

Comparative analysis of road safety parameters in the European motorways

P. Evgenikos (NTUA - EL)

G. Yannis (NTUA - EL)

S. Hoeglinger (KfV - AT)

N. Bos (SWOV - NL)

J. Broughton (TRL - UK)

B. Lawton (TRL - UK)

Introduction

- Motorways form an important part of the road infrastructure system and are generally acknowledged as the safest roads by design.
- Motorways specific characteristics:
 - Traffic at higher speed
 - Separation of opposite traffic flows
 - More lanes enabling straightforward overtaking
- Between 1995 and 2004 more than 25.000 people (about 7,6% of all traffic accident fatalities) were killed in traffic accidents on motorways in 14 European Union countries.
- Within this decade, fatalities on motorways decreased by 16%, whereas overall road fatalities decreased by almost 27%.
- Motorway networks are continuously developing across Europe.

Objectives

- Macroscopic analysis of road safety related parameters in the European motorways, using data from the EU CARE database with disaggregate data on road accidents, together with data from other international data files.
 - Comparative analysis among countries will allow for drawing an overall picture of the road safety level in the European motorways in comparison with the remaining road network.
 - Provide useful support to all decision makers working for the improvement of safety in the European road network.

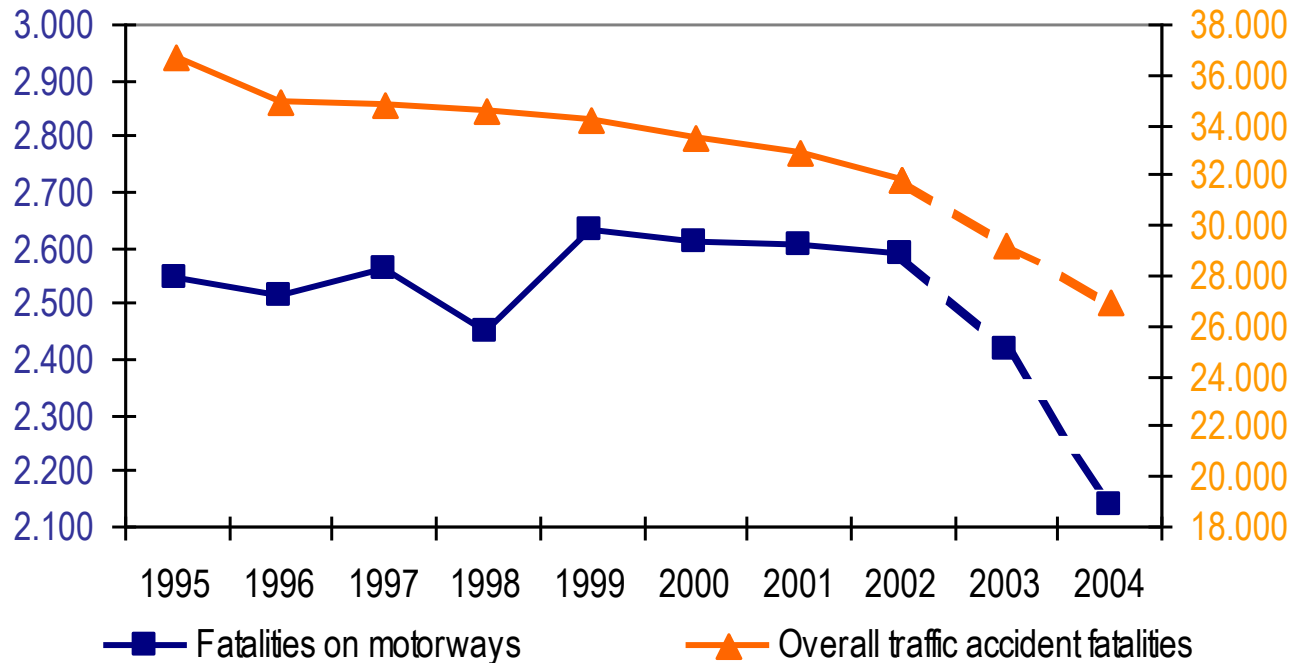
This work was carried out within the scope of the SafetyNet project of the 6th Framework Program for Research, Technological Development and Demonstration of the European Union

