

http://www.liikenneturva.fi/englanti/Statistics/transportssafety_performanceindicators2002.pdf

SAFETY MANAGEMENT SYSTEM AND TRANSPORT SAFETY PERFORMANCE INDICATORS IN FINLAND

CONTENTS

1 INTRODUCTION.....	2
2 THE ELEMENTS OF SAFETY MANAGEMENT SYSTEM IN FINLAND.....	3
2.1 Social costs in Finland.....	3
2.2 Final outcomes in Finland.....	4
2.3 Road safety performance indicators in Finland.....	4
a) Traffic behaviour.....	5
b) Monitoring of traffic atmosphere.....	6
c) Accident investigation surveys	6
2.4 Principal road Safety problems in the European Union and Finland.....	7
a) Speeds	7
b) Alcohol.....	9
c) Young drivers.....	10
d) Protective equipment	10
e) Some other traffic behaviour indicators in Finland.....	12
2.5 Safety measures and safety programmes	15
References	17

1 INTRODUCTION

Transport safety can be assessed in terms of the social costs of accidents and injuries. Still, simply counting crashes or injuries is an imperfect indicator of the level of transport safety. It is necessary to understand the process that leads to accidents. Safety performance indicators serve this end. A safety performance indicator is any variable that is used in addition of accidents or injuries to measure changes in safety performance. Safety performance indicators can give a more complete picture of the level of transport safety and can point to the emergence of new problems at an early stage, before these problems show up in the form of accidents (ETSC, 2001).

Among the road safety performance indicators most commonly used are those that relate to behavioural characteristics such as speed levels, the rate of drink driving and the use of seat belts. Because of the high information density they allow quicker and more local analyses and monitoring than crashes.

European Transport Safety Council (2001) refers that the essential elements of a safety management system are:

- ⌘ social costs of accidents and injuries,
- ⌘ final outcomes,
- ⌘ safety performance indicators,
- ⌘ safety measures and safety programmes.

The place of transport safety performance indicators in safety management system is shown in Figure 1.

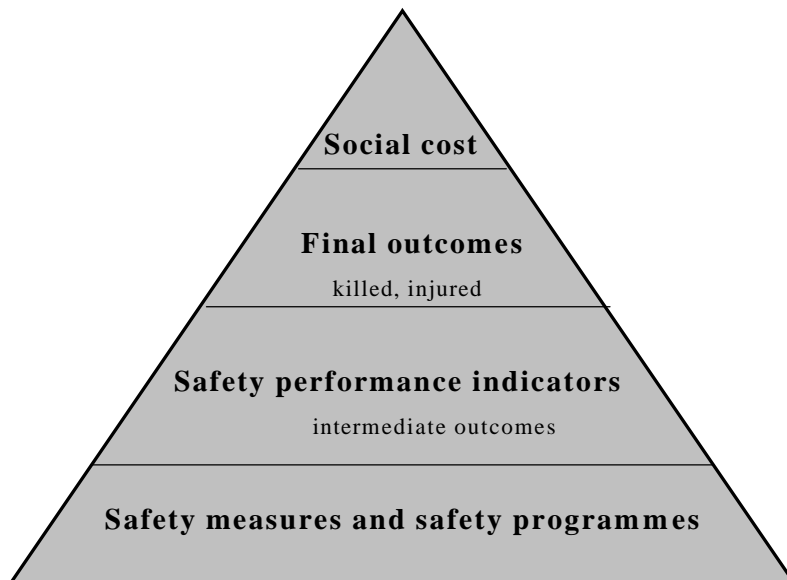


Figure 1 Essential elements of safety management system (ETSC, 2001).

In Finland this kind of safety management system already exist. Figure 2 introduces shortly the Finnish safety management system.

