



Reliability Study of ERTMS in Sweden

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Background

Due to how management of railway systems in Europe has been done historically, interoperability between countries has been limited by several factors, including signalling systems.

Therefore, to solve the issue of several different signalling systems in Europe, the European Union developed ERTMS to be the standardised signalling system in the EU.

The system will phase out ATC-2, which is the current signalling system in Sweden.

Goals

The aim of the study was to look at the technical functionality of ATC-2 and the level of ERTMS that will be used in Sweden (ETCS Level 2). Further elaboration was done by comparing the reliability of the two systems, by using Trafikverket's (Swedish Transport Administration) reports on service monitoring, and analysing ERTMS' reliability in Sweden and what functions within the system could be traced to those faults.

Method

The study used a qualitative study method for gathering data on technical functionality and statistics on reliability faults of the two systems. Once the statistics were collected and analysed, semi-structured interviews were held with people at SJ AB, Trafikverket and Infranord to further develop the findings made in the document study.

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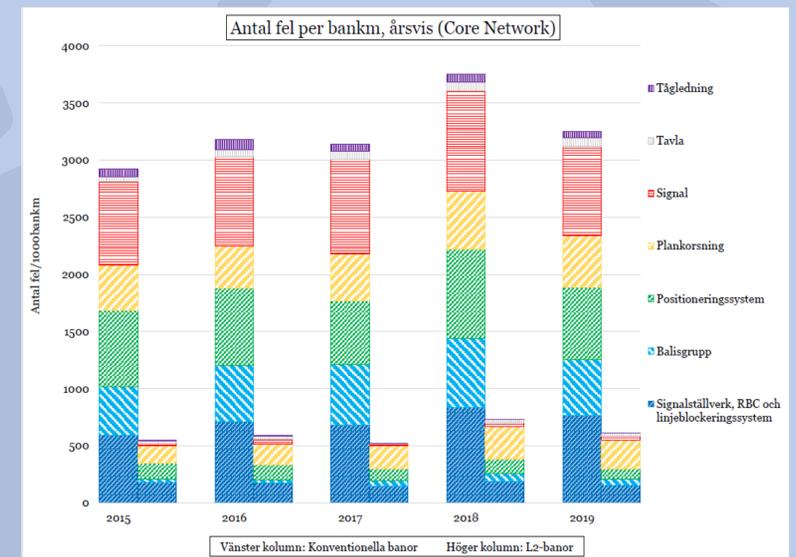
graph TD
    A[DEPENDABILITY (TILLFÖRLITLIGHET)] --> B[Availability Performance (Driftsäkerhet)]
    B --> C[Reliability (funktionssäkerhet)]
    B --> D[Maintainability (underhållsmässighet)]
    B --> E[Maintenance support (underhållssäkerhet)]
  
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Service Monitoring reports were utilised to get data on reliability issues. Source: Trafikverket 2020

Results

The reliability of ERTMS is much higher than that of ATC-2's, based on the statistics presented by Trafikverket, shown below in the diagram.



Statistical Data published by Trafikverket on Faults per Track Kilometre. Source: Trafikverket 2020

Results from the analysis done showed that whilst reliability for ERTMS was higher, there are technical aspects of ERTMS which could cause problems for reliability, such as Euro-balise hardware problems. During the analysis, a couple of questions which the thesis could not answer surfaced. These were suggested as topics for further research, such as expanded research into Euro-balise hardware and the cost-benefit of keeping optical signals as a backup system.