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The development of railway safety in Finland

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ABSTRACT

This study reviews the development of railway safety in Finland from 1959 to 2008. The results show that the level of safety has greatly improved over the past five decades. The total number of railway fatalities did not show any obvious decreasing or increasing trend during the first decade, but since the early 1970s the annual number of fatalities has decreased from about 100 to 20. The estimated overall annual reduction per year from 1970 to 2008 was 5.4% (with a 95% confidence interval from −8.2% to −2.6%). The reduction in subcategories per million train-kilometres from 1959 to 2008 was 4.4% per year for passengers, 8.3% for employees, 5.0% for road users at level crossings and 3.6% for others (mainly trespassers). The safety improvement for passengers and staff was probably influenced by the introduction of central locking of doors in passenger cars and improved procedures to protect railway employees working on the tracks. The number of road users killed at level crossings has fallen due to the installation of barriers and the construction of overpasses and underpasses at crossings with dense traffic, removal of level crossings, and an improvement of conditions such as visibility at crossings. The number of trespasser fatalities has seen the least decline. Key plans for the future include further reduction of the number of level crossings on the state railway network from the current roughly 3500–2200 by 2025, and involving communities in safety work related to railway trespassers.

1. Introduction

Rail transportation has been considered one of the safest modes of transport for some time. Risk comparisons for the EU Member States show that rail and air travel are the safest modes of transport per travelled passenger-kilometre. Specifically, for the years 2001 and 2002, the fatality risk (fatalities per 100 million passenger-kilometres) was 0.035 for air (civil aviation) and rail travel, and 0.95 for road transport (ETSC, 2003). In addition, train and bus travel has the lowest passenger fatality risk per time spent travelling, with two fatalities per 100 million person travel hours. The risk is more than 12 times less than for car travel (ETSC, 2003).

In spite of the positive safety record of rail transport, fatalities in rail traffic do occur and the average yearly number of fatalities (excluding suicides) in Finland was 19.9 during the period 2000–2008 (Finnish Transport Agency, 2011).

On the European scale, the level of railway safety in Finland is roughly at the median based on yearly railway fatalities (excluding suicides) per million train-kilometres (Eurostat, 2007, 2010). As in most European countries, the largest share of railway accident fatalities in Finland involves trespassers (persons other than passengers and railway employees killed by rolling stock in motion outside level crossings) and road users at level crossings (Eurostat, 2007, 2010; Finnish Transport Agency, 2011). Furthermore, in Finland a greater share of all railway accidents occur at level crossings than in most other countries (Eurostat, 2010). However, in a recent comparison of fatal railway accident rates and trends on Europe's mainline railways, the number of fatal train collisions and derailments in Finland was too small to allow reliable comparison of Finland with other countries (Evans, 2011).

Analysis of historical accident data provides useful background information when evaluating previous safety work and when planning future safety strategies. For example, in Great Britain, the research has focused on fatal transport accidents (Evans, 2003a,b), railway risks and valuation and the costs of preventing rail fatalities (Evans, 2005), along with fatal train accidents on Britain's mainline railways (Evans, 2006, 2007, 2008, 2009). Furthermore, studies investigating the effect of privatisation or economic deregulation on railway safety have been carried out in Great Britain (Evans, 2007), the USA (Savage, 2003) and Japan (Evans, 2010).

This study examined railway accidents in Finland from 1959 to 2008. The objective was to describe and model the trends in the development of railway safety.

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