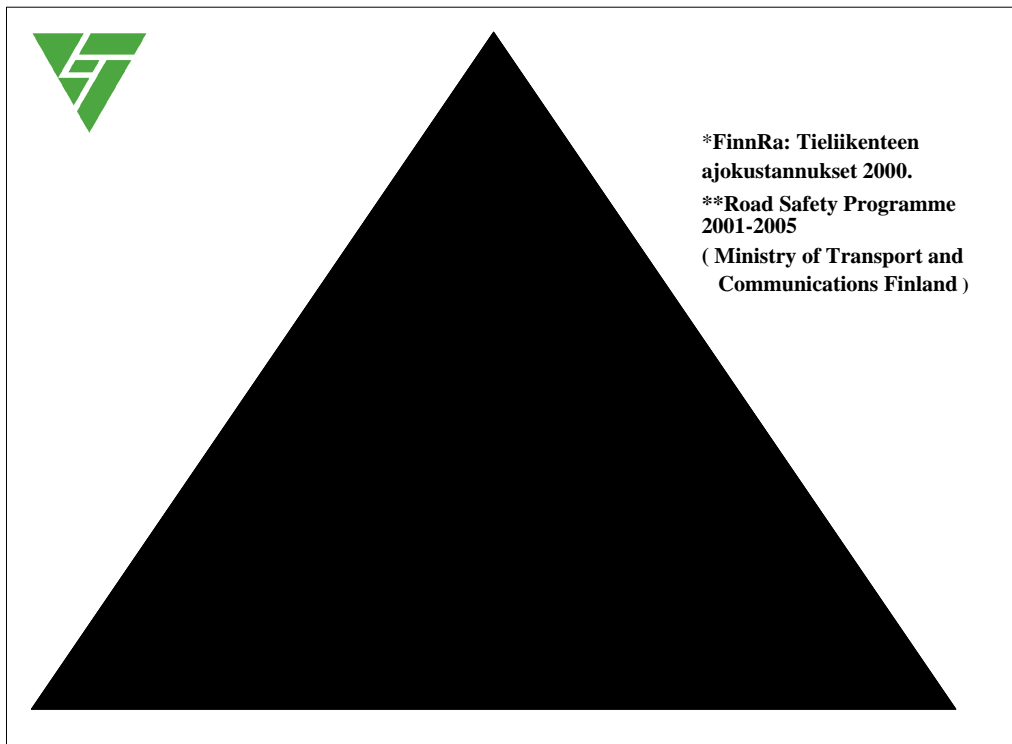


Figure 2 Essential elements of safety management system in Finland.

2 THE ELEMENTS OF SAFETY MANAGEMENT SYSTEM IN FINLAND

2.1 Social costs in Finland

The total costs of road traffic on Finnish public roads yielded in 1998 to 1,66 billion euros. This figure included 773 million in infrastructure costs, 471 million in accident costs and 420 million in pollution costs (Finnra, 2000). According to the Finnish Road Administration (Tiehallinto, 2000) the price of an accident leading to death is about 2 400 000 € and an accident leading to non-fatal injury is about 316 000 €

2.2 Final outcomes in Finland

In Finland over 400 people die and over 8000 people injury in traffic-related accidents every year. A total of 433 persons were killed in road traffic accidents in 2001. The number has been hovering around four hundred for the past seven years. In 2002, according to advance notifications, 410 people were killed and 8139 injured.

Road traffic accident	1980	1990	1995	1996	1997	1998	1999	2000	2001
Involving personal injury	6 790	10 175	7 812	7 274	6 980	6 902	6 997	6 633	6 451
Fatal	514	583	411	355	391	367	391	354	386
Alcohol-related	818	1 626	1 103	999	983	1 018	994	971	942
Deaths	551	649	441	404	438	400	431	396	433
Persons injured	8 442	12 758	10 191	9 299	8 957	9 097	9 052	8 508	8 411

Table 1. Road traffic accidents in Finland (Source: Statistics Finland, Transport and tourism statistics)

In terms of the number of traffic fatalities per 100 000 people in different age groups, the fatality risk is greatest for elderly and young road users. One in four traffic fatalities is over 64 years old and one in five is aged 15-24. About half of all elderly fatalities are pedestrians or cyclists. The other half is almost all car drivers or passengers. This differs from the situation for young people where about 75% of traffic fatalities occur in car accidents.

For pedestrians and cyclists about 50% of all fatalities and 90% of injuries occur **in** built-up areas. For car occupants almost 90% of fatalities and 60% of injuries occur **outside** built-up areas. About 43% of fatalities on the main road network are the result of head-on collisions. Running off the road is the most significant cause of traffic fatalities on other public roads.

2.3 Road safety performance indicators in Finland

ETSC (2001) recommends the EU to set up and specify a set of relevant safety performance indicators to be used at European and national level as a means of assessing the trends in safety levels and the success of casualty reduction programmes. According to ETSC the Member States should use safety performance indicators in a regular and harmonised way and make continuous safety monitoring an integral part of their national safety strategies. The most commonly used safety performance indicators for road transport in Europe are speed measurements, surveys of the use of seat belts and crash helmets and surveys of the incidence of drinking and driving.

In Finland this system includes several indicators for traffic safety performance. Three of them will be considered next.

a) Traffic behaviour

The Ministry of Transport and Communications launched the Traffic Behaviour Monitoring System in the 1992 for the purpose of systematic data collection. Liikenneturva - the Central Organization for Traffic Safety in Finland, maintains the system for the monitoring of traffic safety work. The monitoring data is used to augment the picture of traffic safety development provided by accident statistics. The main objective when planning the traffic behaviour measurements is to monitor changes occurring in traffic behaviour. Annual repetition of the same measurements makes it possible to observe traffic behaviour trends at different measuring points.

