European Commission

Safety Performance Indicator (SPI)

Fatigue

Mobility and Transport

The purpose of the Safety Performance Indicator reports is to provide an overview of recent statistics on road safety performance indicators that are linked to traffic safety.

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1. Summary

It is estimated that driver fatigue is a contributing factor in 15% to 20% of crashes (SWOV, 2019). Consequences of a fatigue related crash are often serious because brakes are used late or not at all, resulting in high impact speed.

This report provides an overview of available data on fatigued driving for EU member states and EFTA countries. Moreover, it provides information related to regulations and enforcement.

In general, data on fatigued driving are scarce and largely limited to self-reported data, since largescale, reliable and objective data based on existing methods are impossible to collect. For this report, data from the ESRA project (survey data) are used.

Based on these self-reported data the following can be:

- The mean percentage of self-reported fatigued driving (during the previous 30 days) in Europe is 23%. For most individual EU countries, the percentage differs less than 5 percentage points from the EU22 mean.
- A higher percentage of males (25%) reported fatigued driving than females (16%).
- Reported fatigued driving decreases with age.
- A European driving time and rest regulation exists for professional drivers only.
- A recent measure to counter fatigued driving is a new EU regulation[1] on type approval requirements for motor vehicles, based on which a Driver Drowsiness Monitoring and Attention Warning (DDAW) system is required for all new types of passenger and goods motor vehicles from July 6 2022.

[1] Commission Delegated Regulation (EU) 2021/1341 of 23 April 2021 supplementing Regulation (EU) 2019/2144

2. Introduction

2.1 Safety Performance Indicators (SPIs)

The most common indicators used for evaluating traffic safety are the number of traffic crashes, or the number of fatal/serious injuries due to a traffic crash. However, these numbers insufficiently reflect the actual problem and the underlying factors that lead to the crash. Moreover, crashes are relatively rare events, and are under-registered. Therefore, alternative proactive approaches have been adopted to evaluate safety. For example, events/behaviors/attitudes which have a recognized relationship with crash frequency, and that are sensitive to policy measures, can be used as a proactive approach to evaluate safety. Since the 90's these so-called safety performance indicators (SPIs) are increasingly used to develop traffic safety policies.

The following *SPIs* are detailed in ERSO SPI reports:

- Speeding
- Distraction
- Fatigue
- Driving under the influence of alcohol and drugs
- Protection – the use of seat belts, helmets, and child restraint systems
- Support for policy measures
- Subjective safety/risk perception

Speeding, distracting driving, and using protective equipment are behaviours which can be observed, through roadside observations or measurements. For the SPI driving under the influence of alcohol and/or drugs, police-assisted random breath testing during roadside alcohol checks provide potentially the best data.

On the other hand, fatigued driving, support for policy measures or subjective risk perception are (practically) not observable. For these SPIs well-designed questionnaire surveys may provide valuable data on road safety performance.

2.2 Aim of the ERSO SPI reports

The ERSO SPI reports provide an overview of the available data in the EU Member States as well as EFTA countries for each listed SPI. The reports aim to give insight into the differences between (groups) of countries regarding their road user behaviour or attitude. Where feasible, the report looks at whether SPIs are related to existing policies and regulations, providing possible effective interventions to increase

safe behaviour, or discourage unsafe behaviour. In addition to identifying relevant interventions, SPI data can be used to evaluate these measures and interventions.

For most SPI subjects an ERSO thematic report exists as well. In these reports background information of risks, effects and causes are provided (see: Thematic reports (europa.eu)).

2.3 SPI Fatigue

The **SPI Fatigue** is defined as:
"Percentage of drivers driving non-fatigued"

SPIs are defined 'positively', that is the percentages of drivers that perform the behaviour that is considered safe. However, presenting the percentages of unsafe behaviour conveys a better picture of the differences between the countries. Therefore, percentages of fatigued driving are presented in this report.

Fatigue is a broad concept which is often used interchangeably with concepts like tiredness, drowsiness and sleepiness. There is no single definition. See the ERSO Thematic Report on Fatigue (European Commission, 2021) for further background information on the subject of fatigued driving.

2.4 Data Source

Largescale, reliable and objective data based on existing methods are impossible to collect. For truck or bus/coach drivers, (COM, 2023) indirect measures/data, that is tachograph and rest/drive times, could be considered.

Information about the prevalence of fatigue is mostly based on self-report studies. The most extensive and recent self-reported data collection on fatigued driving have been collected within ESRA (E-Survey of Road users' Attitudes). Data on fatigued driving by car drivers presented in this report are therefore based on these data.

