crossing			at kerbstone		
	measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value		measured	angle	corrected value	measured	angle	corrected value
68							21.10.	34	4	34	13	3	13	20.10.	38	3	38	38	7	38	20.10.	42	3	42	42	7	42									20.10.	13	10	13	12	27	11
69							21.10.	20	4	20	8	3	8	20.10.	57	3	57	61	7	60	20.10.	53	3	53	53	7	53									20.10.	19	10	19	19	27	17
70							21.10.	28	4	28	7	3	7	20.10.	46	3	46	46	7	46	20.10.	50	3	50	50	7	50									20.10.	21	10	21	21	27	19
71							21.10.	23	4	23	5	3	5	20.10.	54	3	54	58	7	58	20.10.	37	3	37	37	7	37									20.10.	19	10	19	19	27	17
72							21.10.	24	4	24	7	3	7	20.10.	42	3	42	46	7	46	20.10.	56	3	56	52	7	52									20.10.	14	10	14	14	27	13
73							24.10.	20	4	20	7	3	7	20.10.	40	3	40	40	7	40	20.10.	49	3	49	48	7	48									20.10.	16	10	16	16	27	14
74							24.10.	23	4	23	9	3	9	20.10.	54	3	54	55	7	55	20.10.	51	3	51	51	7	51									20.10.	26	10	26	26	27	23
75							24.10.	27	4	27	5	3	5	20.10.	45	3	45	49	7	49	20.10.	50	3	50	50	7	50									20.10.	17	10	17	17	27	15
76							24.10.	20	4	20	10	3	10	20.10.	56	3	56	58	7	58	20.10.	45	3	45	45	7	45									20.10.	21	10	21	21	27	19
77							24.10.	26	4	26	6	3	6	20.10.	40	3	40	45	7	45	20.10.	49	3	49	51	7	51									20.10.	16	10	16	15	27	13
78							24.10.	25	4	25	5	3	5	20.10.	48	3	48	54	7	54	20.10.	48	3	48	48	7	48									20.10.	15	10	15	15	27	13
79							24.10.	33	4	33	5	3	5	20.10.	47	3	47	49	7	49	20.10.	52	3	52	52	7	52									20.10.	15	10	15	15	27	13
80							24.10.	28	4	28	5	3	5	20.10.	46	3	46	48	7	48	20.10.	52	3	52	51	7	51									20.10.	17	10	17	17	27	15
81							24.10.	30	4	30	9	3	9	20.10.	45	3	45	45	7	45	20.10.	51	3	51	50	7	50									20.10.	20	10	20	21	27	19
82							24.10.	33	4	33	8	3	8	20.10.	39	3	39	41	7	41	20.10.	53	3	53	55	7	55									20.10.	19	10	19	19	27	17
83							24.10.	28	4	28	9	3	9	20.10.	39	3	39	41	7	41	20.10.	51	3	51	50	7	50									20.10.	17	10	17	16	27	14
84							24.10.	33	4	33	8	3	8	20.10.	52	3	52	53	7	53	20.10.	44	3	44	43	7	43									20.10.	16	10	16	17	27	15
85							24.10.	24	4	24	10	3	10	20.10.	47	3	47	54	7	54	20.10.	54	3	54	54	7	54									20.10.	16	10	16	15	27	13
86							24.10.	32	4	32	6	3	6	20.10.	48	3	48	49	7	49	20.10.	46	3	46	46	7	46									20.10.	25	10	25	26	27	23
87							24.10.	28	4	28	5	3	5	20.10.	46	3	46	46	7	46	20.10.	53	3	53	51	7	51									20.10.	26	10	26	26	27	23
88							24.10.	17	4	17	5	3	5	20.10.	40	3	40	46	7	46	20.10.	49	3	49	49	7	49									20.10.	20	10	20	19	27	17
89							24.10.	23	4	23	6	3	6	20.10.	40	3	40	42	7	42	20.10.	37	3	37	37	7	37									20.10.	21	10	21	21	27	19
90							24.10.	20	4	20	5	3	5	20.10.	54	3	54	53	7	53	20.10.	65	3	65	66	7	66									20.10.	17	10	17	17	27	15
91														20.10.	47	3	47	49	7	49	20.10.	47	3	47	47	7	47									20.10.	14	10	14	14	27	13
92														20.10.	58	3	58	61	7	60	20.10.	53	3	53	54	7	54									20.10.	15	10	15	15	27	13
93														20.10.	42	3	42	49	7	49	20.10.	49	3	49	49	7	49									20.10.	22	10	22	23	27	21
94														20.10.	48	3	48	53	7	53	20.10.	52	3	52	51	7	51									20.10.	20	10	20	20	27	18
95														20.10.	32	3	32	36	7	36	20.10.	45	3	45	47	7	47									20.10.	21	10	21	21	27	19
96														20.10.	44	3	44	44	7	44	20.10.	33	3	33	33	7	33									20.10.	18	10	18	16	27	14
97														20.10.	42	3	42	45	7	45	20.10.	50	3	50	50	7	50									20.10.	20	10	20	19	27	17
98														20.10.	49	3	49	54	7	54	20.10.	46	3	46	46	7	46									20.10.	20	10	20	20	27	18
99														20.10.	50	3	50	56	7	56	20.10.	49	3	49	48	7	48									20.10.	17	10	17	17	27	15
100														20.10.	40	3	40	46	7	46	20.10.	74	3	74	74	7	73									20.10.	19	10	19	18	27	16