Traffic monitoring data is collected as a collaborative effort involving organizations operating in the traffic safety field. These organizations include:

- ✍ Ministry of Transport and Communications Finland, The Central Organization for Traffic Safety in Finland, University of Helsinki, National Public Health Institute, Ministry of Interior, The Finnish Road Administration, City of Helsinki.

Traffic behaviour data is collected annually using the same methods and the same measuring points. The methods used are road-side observations and automatic traffic counters. The following measurements were made in the 2002:

- ✍ Speeding*, vehicle intervals, drunken driving*, seat belts* (front and rear seats), bicycle helmets*, daytime running lights*, direction indicators, pedestrians' use of reflectors*, pedestrians compliance of red lights*.

(* = will be considered in Chapter 2.4).

These studies differ from one another in terms of the size of the data sets, the measuring points and measuring times. Some of the data sets are collected from all over the country, some from just a few provinces and others from just a single province.

The measurements do not give an accurate picture of the prevalence of the phenomenon being measured, nor do they describe regional variation. For example, pedestrian compliance with the rules of light-controlled crossings and the usage of vehicle direction indicators vary greatly from one measuring point to another. Only a few selected crossings and road junctions have been monitored, and data is collected from them over a short period of time. That being the case, the changes do not describe the studied phenomena generally, but thanks to the standardized measuring methods they can, when repeated, describe changes in traffic behaviour.

The results of traffic behaviour are reported annually and the reports are publicly available.

b) Monitoring of traffic atmosphere

Traffic atmosphere has been monitored since 1992. The data of traffic atmosphere is collected twice a year by interviewing 1000 drivers. The main reason for data collection is to observe the negative and positive changes and features of the traffic atmosphere. The negative phenomena observed are e.g. speeding, terrifying aspects of the traffic, impatience in traffic jam, unconcernedness of rules and teasing. The positive phenomena observed are e.g. politeness, amiability and helpfulness, following the rules and deliberateness in passing.

Since the middle of the 1990's the traffic atmosphere has changed for the worse. Surprisingly in the beginning of the 2002 there was a huge decrease of the proportion of people who felt that the traffic atmosphere changed for the worse (Figure 3).

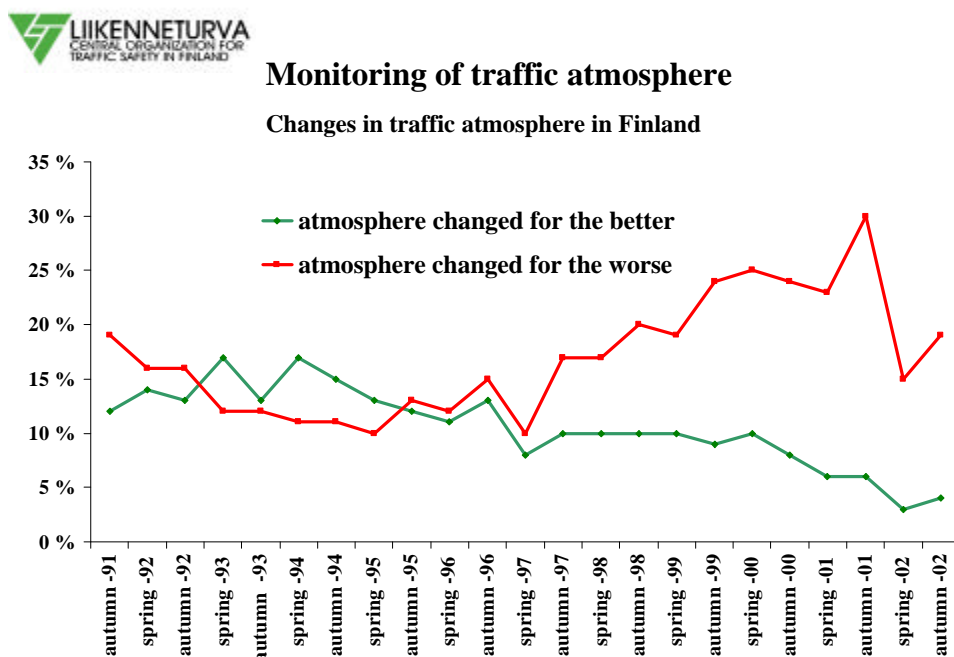


Figure 3 Changes in Traffic atmosphere in Finland.

c) Accident investigation surveys

In Finland the Road Traffic Accident Investigation Teams of the Finnish Traffic Safety Committee of Insurance Companies (VALT) investigates all road traffic accidents leading to death (some 350/year) and also some other accidents e.g. buss - and snowmobile accidents (some 100/year). The purpose of the survey is to improve safety and prevent future accidents. A report is prepared on the results of the investigation.