Methodology

- Road accident data from the EU-CARE database:
 - 14 EU countries (BE, DK, EL, ES, FR, IE, IT, LU, NL, AT, PT, FI, SE,UK)
 - Data for the period 1995 - 2004¹
 - Road accident data on motorways and other roads for the period 1995-2004 and 14 EU countries are correlated with basic safety parameters:
 - i) vehicle type
 - ii) casualty age & person class
 - iii) manoeuvre type
 - iv) lighting conditions
- Available risk exposure data from other international datafiles (Eurostat, IRTAD)

¹ or last available year, for LU (2002) and for NL, IE (2003)

EU-14 fatalities evolution, 1995 - 2004¹

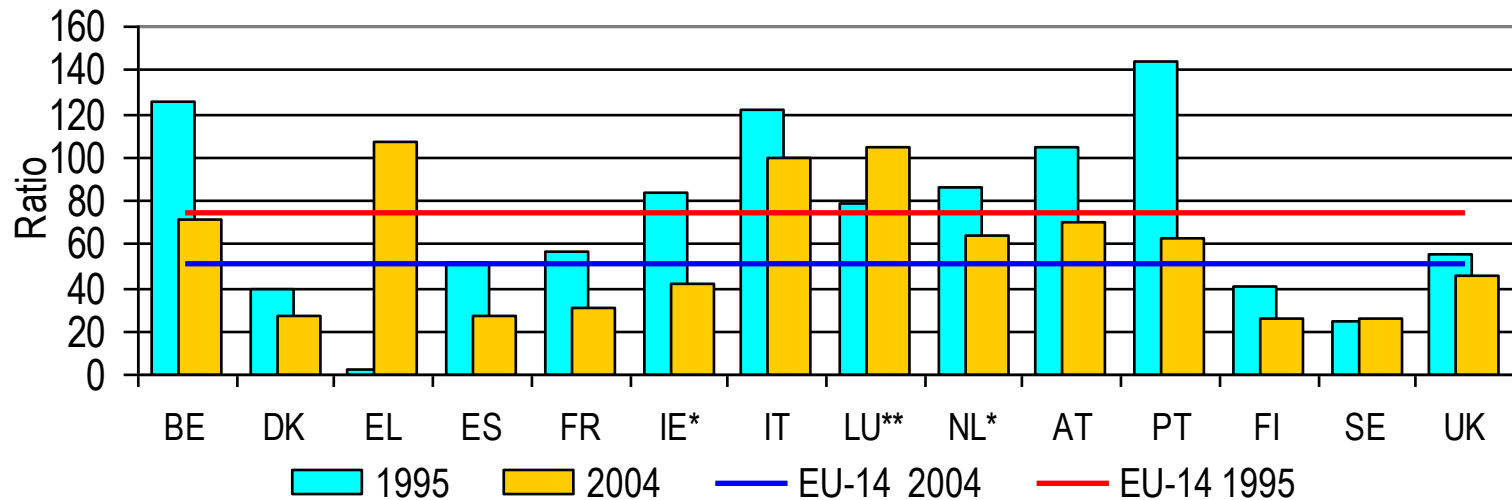


- In 1999 increase by 7,4% in motorway road accident fatalities compared to 1998, whereas within the same year, decrease by 1,2% in the overall number of road fatalities.
- Between 2000 and 2002 fatalities on motorways in the 14 countries did not really change, whereas the overall number of road accident fatalities decreased by 5,2%.

Fatality rates on motorways per million population

- In 2004¹ motorways fatality rate per million population in Austria was more than twice the EU-14 average rate (14,5 comparing to 7,1).
- Between 1995 and 2004 fatality rate on motorways decreased by 19% (from 8,8 per million inhabitants in 1995 to 7,1 in 2004), compared to an approximate 30% decrease (from 117,7 to 82,5) in the corresponding fatality rate on the remaining road network.
- Belgium experienced the most significant reduction during this decade (42,2%), whereas in Sweden the fatality rate increased by 33,1%.
- Seven of the countries are lower than the average rate of all EU-14 countries for 2004¹.