Appendix U: Counted vehicles at Rudeboksvägen / Gunnesbovägen

Observer: König Date: 12th October 2005 Time: 07:15 - 09:30

Town: Lund Place: Rudeboksvägen / Gunnesbovägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:



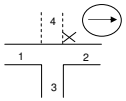
Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:15 - 07:30	37	0	0	3	6	14	1	0	2	0	11	2	0	2	0	1	0	0	0	0	10	0	0	0	0	1	0	0	0	0
07:31 - 07:45	45	0	0	5	0	18	3	0	2	0	15	2	0	0	0	1	0	0	0	0	7	0	0	0	0	3	0	0	0	0
07:46 - 08:00	51	0	1	11	0	29	2	0	3	0	12	2	0	0	0	1	0	0	0	0	9	0	0	0	0	0	0	0	0	0
08:01 - 08:15	45	1	2	4	0	20	3	2	0	0	8	1	0	0	1	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0
08:16 - 08:30	24	0	0	1	1	30	2	0	0	1	6	3	0	0	0	4	0	0	0	0	4	1	0	0	0	3	0	0	0	0
08:31 - 08:45	25	0	0	2	1	28	1	0	1	0	9	3	0	2	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0
08:46 - 09:00	25	0	0	0	1	20	2	0	0	0	14	2	0	0	0	0	0	0	0	0	9	0	0	0	0	1	0	0	0	0
09:01 - 09:15	14	0	0	3	0	6	1	0	2	2	10	2	0	0	0	2	0	0	0	0	4	0	0	0	0	1	0	0	0	0
09:16 - 09:30	21	0	0	2	1	8	2	0	0	1	7	1	0	1	0	1	0	0	0	1	4	1	0	0	0	1	0	0	0	0

Time	Direction 1 => 4					Direction 3 => 4					Direction 4 => 1					Direction 2 => 4				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:15 - 07:30	24	1	1	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
07:31 - 07:45	11	0	0	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0
07:46 - 08:00	29	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
08:01 - 08:15	34	0	0	3	0	0	0	0	5	2	3	0	0	0	0	0	0	0	1	0
08:16 - 08:30	17	0	0	0	0	1	0	0	5	0	1	0	0	0	0	0	0	0	1	0
08:31 - 08:45	14	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0
08:46 - 09:00	5	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:01 - 09:15	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:16 - 09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Observer: König Date: 17th October 2005 Time: 07:12 - 07:33

Town: Lund Place: Rudeboksvägen / Gunnesbovägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:



Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:12 - 07:22	20	1	0	1	0	8	1	0	0	0	7	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
07:23 - 07:33	37	0	0	3	1	15	1	1	2	1	9	1	0	0	1	1	0	0	0	0	5	0	0	0	0	1	0	0	0	0

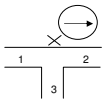
Time	Direction 1 => 4					Direction 3 => 4					Direction 2 => 4				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:12 - 07:22	10	0	0	2	0	0	0	0	2	0	1	0	0	0	1
07:23 - 07:33	11	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Appendix V: Counted vehicles at Rudeboksvägen / Dösvägen

Observer: König Date: 11th October 2005 Time: 07:15 - 09:30

Town: Lund Place: Rudeboksvägen / Dösvägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:

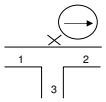


Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:15 - 07:30	41	2	2	3	0	37	1	0	3	0	4	0	1	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
07:31 - 07:45	77	2	0	9	0	57	2	0	6	0	6	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
07:46 - 08:00	63	2	3	10	0	75	2	0	5	0	4	0	0	4	1	2	0	0	0	1	2	0	0	0	0	0	0	0	1	0
08:01 - 08:15	53	2	1	8	0	75	3	1	3	0	10	0	1	4	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0
08:16 - 08:30	45	3	0	0	0	60	1	0	5	0	4	0	0	2	0	2	0	0	1	2	1	0	0	0	0	2	0	0	0	0
08:31 - 08:45	38	2	0	2	1	42	2	0	5	0	7	0	0	1	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0
08:46 - 09:00	41	1	0	3	1	53	3	0	4	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:01 - 09:15	46	2	0	0	0	34	2	1	2	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
09:16 - 09:30	38	2	0	11	0	27	2	0	1	1	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Observer: König Date: 17th October 2005 Time: 07:00 - 07:10
07:36 - 07:46

Town: Lund Place: Rudeboksvägen / Dösvägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:



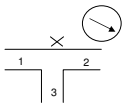
Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
07:00 - 07:10	26	1	0	1	1	24	2	1	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
07:36 - 07:46	41	2	1	5	0	35	1	0	2	0	4	0	0	1	0	0	0	0	0	2	1	0	0	1	0	0	0	0	0	0

Appendix W: Counted vehicles at Fjelievägen / Bokbindaregatan and at Baravägen / Margaretavägen

Observer: König Date: 18th October 2005 Time: 16:00 - 18:00

Town: Lund Plats: Fjelivägen / Bokbindaregatan

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:

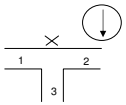


Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
16:00 - 16:15	37	1	0	13	8	46	4	0	24	7	1	0	0	1	0	0	0	0	0	0	2	0	0	2	2	3	0	0	0	0
16:16 - 16:30	49	1	1	15	6	40	1	0	31	2	0	0	0	1	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	1
16:31 - 16:45	30	4	1	15	5	40	2	0	33	9	0	0	0	1	0	6	0	0	0	0	0	0	0	3	1	3	0	0	0	0
16:46 - 17:00	40	2	0	18	1	36	2	0	19	6	2	0	0	0	0	2	0	0	0	0	1	0	0	0	0	3	0	0	0	0
17:01 - 17:15	34	2	2	17	4	23	3	1	24	4	0	0	0	1	0	4	0	0	1	1	1	0	0	0	0	0	0	0	0	0
17:16 - 17:30	37	1	0	8	2	30	2	0	23	6	3	0	0	0	0	7	0	0	0	0	1	0	0	0	0	2	0	0	0	0
17:31 - 17:45	40	2	0	10	5	16	3	0	18	3	3	0	0	1	0	4	0	0	2	0	1	0	0	1	0	2	0	0	1	0
17:46 - 18:00	36	1	0	18	5	20	1	0	15	3	0	0	0	1	4	3	0	0	2	0	0	0	0	4	1	0	0	0	0	2

Observer: Engel Date: 18th October 2005 Time: 16:00 - 18:00

Town: Lund Place: Baravägen / Margaretavägen

Weather: sunny: X cloudy: rainy:
Roadway: dry: X wet:



Time	Direction 2 => 1					Direction 1 => 2					Direction 3 => 1					Direction 3 => 2					Direction 1 => 3					Direction 2 => 3				
	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian	Private car	Heavy traffic	Motorcycle / moped	Bicycle	Pedestrian
16:00 - 16:15	35	1	0	2	0	47	1	0	8	4	15	2	0	0	0	16	2	0	1	0	2	0	0	9	0	6	0	0	1	0
16:16 - 16:30	19	0	1	3	2	48	0	1	9	0	20	0	0	5	0	6	0	0	0	0	9	1	0	4	5	7	0	0	4	0
16:31 - 16:45	18	1	0	5	4	40	2	0	9	3	12	6	0	6	0	9	0	0	3	0	6	1	0	6	0	5	0	0	4	0
16:46 - 17:00	19	0	0	6	0	58	0	0	10	0	20	0	0	4	0	8	0	0	2	0	6	1	0	6	0	4	0	0	2	0
17:01 - 17:15	23	0	0	5	0	44	0	0	14	0	12	2	1	2	0	5	0	0	3	0	11	2	0	4	0	4	0	0	0	0
17:16 - 17:30	25	0	0	6	1	32	1	0	10	0	8	1	0	2	0	16	0	0	0	0	12	1	0	3	0	3	0	0	1	0
17:31 - 17:45	22	1	0	4	0	42	2	0	8	0	10	1	0	0	0	8	0	0	2	0	8	1	0	0	0	5	0	0	0	0
17:46 - 18:00	13	0	0	4	0	24	0	2	7	0	14	2	0	2	0	10	0	0	1	0	8	1	0	5	0	3	0	0	4	0

Appendix X: Timetable

Rudeboksvägen / Gunnesbovägen		
Counts	2005-10-12	07:15 - 09:30
Conflict study	2005-10-12	07:15 - 10:00
Behaviour study	2005-10-12	07:15 - 10:00
Interview	2005-10-12	09:30 - 10:00
Interview	2005-10-12	13:15 - 17:15
Conflict study	2005-10-12	13:15 - 18:15
Behaviour study	2005-10-12	13:15 - 18:15
Speed measurement	2005-10-15	10:30 - 14:30
Behaviour study	2005-10-15	11:00 - 14:00
Speed measurement	2005-10-16	14:30 - 17:30
Counts	2005-10-17	07:13 - 07:33
Speed measurement	2005-10-17	18:00 - 19:00
Conflict study	2005-10-31	16:00 - 17:00
Surveying	2005-11-03	18:00 - 19:00
Conflict study	2005-11-08	16:00 - 17:00

Rudeboksvägen / Dösvägen		
Counts	2005-10-11	07:15 - 09:30
Conflict study	2005-10-11	07:15 - 11:30
Behaviour study	2005-10-11	07:15 - 11:30
Interview	2005-10-11	09:30 - 11:30
Interview	2005-10-11	13:15 - 16:00
Conflict study	2005-10-11	13:15 - 18:15
Behaviour study	2005-10-11	13:15 - 18:15
Speed measurement	2005-10-16	17:30 - 18:30
Conflict study	2005-10-16	17:30 - 18:00
Counts	2005-10-17	07:00 - 07:10
Counts	2005-10-17	07:36 - 07:45
Speed measurement	2005-10-17	14:00 - 18:00
Speed measurement	2005-10-18	07:00 - 09:00
Conflict study	2005-10-18	07:00 - 09:00
Surveying	2005-11-03	17:00 - 18:00
Conflict study	2005-11-09	16:00 - 17:00

