



# Economic and Social Council

Distr.: General  
13 September 2019

Original: English

---

## Economic Commission for Europe

### Inland Transport Committee

#### Working Party on Rail Transport

##### Seventy-third session

Geneva, 25–27 November 2019

Item 18 of the provisional agenda

##### Improving safety in Rail Transport

### Analysis of rail safety data

#### Note by the secretariat

#### I. Mandate

1. At the seventy-second session of the Working Party on Rail Transport delegates decided to modify the agenda item on level crossing safety to widen its scope to ensure that all aspects of safety in the railways were covered. This document has been prepared in the framework of this updated agenda item.

#### II. Background

2. In support of agenda item number 18, the secretariat of the Working Party on Transport Statistics (WP.6) has prepared some analysis of the safety record of rail transport, on its own terms in addition to comparisons with other modes. Analyses are based on data from the UNECE transport statistics database which is provided as official statistics by member States, unless otherwise noted. The analysis focusses on the timeframe 2010 to 2017, as 2010 is the first year that the secretariat received rail accident statistics.

3. There is significant data availability in the ECE region, with 39 countries having at least some rail safety data available. Armenia, Israel, Kyrgyzstan, Montenegro, Russian Federation, Tajikistan, Turkey, Turkmenistan and Uzbekistan were not included in the analyses due to lack of data. It should be noted that the European Union Agency for Railways (ERA) is the source of the ECE data for EU member States, Norway and Switzerland and ERA has produced its own document for European Union (E.U.) member States in 2016 on this subject.<sup>1</sup>

---

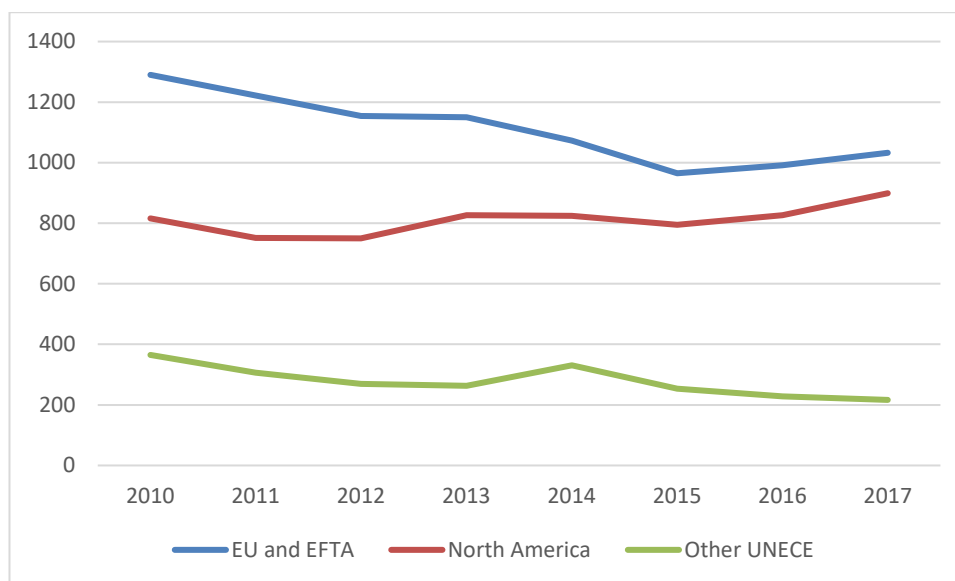
<sup>1</sup> [https://www.era.europa.eu/sites/default/files/library/docs/safety\\_interoperability\\_progress\\_reports/railway\\_safety\\_performance\\_2016\\_en.pdf](https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/railway_safety_performance_2016_en.pdf)

### III. Overview of Rail Safety

4. Between 2010 and 2017, over 17 000 fatalities occurred as a result of rail accidents in the ECE region. This figure is made up of nearly 6 500 in North America, more than 8 700 in the E.U. and EFTA countries, and nearly 2 000 in the rest of the ECE region (Figure I). Over this period, there was a broadly improving trend, with fatalities steadily decreasing from around 2 500 in 2010 to 2 150 in 2017. It is important to note that rail accidents are rather erratic, with occasional disastrous accidents leading to spikes in the data. Fatalities are typically included if the victim dies within 30 days of the accident, agreeing with road traffic accident statistics definitions.