2.4 Principal road Safety problems in the European Union and Finland

The ETSC report (2001) refers the key road safety problems as follows:

- i. Excess and inappropriate speeds
- ii. Excess alcohol
- iii. The accident risk of young drivers
- iv. The accident risks of pedestrian, cyclist, moped riders and motorcyclists
- v. Non-use of protective equipment
- vi. Unforgiving vehicles and infrastructure.

In Finland all these road safety problems are examined regularly. In this report is given more detailed information of speeds, alcohol, accident risk of young drivers and the use of protective equipment.

a) Speeds

Since 1961 the Finnish Road Administration (Finnra) has followed vehicle speed development on Finnish public roads. In the beginning the vehicle speeds were measured by radar. Since 1992 vehicle speeds have been automatically measured by traffic monitoring system (TMS). In 2001, the annual average speed of all vehicles on main roads was 91.3 km/h. According to Finnra report (Kangas & Prokkola 2002) for cars and vans the average speed was 92.3 km/h and for lorries 85.3 km/h and buses 87.6 km/h. The average vehicle speeds varied monthly a maximum -8 to +4% of the annual average speed. Weekend traffic was 1.4% to 1.7% faster than the average weekly traffic. 10-15% of all vehicles were speeding more than 10 km/h over the speed limits. On motorways with a speed limit 100 km/h 18% and with a speed limit 120 km/h 9% of cars and vans were exceeding the speed limit more than 10 km/h. (Kangas & Porokkola 2002).

The TMS speed monitoring system maintained by the Finnra comprises about 250 sites throughout the country. The average driving speeds in 80 km/h and 100 km/h speed limit zones and the proportion of vehicles exceeding limit over 10 kph are given in Figure 4 and 5.

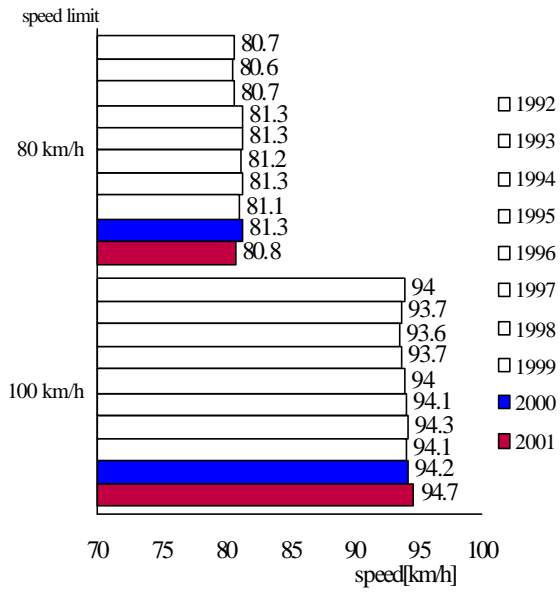


Figure 4 Vehicle driving speeds in Finland 1992-2001.

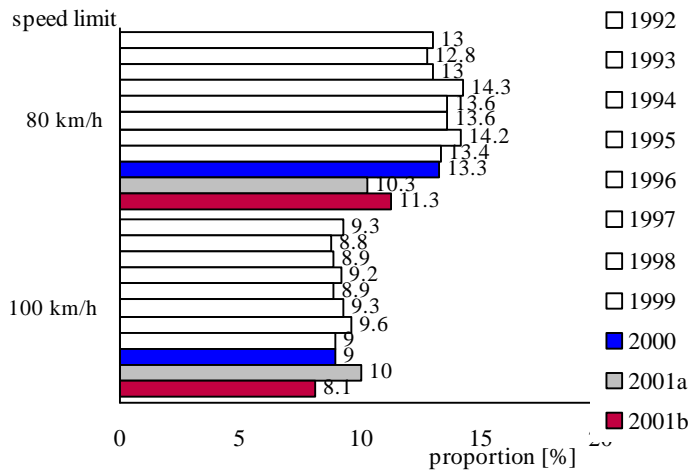


Figure 5 Proportion of vehicles exceeding limit over 10 kph in Finland. (2001a: Same measuring points that in 1992-2000, 2001b: New measuring points included)

b) Alcohol

In Finland, approximately 23 000 cases of drunken driving are reported by the police each year. In 2002, altogether 0,18 per cent of drivers drove under the influence of alcohol (BAC =0.05%) and 0.94 per cent had some alcohol (BAC< 0.05%) in blood (Figure 6).

Alcohol has been a factor in about one quarter of all fatal accidents in Finland in recent years. In accidents involving drunken driver is killed about 70 people and injured about 1000 person each year. In 2001 altogether 82 persons died and 994 persons were injured in drunk driving cases.