Baravägen / Margaretavägen		
Conflict study	2005-10-17	12:00 - 13:00
Behaviour study	2005-10-17	12:00 - 13:00
Counts	2005-10-18	16:00 - 18:00
Conflict study	2005-10-19	15:00 - 18:00
Behaviour study	2005-10-19	15:00 - 16:00
Speed measurement	2005-10-19	15:00 - 18:30
Speed measurement	2005-10-21	07:00 - 13:00
Conflict study	2005-10-21	12:00 - 13:00
Behaviour study	2005-10-21	12:00 - 13:00
Speed measurement	2005-10-23	15:30 - 18:00
Speed measurement	2005-10-24	08:40 - 09:00
Conflict study	2005-10-28	15:15 - 17:30
Behaviour study	2005-10-28	15:15 - 17:30
Conflict study	2005-11-02	16:00 - 17:00
Surveying	2005-11-02	17:00 - 18:00
Surveying	2005-11-06	17:00 - 18:00

Fjelievägen / Bokbindaregatan		
Conflict study	2005-10-18	17:00 - 18:00
Behaviour study	2005-10-18	17:00 - 18:00
Counts	2005-10-18	16:00 - 18:00
Speed measurement	2005-10-20	07:00 - 13:00
Conflict study	2005-10-20	07:30 - 08:30
Conflict study	2005-10-20	12:00 - 13:00
Speed measurement	2005-10-20	14:00 - 18:00
Conflict study	2005-10-20	15:00 - 18:00
Behaviour study	2005-10-20	15:00 - 18:00
Speed measurement	2005-10-21	15:00 - 18:00
Conflict study	2005-10-21	16:00 - 18:00
Behaviour study	2005-10-21	16:00 - 18:00
Speed measurement	2005-10-24	07:00 - 08:30
Conflict study	2005-10-24	07:30 - 08:30
Conflict study	2005-10-25	16:00 - 17:30
Behaviour study	2005-10-25	16:00 - 17:30
Surveying	2005-11-02	18:00 - 19:00
Surveying	2005-11-06	16:00 - 17:00