Fatality rates on motorways per 1.000 km motorways

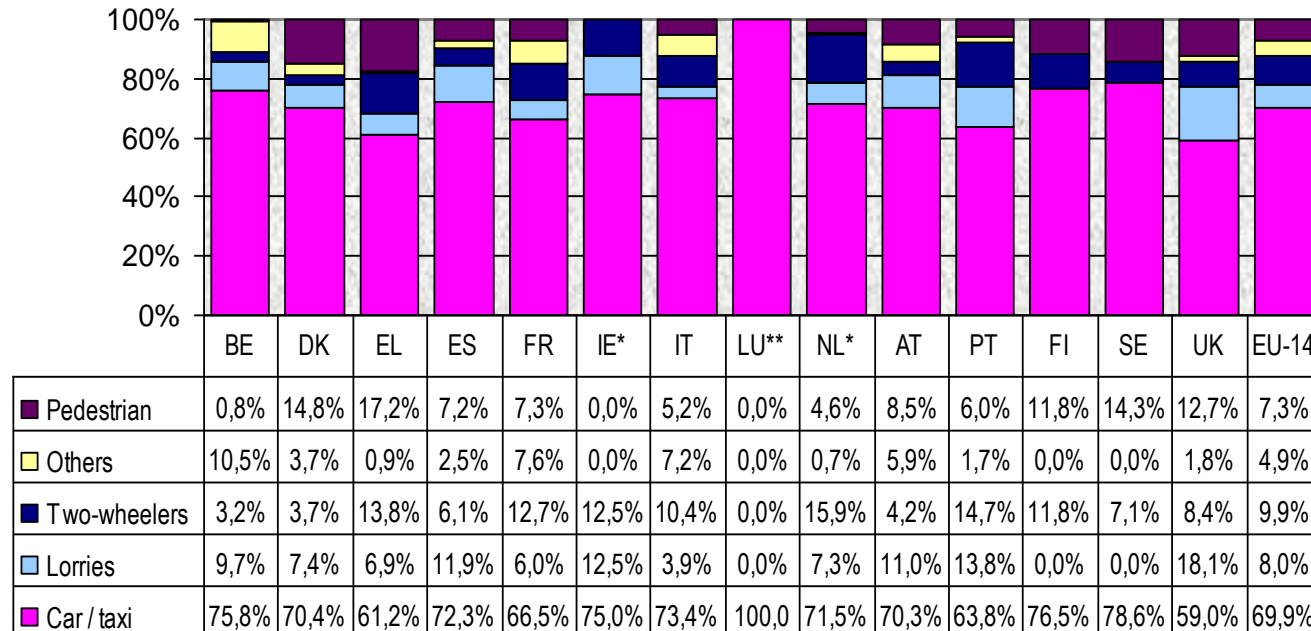


* Data from 2003, ** Data from 2002

Source: CARE Database / EC, EUROSTAT
Date of query: November 2006

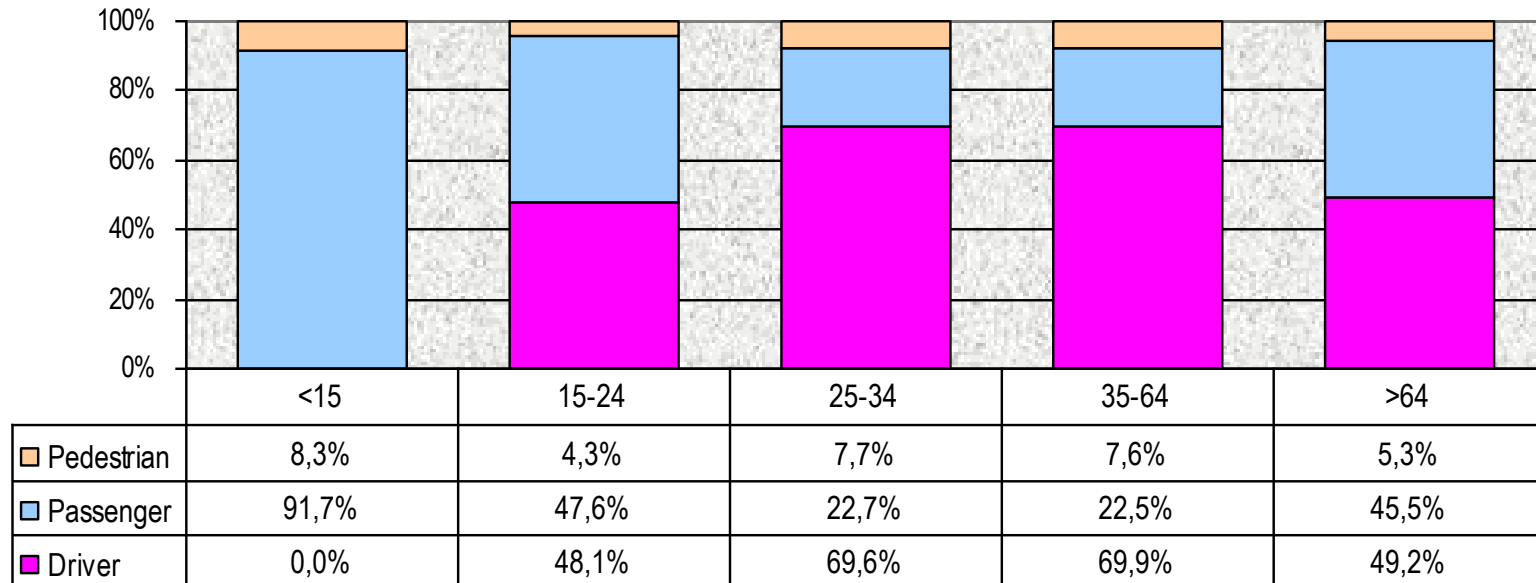
- Portugal experienced a considerable reduction in fatality rates on its motorway network (56,1%).
- Greece and Italy are the countries with the most fatalities per thousand kilometres of motorway network in 2004.
- Motorways in Finland and in Sweden were safer than the ones in the remaining 12 EU countries in 2004¹ (fatality rates 26 and 26,4 respectively, compared to the average EU-14 rate of 50,1).

Fatalities on motorways by mode of transport



- Almost 70% (1.460 persons) of the fatalities on motorways across the European countries concern passenger car/taxi occupants.
- On average, only 9,9% of the fatalities occurring on motorways in the 14 countries concerns two-wheelers, with the Netherlands having the largest percentage (15,9%).
- The two-wheeler rider fatalities on the non-motorway road network constitute 35,1% of the respective overall number of fatalities, with Portugal and Italy having the largest shares (43,4% and 42,5%).