2.4.1 ESRA

Within ESRA (www.esranet.eu), a joint collective of road safety institutes, research centres, public services, and private sponsors collect and analyse comparable data on road safety performance, in particular on road safety culture and behaviour of road users worldwide.

ESRA data are collected by means of online panel surveys, providing a representative sample of the national adult population in each

participating country (at least N = 1,000 per country). The extensive survey is conducted in 68 participating countries, covering 6 continents. Data on fatigued driving are collected across 24 European countries, 22 of which are among the European Union and/or EFTA countries. In this report, the ESRA data for these 22 European countries are presented, i.e., Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland. The ESRA data are restricted to car-drivers. For details on the methodology of the data collection and analysis see: Goldenbeld and Nikolaou (2022); Meesmann, Torfs, Wardenier, and Van den Berghe (2023).

3. The occurrence of driving when being fatigued in Europe

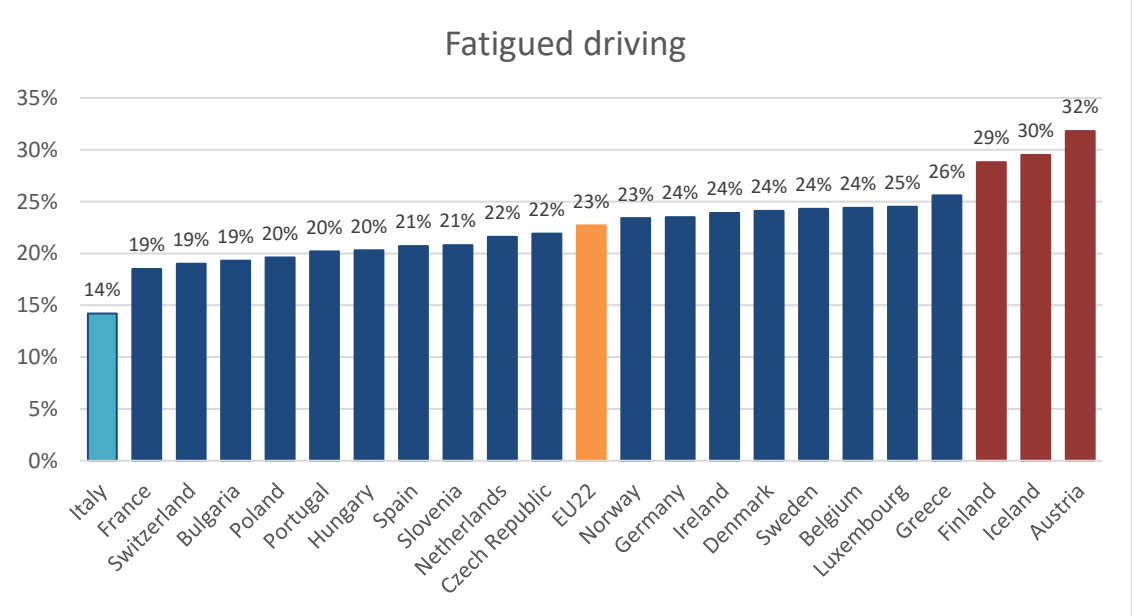
Within the ESRA survey, the following question was asked regarding fatigue:

Over the last 30 days how often did you as a car driver:
Drive when you were so sleepy that you had trouble keeping your eyes open?

The answer options ranged from 1 'never' to 5 '(almost) always'. The data represent the percentage of car drivers that answered values 2 to 5 (at least once) on the above questions.

Figure 1 shows the percentages of drivers that indicated having driven when they had trouble keeping their eyes open. On average 23% of European drivers reported fatigued driving. The scores per country varied between 32% (Austria) and 14% (Italy). For most countries, scores on fatigued driving are quite homogeneous across Europe. Three countries have percentages more than 5 percentage points higher than the EU22 mean, that is: Finland (29%), Iceland (30%) and Austria (32%). Italy is the only country that shows a percentage more than points lower than the EU22 mean, namely 14%.

***Figure 1**. Percentage of drivers that indicated having driven when they were so sleepy that they had trouble keeping their eyes open during the past 30 days. (Source: https://www.esranet.eu/)*