Appendix Y: Checklist

Rebuilt junctions	Year of recon-struction	Number of cycle crossings	Colour of cycle crossing	Refuge in side street	Position of refuge			traffic light	Traffic volume 2004	Arms of junc-tion	Is the junction located in a curve?	Is the junction right-angled?	Gradi-ent	Distance between cycle crossing and main street [m]	Surrounding (d=0,5 km)
					in red part	in grey part	outside the crossing								
Baravägen/Sofiavägen	2004	1	red-grey	yes	no	yes	yes	no	4.100	3	no	yes	even	max. 1	home for disabled people, park, 4-floor houses
Baravägen/Tingsgatan	2004	1	red-grey	no	-			no	3.100	3	no	yes	even	max. 1	park, detached houses, 2-3-floor houses, old people's home
Thulehemsvägen/Skolmästarevägen	2004	1	red-grey	yes	no	yes	yes	no	4.300	3	no	yes	uphill	max. 1	2-floor houses, detached houses
Thulehemsvägen/Överlärarevägen	2004	1	red-grey	no	-			no	4.300	3	no	yes	uphill	max. 1	2-floor houses, detached houses, school
Thulehemsvägen/Skolbänksvägen	2004	1	red-grey	no	-			no	4.300	3	no	yes	uphill	max. 1	2-floor houses, detached houses, school
Thulehemsvägen/Katedervägen	2004	1	red-grey	no	-			no	4.300	3	no	yes	uphill	max. 1	detached houses, school
Thulehemsvägen/Bläckhornsvägen	2004	1	red-grey	no	-			no	4.300	3	no	yes	uphill	max. 1	detached houses, school, kindergarten
Thulehemsvägen/Fagottgränden	2004	1	red-grey	yes	no	yes	yes	no	4.300	4	no	yes	uphill	6	2-floor houses, detached houses, school, kindergarten
Malmövägen/Blekingevägen	2000	1	red-grey	no	-			no	11.000	3	no	yes	even	max. 1	detached houses direct, 4-floor houses
Tornavägen/Neptunsgatan/Merkuriusgatan	2000	2	red-grey	no	-			no	7.800	4	no	yes	even	max. 1	church, park, small trades, detached houses, 3-floor houses
Tornavägen/Tellusgatan	2000	1	red-grey	no	-			no	7.800	3	no	yes	uphill	max. 1	church, park, small trades, detached houses, 3-floor houses
Tornavägen/Östra Fälandsvägen	2000	1	red-grey	no	-			no	10.000	3	no	yes	uphill	max. 1	detached houses
Tornavägen/Schlyters väg	2000	1	red-grey	no	-			no	10.000	3	no	yes	uphill	max. 1	detached houses
Tornavägen/Nicolovinsväg	2000	1	red-grey	no	-			no	10.000	3	no	yes	uphill	max. 1	detached houses
Tornavägen/Otto Lindblands väg	2000	1	red-grey	no	-			no	10.000	3	no	yes	down-hill	max. 1	detached houses
Tornavägen/Nationsgatan	2000	1	red-grey	no	-			no	10.100	3	no	yes	down-hill	max. 1	detached houses, student nations
Tornavägen/Professorsgatan	2000	1	red-grey	no	-			no	8.400	3	no	yes	down-hill	max. 1	detached houses, Lund University, 3-floor houses
Tornavägen/Systervägen	2000	1	red-grey	no	-			no	7.200	3	no	yes	uphill	max. 1	3-floor houses, power plant, home for disabled people
Tunavägen/Pålsjövägen	1998	1	red-grey	no	-			no	3.900	3	no	yes	down-hill	max. 1	botanical garden, detached houses, 2-floor houses, Lund University, museum
Tunavägen/Olshögsvägen	1998	2	red-grey	no	-			no	3.200	4	yes	yes	down-hill/up-hill	max. 1	botanical garden, detached houses, 2-floor houses
Tunavägen/Studentgatan	1998	2	red-grey	no	-			no	4.000	4	no	yes	down-hill/up-hill	max. 1	botanical garden, detached houses, 2-floor houses
Tunavägen/Docentgatan	1998	1	red-grey	no	-			no	4.000	3	no	yes	uphill	max. 1	botanical garden, detached houses, 2-floor houses
Solvägen/Vegagatan	2000	2	red-grey	no	-			no	7.800	4	no	yes	even	max. 1	school, 2-floor houses, detached houses
Solvägen/Siriusgatan	2000	2	red-grey	no	-			no	7.800	4	no	yes	even	max. 1	school, 2-floor houses, detached houses
Solvägen/Herkulesgatan	2000	1	red-grey	no	-			no	7.800	3	no	yes	even	max. 1	school, 2-floor houses, detached houses
Solvägen/Planetgatan/Tornavägen	2000	1	red-grey	no	-			no	7.800	3	yes	yes	even	max. 1	2-floor houses, detached houses
Södra vägen/Kastanjegatan	2000	1	red-grey	no	-			no	12.150	4	no	yes	even	max. 1	2-floor houses, ein 7-floor hous, church, gymnasium
Fasanvägen/Trastvägen	2005	1	red-grey	yes	no	yes	no	no	15.700	3	no	yes	down-hill	max. 1	Bollhuset, sport field, school, patrol station, 5-floor houses
Fasanvägen/Örnvägen	2005	1	red-grey	yes	no	yes	no	no	15.200	3	no	yes	even	max. 1	Bollhuset, sport field, 2-floor houses
Bryggaregatan/Hantverksgatan/Tunnbindaregatan	2000	2	red-grey	no	-			no	6.500	4	yes	no/yes	even	max. 1	church, detached houses
Bryggaregatan/Postiljonsgatan	2000	1	red-grey	no	-			no	6.500	3	no	yes	even	max. 1	industry, church, 2-floor houses, detached houses
Bryggaregatan/Lokföraregatan	2000	1	red-grey	no	-			no	8.500	3	no	yes	even	max. 1	industry, 4-floor houses
Värpinge bygatan / Höjeåvägen	2004	1	red-grey	no	-			no	2.200	3	no	no	down-hill	max. 1	Park, detached houses
Trollebergsvägen/Donatus väg	2000	1	red-grey	no	-			no	6.900	3	no	yes	uphill	max. 1	school, kindergarten, 3-floor houses
Trollebergsvägen/Lärkvägen	2000	1	red-grey	no	-			no	6.900	4	no	yes	uphill	max. 1	kindergarten, 2-4-floor houses
Trollebergsvägen/Snickarevägen	2000	1	red-grey	yes	no	no	yes	no	6.900	4	no	yes	down-hill	max. 1	kindergarten, 2-4-floor houses
Trollebergsvägen/Falkvägen	2000	1	red-grey	no	-			no	6.900	3	no	yes	down-hill	max. 1	kindergarten, 4-floor houses, detached houses, park
Trollebergsvägen/Rinnebäcksvägen/Folkparksvägen	2004	2	red-grey	yes	no	yes	yes	no	6.900	4	no	yes	down-hill/up-hill	max. 1	park, detached houses, 3-floor houses
Trollebergsvägen/Talmansgatan	2004	1	red-grey	no	-			no	4.800	3	no	yes	uphill	max. 1	park, 2-floor houses
Trollebergsvägen/Rösträttsgatan	2004	1	red-grey	no	-			no	4.800	4	no	yes	uphill	max. 1	park, 2-floor houses
Trollebergsvägen/Hålvägen	2004	1	red-grey	no	-			no	4.800	4	no	yes	uphill	max. 1	park, school, detached houses
Fjelievägen/Stilgjutangatan	2000	1	red-grey	no	-			no	14.500	3	no	yes	down-hill	max. 1	health care center, detached houses, 3-2-floor houses, park
Fjelievägen/(Tunnbindaregatan/)Starvägen	2000	1	red-grey	no	-			no	14.500	4	no	yes	uphill	max. 1	health care center, detached houses, 3-2-floor houses