Mobile Police together with National Health Institute have carried out scientific monitoring of drinking and driving. The material is collected by using an alcometer (a breath analyser) to test the drivers of all vehicles passing a control point.



Drunken driving as proportion in total traffic flow

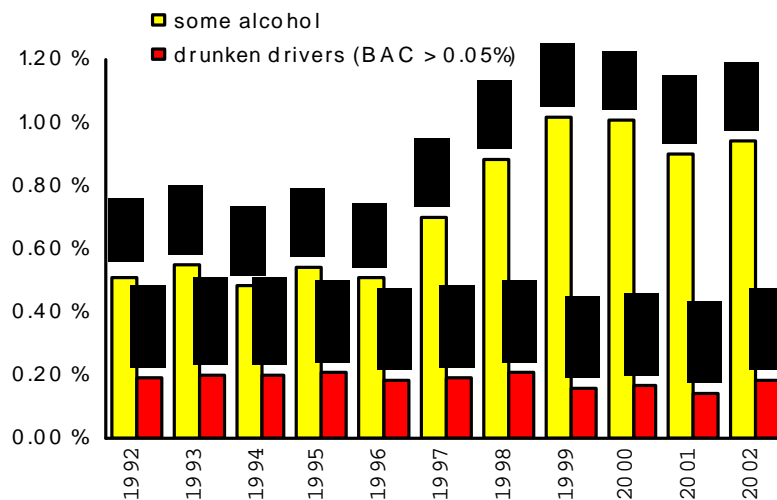


Figure 6 Drunken driving as proportion in total traffic flow in Finland.

c) Young drivers

The risk of fatalities and injury amongst younger road users is high. When viewed in terms of the number of traffic fatalities per 100 000 people in different age groups, the fatality risk is greatest for elderly and young road users (Figure 7). One in five traffic fatalities is aged 15-24. 75% of traffic fatalities amongst young people occur in car accidents.

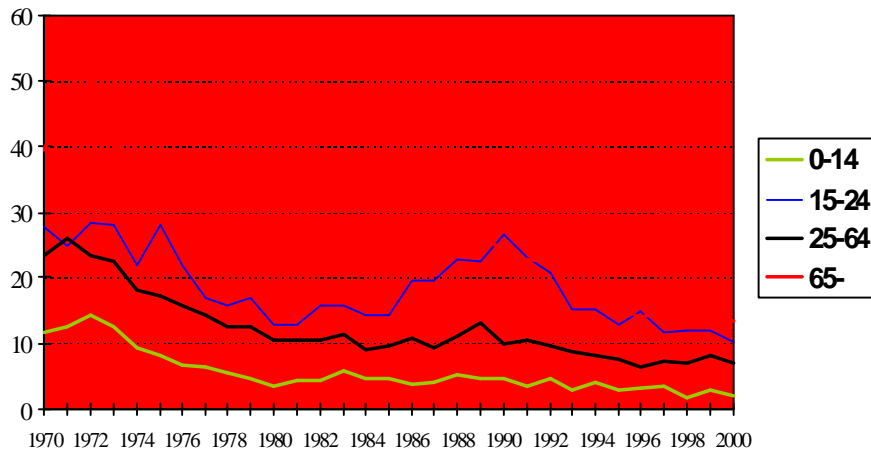


Figure 7 Fatalities and injured per 100 000 people in different age groups. (Source Statistics Finland)

d) Protective equipment

Seat belts

The use of safety belts by drivers and front-seat passengers in vans and passenger cars is studied by Liikenneturva (the Central Organization for Traffic Safety in Finland) in collaboration with the Mobile Police. The Mobile Police collects the data from all over the country. Taxis and emergency vehicles are excluded from the study. In the 2002 about 60 000 observations was made over the whole country.

In the 2002 safety belt usage increased in built-up areas compared with previous year. In 2002 over 80 per cent of drivers and front-seat passengers used their safety belts on trips in built-up areas. The corresponding percentage in the previous year was 78 per cent. Outside built-up areas the percentage usage rate remained about the same (93%) (Figure 8).

Seat belt use in front seats of cars

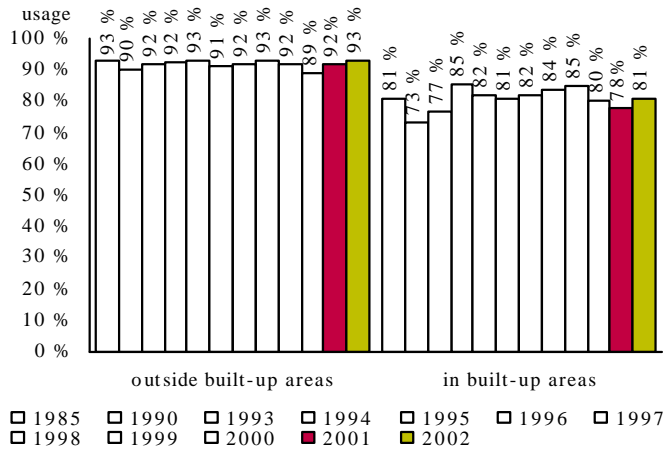


Figure 8 Seat belt use in front seats of cars in Finland.