Figure I

#### Breakdown of ECE rail fatalities by region (including some estimations)



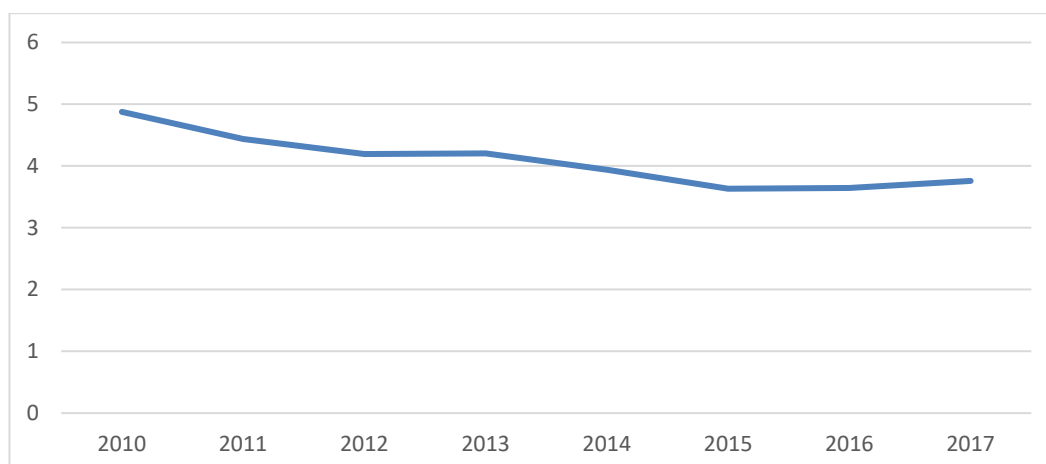
Source: ERA and UNECE.

5. As the ERA document referenced above makes clear, it is not immediately obvious which activity data is the best denominator to use when comparing rail safety across countries (or indeed with other modes). A particularity of rail safety is that around 95% of fatalities occur to victims external to the train: either trespassers on the line, level crossing users (pedestrians and vehicle users).<sup>2</sup> This means that comparisons per passenger-km are not always optimal, as countries with large freight rail systems and small passenger volumes may still have a large number of trespasser deaths. Train-km is thus an additional possible denominator to consider, however this report concentrates on passenger-km.

<sup>2</sup> See Figure III below, noting that further external deaths will be included in employees, namely track workers.

## IV. Relative safety of rail

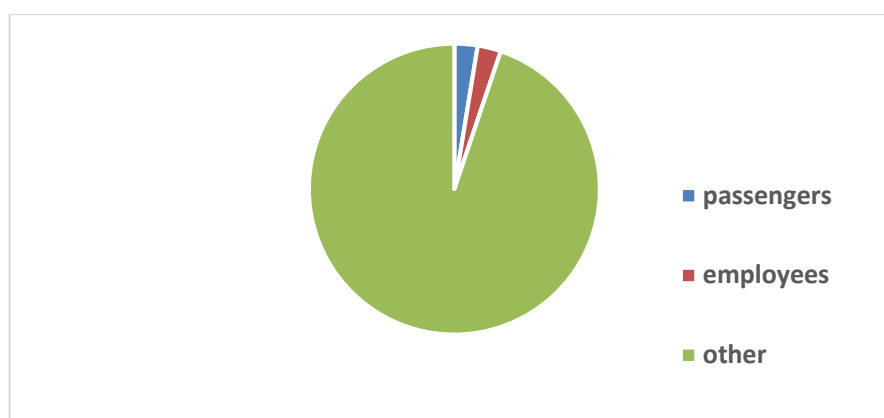
Figure II  
Evolution of UNECE rail accident fatalities (total fatalities per billion passenger-km), 2010-2017



6. Taking the ECE average for 2010-2017, the total rail fatality rate was around 3.8 deaths per billion passenger-km. It too showed a general downward trend over this short time period, as shown in Figure II.

7. This total figure masks important differences across countries, as it ranged from less than one in Ukraine and United Kingdom, to 310 in Bosnia Herzegovina and 286 in Albania. These two countries do have relatively small passenger rail services, and so these high numbers are likely to be a result of the situation described above - the breakdown of fatalities by user is not available in Albania, but the data of Bosnia Herzegovina do show 100% of fatalities are “others”, meaning neither passengers nor employees.