Rebuilt junctions	Year of recon-struction	Number of cycle crossings	Colour of cycle crossing	Refuge in side street	Position of refuge			traffic light	Traffic volume 2004	Arms of junc-tion	Is the junction located in a curve?	Is the junction right-angled?	Gradi-ent	Distance between cycle crossing and main street [m]	Surrounding (d=0,5 km)
					in red part	in grey part	outside the crossing								
Fjelievägen/Tunnbindaregatan(/Starvägen)	2000	1	red-grey	no	-			no	14.500	4	no	yes	down-hill	1-3	health care center, detached houses, 3-2-floor houses
Fjelievägen/Handsmarkaregatan	2000	1	red-grey	no	-			no	3.500	3	no	yes	down-hill	max. 1	2-floor houses, detached houses, sport field, Bollhuset
Fjelievägen/Bokbindaregatan	2000	1	red-grey	no	-			no	3.500	3	no	yes	down-hill	max. 1	sport field, Bollhuset, 4-floor houses
Fjelievägen/Papegojevägen/Stadsbundsgatan	2000	2	red-grey	no	-			no	3.500	4	yes	no	even	max. 1	police station, sport field, detached houses, 3-4-floor houses, Bollhuset
Fjelievägen/Slöjdgatan	2000	1	red-grey	no	-			no	3.300	3	no	yes	even	max. 1	police station, sport field, detached houses, 4-5-floor houses
Kung Oskars väg/Erika Dahlbergegatan	1999	1	red-grey	no	-			no	11.000	3	no	yes	uphill	max. 1	home for disabled people, 3-4-floor houses, student's hostel
Rudeboksvägen/Båtyxervägen	2000	1	red-grey	no	-			no	7.800	3	no	yes	even	5-6	industry, detached houses, 2 floor houses
Rudeboksvägen/Dösvägen	2000	1	red-grey	yes	no	yes	yes	no	7.800	3	no	yes	uphill	6	industry, detached houses, 2 floor houses
Vipeholmsvägen/Seved Ribbings väg	2000	1	red-grey	no	-			no	-	3	no	yes	uphill	max. 1	school, highway, detached houses
Vipeholmsvägen/Andreas Rydelius väg	2000	1	red-grey	no	-			no	-	3	no	yes	down-hill	max. 1	school, highway, detached houses
Hjalmar Gullbergs väg/Fritjofsväg	2000	1	red-grey	no	-			no	2.300	3	no	yes	uphill	max. 1	school, park, detached houses
Hjalmar Gullbergs väg/IngångLinebäck	2000	1	red-grey	no	-			no	2.300	3	no	yes	even	max. 1	park, 2-floor houses
Brunnsgatan/Vegagatan	1999	1	red-grey	no	-			no	6.700	3	no	no	even	max. 1	old people's home, park, 3-floor houses
Brunnsgatan/Ulrikedalsvägen	1999	1	red-grey	yes	no	no	yes	no	6.700	3	yes	yes	uphill	max. 1	old people's home, park, 3-floor houses
Dalbyvägen/Merkuriusgatan	1999	1	red-grey	no	-			no	10.700	3	no	yes	even	max. 1	old people's home, 4-floor houses
Dalbyvägen/Siriusgatan	1999	1	red-grey	no	-			no	10.700	3	no	yes	even	max. 1	old people's home, 5-floor houses
Dalbyvägen/Arkivgatan	1999	1	grey	no	-			no	7.900	4	no	yes	down-hill	max. 1	old people's home, archives, school, park
Dalbyvägen/Östervångsgatan	1999	1	grey	no	-			no	7.900	4	no	yes	uphill	max. 1	old people's home, archives, school, park
Sölvegatan/Finngatan	2004	1	red-grey	no	-			no	2.400	4	no	yes	uphill	max. 1	Lund University, gymnasium
Sölvegatan/Helgonavägen	2004	1	red-grey	no	-			no	2.400	4	no	yes	uphill	max. 1	Lund University, gymnasium