In Finland the usage of safety belts in the front seats of vans is over 20 percentage points lower outside built-up areas and about 30 percentage points lower in built up areas than it is in passenger cars.

Also the seat belt usage on the rear seats of passenger cars is examined in Finland. Seventy-four per cent of the back-seat passengers were wearing their safety belts in 2002 (Figure 9).

Seat belt use in rear seats of cars

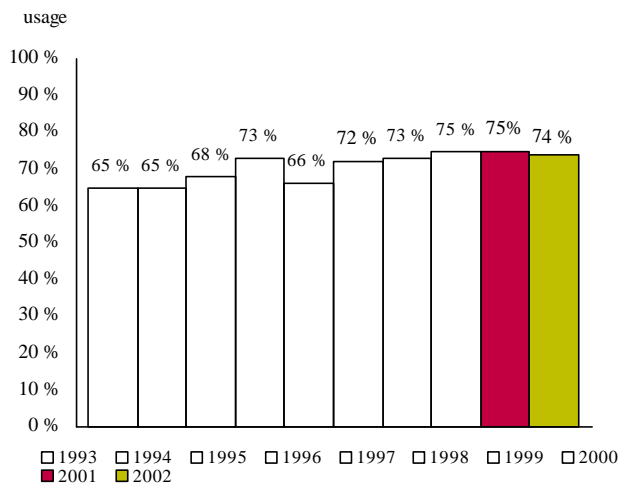


Figure 9 Seat belt use in rear seats of cars in Finland.

Bicycle helmets

The material of percentage of cyclists wearing safety helmets is collected from all over the country during the first two weeks of June. All those persons who are riding a bicycle or being carried on a bicycle are counted as being cyclists. Those pushing bicycles are not counted as cyclists. The percentage usage for the country as a whole is calculated by proportioning the number of observations to the populations of the provinces in which they were made. In 2002 over 30 000 observations was made over the whole country

About one fifth of the bicyclist's use a bicycle helmet in 2002 (Figure 10).



Use of bicycle helmets

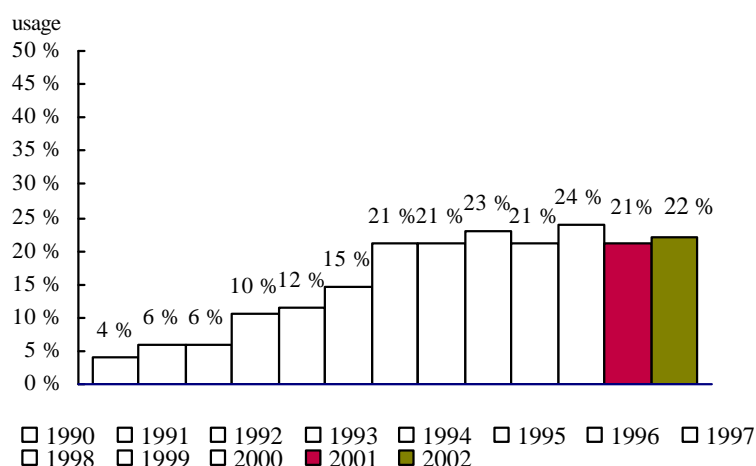


Figure 10 Use of bicycle helmets in Finland

e) Some other traffic behaviour indicators in Finland

Use of daytime running lights

Liikenneturva makes observations of the daytime use of running lights over a two-week period in August. The material is collected both in and outside built-up areas. The daytime use of running lights has been compulsory in Finland both in and outside built-up areas since 1.6.1997.

Drivers using alert or fog lights are counted as using headlights. A driver is regarded as having had his headlights on even if only one light is working. In 2002 a total of 21454 observations was made over the whole country. The percentage usage rates have been calculated by proportioning the number of observations to the populations of the provinces in which they were made.

In built-up areas 95 per cent of the drivers used their running lights during the daytime in 2002. The usage rate in the previous year was the same. The daytime usage of running lights in built-up areas has reached the usage outside built-up areas (Figure 11).



