Long-term trends in road safety in Finland - evaluation of scenarios towards 2020 and beyond

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Background

• In early 2000s, the presenter was involved in analysing the future outlook and depicting road safety scenarios towards year 2020 in Finland.
• This study was published by the Finnish road administration* in 2004.
• As we are approaching year 2020, it is interesting to examine to what extent the development has been as projected and to what extent the development has differed from the projections and forecasts made about 15 years back.

Description of the project in 2003-2004

- The goal was to produce futures oriented information to support strategic planning
- Identifying changes in the operational environment of road safety towards year 2020
  - Which factors have influenced the historical development?
  - What are the trends in road fatalities?
- Analysing the entity, creating alternative futures images and scenarios
- To support the future outlook, historical development was analysed for the past 40 years (about 1970-2002)
Outline

- Long-term trends in road fatalities in Finland from 1970
- Issues affecting the development of road safety
- Trend-based scenarios for 2002 - 2020
  - Trends among different age groups
  - Trends among women and men
  - Trends among different road user groups
- Update: Trend-based forecast for 2018 - 2030
- Discussion and conclusions
Road fatalities 1970-2002 in Finland and some key interventions

- General 80 km/h speed limit 1973/1974
- Obligatory safety belt usage, first in front seat in passenger cars 1.7.1975
- Blood alcohol content act 1.4.1977
- Obligatory helmet usage for motorcyclists 1.6.1977
- Winter tyre act 1.12.1978
- Removing black spots on road network
- 1973: President’s new year’s speech and I parliamentary transport committee
- Winter time speed limits 1.11.1987
- 1991: II parliamentary transport committee

Data: Statistics Finland, Finnish Road Safety Council
Figure 2. Traffic deaths per 100 000 population since 1970
Issues affecting the development of road safety

• **Demographical development**: urbanisation, aging population
• **Economical development**: GDP growth, which affects e.g. transport volume and new vehicle registration
• **Transport costs**: differences in costs in different modes, fuel prices
• **Transport infrastructure**: improving road network, transition from building new to maintaining existing roads
• **Transport policy**: allocating funds, prioritising between different aims (e.g. travel time vs. safety) and transport modes
• **Vehicle fleet**: strong growth in many vehicle types, improvements in vehicles’ passive and active safety
• **Transport demand**: continuous growth in transport volume (except of some financial crises)
• **Other issues**: e.g. improvement in medical sciences and first aid
Road users / drivers

Car ownership

Population
age structure,
driving licences,
migration

Travel behaviour

Costs
Car purchase and usage

Traffic environment

Management and regulation of the transport system

Traffic behaviour

Mileage
Volume, quality

Car fleet
Quantity and composition;
age, size, safety equipment

Crash risk

Amount of crashes

Adapted from Häkkinen ja Luoma (1990)
Strong growth in ...

Vehicle mileage 1977 - 2002

Separate pedestrian and cycle ways along national roads 1981 - 2003

Vehicle fleet 1950 - 2002

65+ year old population 1960 - 2020

Data: Statistics Finland, Finnish Road Administration
Analysing the trends in road fatalities

- The long-term trends in road fatalities per population (i.e. per 100,000 inhabitants) are analysed
  - among different age groups
  - among men and women
  - among different road user groups

- The extrapolated development 2003 - 2020, based on trends 1970-2002, is compared with the actual development (figures marked next as 2010real and 2017real)
Trends among different age groups

Data: Statistics Finland
Forecasts based on trends in 1970-2002
Trends among women and men

Data: Statistics Finland
Forecasts based on trends in 1970-2002
Trends among different road user groups

Data: Statistics Finland
Road fatalities in different road user groups, 2003-2020 extrapolated based on historical trends in 1970-2002

Data on road fatalities 1970-2002 from Statistics Finland. Projection is based on trend extrapolation (road fatalities per population in each road user group) and population forecast 2003-2020 by Statistics Finland.
Road fatalities in different road user groups - actual development 2003-2017 compared with the extrapolation

Data on road fatalities 1970-2017 from Statistics Finland. Projection is based on trend extrapolation (road fatalities per population in each road user group) and population forecast 2003-2020 by Statistics Finland.
The trend of road fatalities per vehicle mileage 1970-2002

Data on road fatalities from Statistics Finland. Data on vehicle mileage on national roads from Finnish Road Administration.
Trend-based scenarios for 2002-2020, actual development 2002-2017 and road safety aim (-50% 2010-2020)

Data on actual development of road fatalities 2002-2017 from Statistics Finland
Actual vs. forecasted development

Vehicle mileage, national road network (million vehicle-km)

Risk (road fatalities per million vehicle-km)

Data: Statistics Finland, Finnish Road Administration, Finnish Transport Agency
In 2017, the population was 206 000 persons (+3.9%) greater than forecasted. The greatest difference was in the amount of under 15 years old.
Trend-based forecast 2018-2030

Annual mileage change: ca +1.4%
Annual risk change: -4.5%
Annual road fatalities change: ca -3.1%
About 150 road fatalities in 2030?

Risk (fatalities per mileage) of 2003-2017 extrapolated to years 2018-2030 * forecast of vehicle mileage 2018-2030

Data: Statistics Finland, Finnish Transport Agency
Please note!

• We haven’t got, and in future will not get the positive trends for free
• To reach the extrapolated development, the development should be similar and implemented measures of the future should have similar effect as those of the past
• There is no automatic mechanism that produces road safety improvement
Discussion

- Even though the actual development of population or vehicle mileage has not been as forecasted, the difference is not big, and the trend extrapolations from early 2000s have been surprisingly similar to the actual development in road fatalities.
- There is great safety potential in affecting transport mileage and its expected growth as well as the crash risk.
- Additionally, the seriousness of crashes can be affected (e.g. eCall, medical services, use of safety equipment).
- How will automation affect road safety in future?
- Quantitative trends are only one part of the big picture, also the qualitative trends and aspects should be considered.
Conclusions

• Higher risk still among men, the young (15-24 year old), and seniors, but the risks have continued to decrease

• Road fatalities continue to be especially in passenger cars (57%)

• In Finland, Vision Zero in road safety is still very far away, but the trends are pointing to the right direction

• To reach the road safety target (-50% road fatalities in a decade, also during 2020-2030), there is a need for further commitment in road safety measures and strict actions