Control junctions	Number of cycle crossings	Refuge in side street	traffic light	Traffic volume 2004	Arms of junc-tion	Is the junction located in a curve?	Is the junction right-angled?	Gradient	Surrounding (d=0,5km)
Baravägen/Möllevångsvägen	1	no	no	3.100	3	no	yes	even	park, old people's home, crematorium, 2-floor houses, municipality
Baravägen/Margaretavägen	1	no	no	3.100	3	yes	yes	even	park, school, municipality, home for disabled people, 4-floor houses
Thulehemsvägen/Flöjtvägen	1	yes	no	4.300	3	no	yes	uphill	detached houses, 2-floor houses
Thulehemsvägen/Basungränd	1	no	no	4.300	3	no	yes	down-hill	detached houses, kindergarten
Thulehemsvägen/Valthornsvägen	1	no	no	4.300	4	no	yes	down-hill	2-floor houses, detached houses, school, kindergarten
Malmövägen/Norra Knästorpsvägen	1	no	no	15.200	3	no	yes	uphill	museum, industry, detached houses
Malmövägen/Frejavägen	1	no	no	15.200	3	no	yes	uphill	museum, industry, detached houses
Malmövägen/Odinvägen	1	no	no	15.200	3	no	yes	uphill	museum, industry, detached houses
Norra Gränsvägen/Parternas gränd	1	yes	no	3.300	4	no	yes	even	detached houses, 2-floor houses, kindergarten
Norra Gränsvägen/Vittnesgränden	1	yes	no	3.300	4	no	yes	even	detached houses, 2-floor houses, kindergarten
Norra Gränsvägen/Gästgivarevägen	1	yes	no	3.300	4	no	yes	even	detached houses, 2-floor houses, kindergarten
Norra Gränsvägen/Borgarevägen	1	yes	no	3.300	4	no	yes	even	detached houses, 2-floor houses
Norra Gränsvägen/Beslutsgränd	1	yes	no	3.300	3	no	yes	even	detached houses, 2-floor houses
Klosterängsvägen/Utsättaregränd	1	no	no	no numbers	3	no	yes	even	detached houses, 2-floor houses
Rudeboksvägen/Gunnesbovägen	1	yes	no	7.800	3	no	yes	uphill	industry, 2-floor houses