Use of daytime running lights

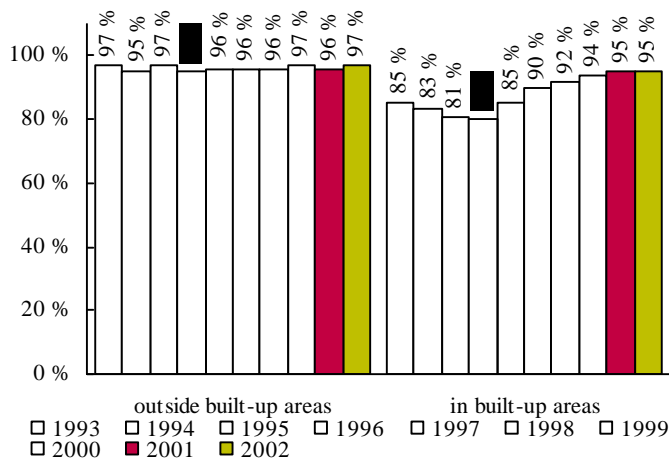


Figure 11 Use of daytime running lights

Pedestrians' compliance with the rules of light-controlled crossings

The aim of the study is to determine what percentage of pedestrians approaching a light-controlled crossing complied with the red "do not walk" light. The material is collected by observing pedestrians crossing streets in Helsinki, Vantaa, Tampere, Mikkeli, Kuopio, Vaasa, Joensuu and Rovaniemi. The observation points are selected so that other traffic hardly ever affected the behaviour of the pedestrians, i.e. does not influence their decision to cross or wait. In other words, the volume of vehicular traffic at the crossing points can't be too great.

Liikenneturva is responsible for collecting the material. The task of the observers is to count the number of pedestrians who wait at the red light until it turned green, and the number of pedestrians who ignore the red light and cross the road. For a pedestrian to be counted, he or she has to have arrived at the curbside at least 5 seconds before the light turned green. The observers also count the number of vehicles driving over the crossing while the red "do not walk" light was on.

A total of 8 668 observations were made in the 2002. The percentage compliance rates have been calculated by weighting each measuring point equally.

Of the pedestrians arriving at the curbside while the red light was on, eighty-six per cent waited until it turned green (Figure 12). Women complied with the rules of light-controlled crossings more often than men.

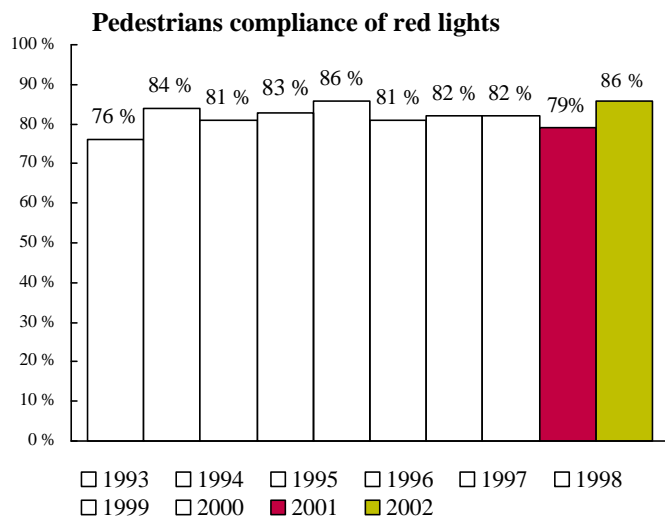


Figure 12 Pedestrians compliance of red lights

Use of reflectors by pedestrians in built-up areas

The material of the use of reflectors by pedestrians in built-up areas is collected on lit streets in built-up areas during the hours of darkness. No observations are made in city centers or other brightly illuminated areas. The observations are made using the headlights of a stationary or moving vehicle. The task of the observers is to record on a form whether a reflector is being used by any pedestrian walking in an illuminated street zone, what type of reflector if any is used, and an assessment of the pedestrian's age and gender. Liikenneturva is responsible for collecting the data. Total of 6722 observations was collected in the 2002. 27 per cent of pedestrians used reflectors. (Figure 13).