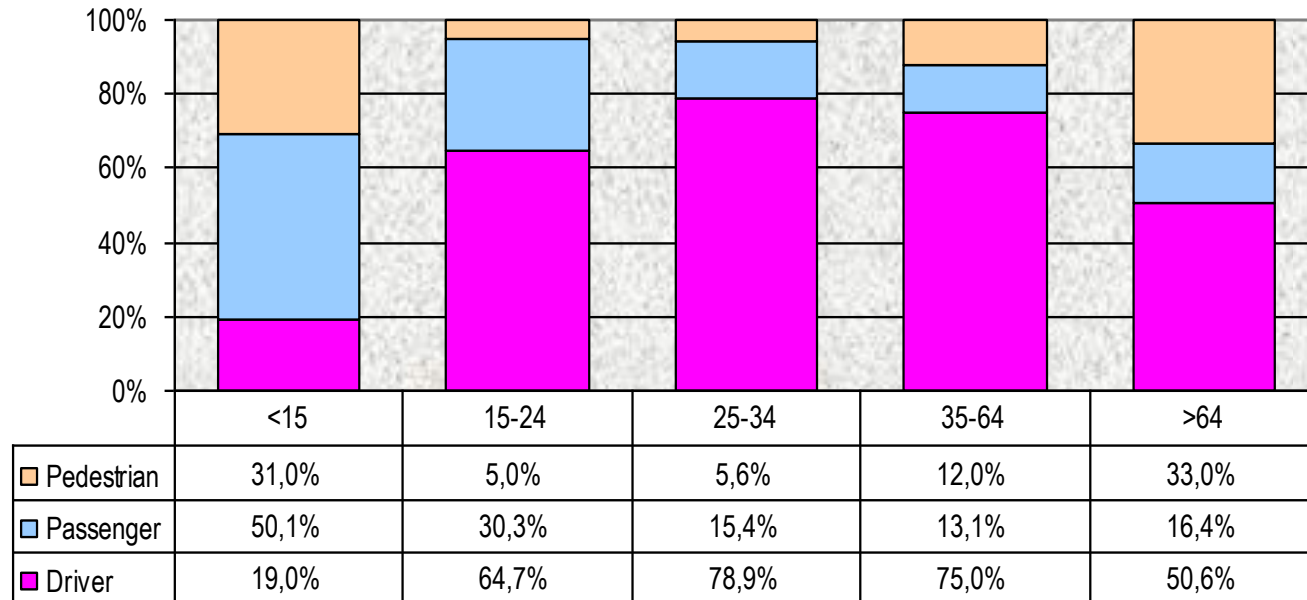
Fatalities on motorways by age & person class



Fatalities on motorways by age and person class, 2004¹

- A larger proportion of middle age drivers (35 - 64 years old) are killed on motorways (69,9%), compared with those of other age groups.
- A relatively small number of young driver (up to 24 years old) fatalities is noted on motorways (192 people, compared to 3.572 people on the remaining road network), possibly indicating that young people do more driving on the non-motorway network.

Fatalities on non-motorway road network by age & person class



Fatalities on non-motorway road network by age and person class, 2004¹

- Children and elderly people seem to be more vulnerable pedestrians on the non-motorway road network, as they constitute 31% and 33% of fatalities amongst all children and elderly people respectively.
- Younger drivers (25 - 34 years old) constitute the largest proportion of fatalities occurring on the remaining road network.

Fatalities on motorways by vehicle manoeuvre type & lighting conditions

- The single biggest category of fatalities occurring on EU-14 motorways in 2004¹, concern fatalities resulting from accidents in which occupants killed were in a vehicle moving straight ahead and where no other manoeuvre took place (29,5%). The respective percentage for the same manoeuvre type on the remaining road network is higher (39,2%).
- On both motorways and non-motorway road network, almost one-third of the fatalities occurred when it was dark in 2004¹.
- 11.030 (48%) persons, almost half of the respective overall fatalities, are killed on non-motorway roads in daylight or twilight, whereas on motorways the respective percentage is lower (39%).

Conclusions & recommendations

- Different impact of the various examined road safety parameters on the motorways safety level, than on the remaining road network due to the specific design characteristics but also to the different behaviour of the drivers.
- Within the decade 1995 - 2004¹ a decrease in accident fatalities on motorways was observed, which was though lower than the respective reduction of the overall road accident fatalities in the 14 EU countries.
- The use of exposure data (population, length of motorways), allows for more accurate comparison between EU countries. More exposure data (vehicle-km, person-km and vehicle fleet) necessary for further analyses of road accident risk.
- Motorways in two countries of the Southern part of Europe (Greece and Italy) seem to be the least safe, whereas two Nordic countries (Sweden and Finland) have the lower motorway fatality rates.
- Analyses using CARE disaggregate road accident data lead to results which do not always coincide with analyses using aggregate data.
- Analysis using statistical models is necessary for the identification of the combined correlation of the parameters with an impact on motorway safety and the underlining reasons behind the motorway casualties.

Thank you for your attention!

Presented by Petros Evgenikos

Tel: +30.210.7721380

E-mail: pevgenik@central.ntua.gr