Figure III  
Fatalities by type of user, UNECE average 2010-2017



8. This overall rail fatality rate compares broadly favourably with other modes. The figure for total road accidents in UNECE is 6 fatalities per billion passenger-km (passenger-km of all modes). Like with the rail data, this average masks a large range of safety levels, from 1.5 deaths per billion pkm in Norway to nearly 24 in Turkey.

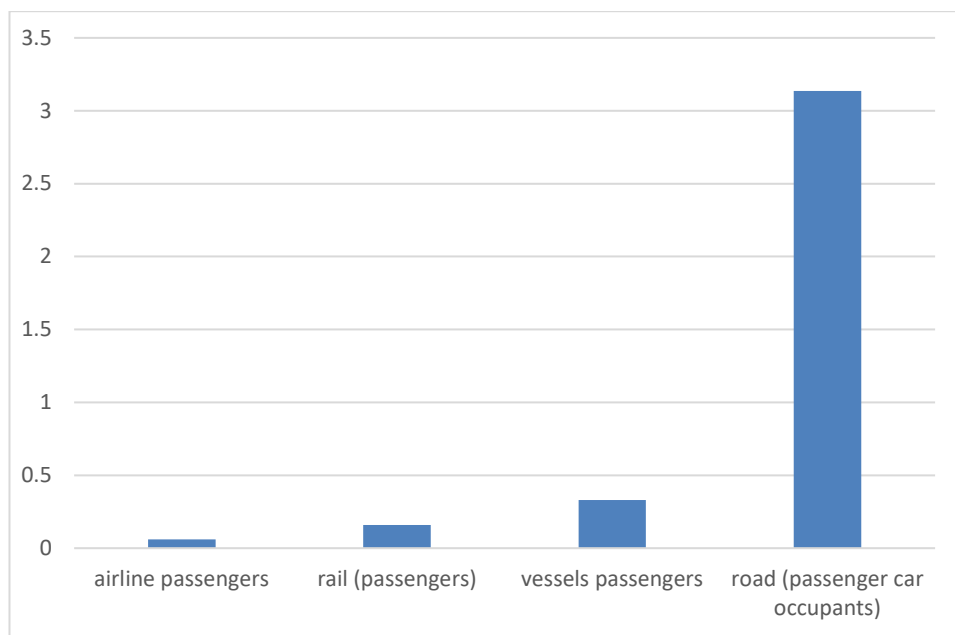
9. While the coverage of available countries with road and rail safety and activity data differs, the reasonably large number of countries for both calculations gives some reassurance that the two sets are somewhat comparable. However, the main comparability challenge is as mentioned earlier, namely that the vast majority of rail accident fatalities occur to trespassers, level crossing users and track workers. Further analysis is briefly made on the basis of passengers only.

## V. Passenger-Only Fatality Rates

10. As ERA does in their analysis, passenger-only fatalities can be compared to passenger-km. This drastically reduces the rail figures, with a UNECE average of 4 rail fatalities per billion passenger-km reducing to 0.16 passenger fatalities per billion passenger-km. For the road sector, a similar adjustment is not possible due to the multiple types of road user (passengers and drivers of cars, buses, bicycles, lorries, pedestrians etc), not all of which have passenger-km data attached to them. Nevertheless, only looking at passenger car occupants gives a fatality rate of 3.1 per billion (passenger car) passenger-km.<sup>3</sup>

Figure IV

### Passenger fatalities per billion-pkm



*Notes:* Arline data are based on available EU/EASA data for 2014. Rail passengers is available UNECE countries and averaged 2010-2017. Vessels data are based on available EU/EMSA data for 2011–2014. Road passenger car occupants are based on UNECE road accident fatalities by victim (latest year 2010-2017) and UNECE passenger-car passenger-km (latest year 2010–2017).

## VI. Concluding remarks

11. This brief analysis shows that the rail network in the ECE region has an improving safety record and compares well with other modes of transport. The safety performance specifically for passengers is even better with a strong indication that the main fatalities arise from trespassers and level crossing users.

12. The Inland Transport Committee Group on Experts on Safety at Level Crossings has already prepared a report on recommendations for level crossing (ECE/TRANS/WP.1/2017/4) discussed at the seventy-first session of SC.2. Given the significance of this data and that rail transport remains very safe for its users, the Working Party may wish to discuss how best to look at those rail safety aspects not related to level crossing safety, including trespassing.

<sup>3</sup> See Figure IV for passenger/occupant comparisons across modes.