Pedestrians' use of reflectors in built-up areas

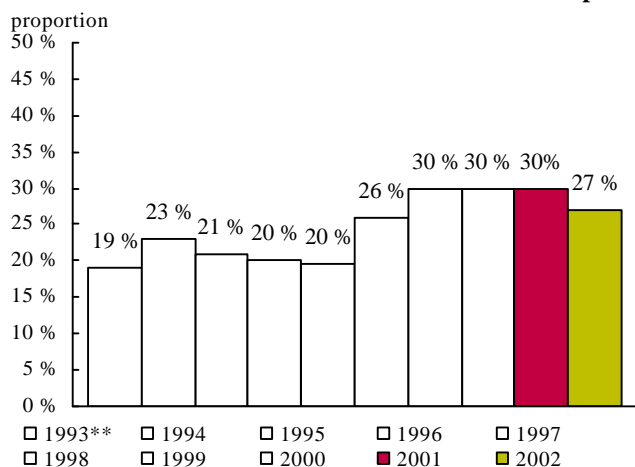
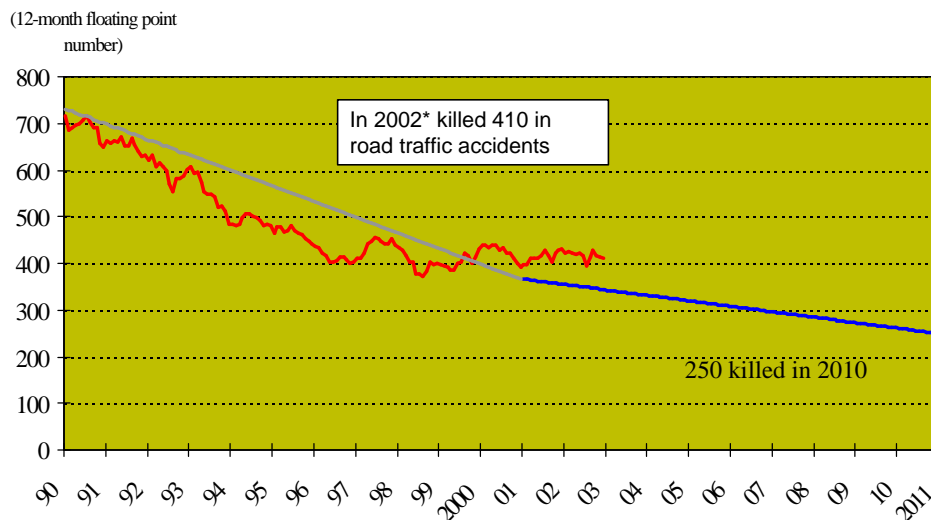


Figure 13 Pedestrians use of reflectors in built-up areas

2.5 Safety measures and safety programmes

The aim of the Finnish Road Safety Programme is to create the right conditions for a continuous improvement of the transport system, with the target of no more than 250 killed in 2010 and 100 traffic fatalities per year by about 2025.



Source: Statistics Finland, 2002 preliminary information

Leena Paartola/ 4.2.2003

Figure 14. Killed in road traffic accidents and safety target

Some examples of increasing the appreciation of road safety issues (Road Safety Programme 2001-2005):

- ✍ Political acceptance of a vision for the road transport system, which embodies the aim that nobody should die or be seriously injured in traffic.
- ✍ Both central and local government should give priority to road safety and allocate more resources to road safety work.
- ✍ In land use and transport planning the role of road safety will be emphasized when decision-makers are motivated and planners trained in accordance with a new approach to road safety.
- ✍ Lifelong road safety education for everyone will ensure that road users have sufficient information and ability to travel safely on the roads.
- ✍ The safety knowledge of decision-makers and the public at large should be maintained by providing topical information on safety issues.
- ✍ The effectiveness of specific safety measures should also be enhanced and the road safety education given in schools improved.
- ✍ To increase the use of safety equipment, new marketing methods should be introduced.
- ✍ A traffic environment designed on the basis of the knowledge and abilities of the most vulnerable road users will enable safe travel by everyone.

- ✍ In built-up areas, the measures should include fundamental improvements at locations where non-motorized and motorized traffic routes cross, and reduction of vehicle speeds by a system of progressive speed restrictions.
- ✍ Pedestrian and cycle routes and underpasses should be built as necessary to ensure safety within built-up areas and outside them.
- ✍ The use of safety equipment should be increased through educational and surveillance methods.
- ✍ The sense of responsibility felt by young drivers will be enhanced by securing the involvement of the authorities, the police and the driver's friends and family.
- ✍ More attention should be paid to the health of drivers.
- ✍ Control over driving speeds should be improved in order to prevent head-on collisions and single accidents.

References

Finnra (Tiehallinto): Tieliikenteen ajokustannukset 2000.

Finnra (Tiehallinto): Tieliikenteen tarkennettu kustannusvastaavuus yleisillä teillä. Tielaitoksen sisäisiä julkaisuja 27/2000.

ETSC 2001: Transport Safety Performance Indicators. ETSC Brussels 2001.

Kangas, J. & Prokkola, R. 2002. Autojen ajonopeudet pääteillä vuonna 2001. Tiehallinnon selvityksiä 30/2002.

Road Safety Programme 2001-2005. Ministry of Transport and Communications Finland.

Statistics Finland & Liikenneturva. Road traffic accidents 2001. SVT. Transport and Tourism.

The Central Organization for Traffic Safety in Finland 2001: Monitoring of traffic behaviour in Finland. Helsinki 2001.

The Central Organization for Traffic Safety in Finland 2001: Monitoring of traffic atmosphere. Helsinki 2002.