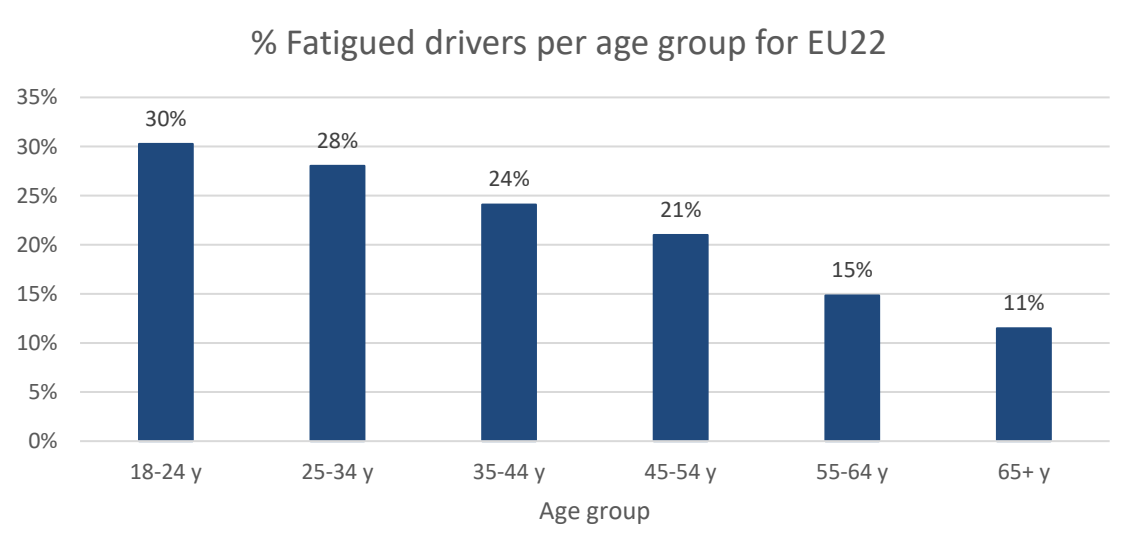


3.1 Gender differences

With regards to gender, a lower share of females (16%) reported driving fatigued in the last 30 days compared to males (25%).

3.2 Age differences

***Figure 2.** Percentage of drivers per age group for EU22 (Source: https://www.esranet.eu/)*



There seems to be a clear relation between age and reported fatigued driving. The younger the age, the higher reported incidence of fatigued driving: 30% of 18–24-year-olds against 11% of those aged 65 and over.

4. Consequences of fatigued driving

It is estimated that, overall, driver fatigue is a contributing factor in 15% to 20% of crashes (SWOV, 2019). In general, the impact speed of an asleep-behind-the-wheel crash is high, and the consequences serious, because brakes are used too late or not at all.

No recent international data however exists on fatigue related fatalities, because the police rarely register fatigue as a specific accident factor. One of the main reasons for this is probably that fatigue as an accident cause is hard to ascertain objectively.

5. Legislation and enforcement

There are no specific rules or regulations related to fatigued driving that apply to all road users but for professional drivers, a European driving time and rest regulations exists:

Regulation (EC) No 561/2006 of the European Parliament and of the Council of 15 March 2006 on the harmonisation of certain social legislation relating to road transport[2].

Enforcement of these regulations finds place through on-road checks of the vehicle's on-board tachograph and through inspection of the transport companies' administration. It also establishes that the minimum number of checks shall cover at least 3% of days worked by drivers of vehicles falling within the scope of Regulation (EC) No 561/2006. According to numbers collected in 2019-2020, most EU countries reached this threshold of 3%, with seven member states having a lower number, namely: Greece, Hungary, Ireland, Luxembourg, Malta and The Netherlands.

Although specific regulations differ between EU countries, no relation with fatigue related crashes can be investigated, since crash data specifically related to fatigue are not available.

[2] http://data.europa.eu/eli/reg/2006/561/oj

Another more recent measure to counter fatigued driving is a new EU regulation on type approval requirements for motor vehicles. The EU Regulation 2019/2144, more commonly referred to as 'General Safety Regulation 2', requires all new types of passenger and goods motor vehicles from July 6 2022 and all new vehicles from 7 July 2024 to be equipped with Driver Drowsiness Monitoring and Attention Warning (DDAW) system. The DDAW is defined as a system that assesses the driver's alertness through vehicle systems' analysis and, where needed, provides a warning to the driver. In particular, DDAW must detect or recognize the driving and/or steering pattern symptomatic of a driver exhibiting reduced alertness due to fatigue, and interact with and alert the driver via the vehicle's human-machine interface.

So far, there is however no empirical evidence of the effects of these systems on road accidents.

6. Limitations

Fatigued driving appears to be an important risk factor in road safety. However, data on fatigued driving are scarce. The data source used in this report is the ESRA project which is based on self-reports. This type of data has disadvantages, such as social desirability bias (the tendency of respondents to provide answers which present a favourable image of themselves), non-accurate recall, misunderstanding of questions or selective non-response bias (occurring when subjects who refuse to take part in a study, or who drop out before the study can be completed, are systematically different from those who participate).

7. References

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