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Traffic censuses and geospatial statistics:
2020 E-Road traffic censuses

E-Road Census: Reminder to submit data, results so far received, and the value of road traffic data

Note by the secretariat

Summary

This document gives an update on the status of the 2020 E-Road census. It contains a summary of the results received so far by country, notes which countries have delayed their census due to COVID-19, describes dissemination of the results by the secretariat, and also discusses the future direction of the census exercise.

I. Background

1. The E-Road census has, since the 1980s, provided infrastructure and traffic information on the E-Road network, as defined in the European Agreement on Main International Traffic Arteries (1975) (AGR). These roads make up highways deemed to have international importance, and information on their characteristics and use provides insights into internationally relevant infrastructure (past use and future requirements), the identification of bottlenecks, road safety benchmarking, modal split analysis, and the potential to shift volumes from roads towards more sustainable modes (notably to rail and inland waterways). While the data collected does not explicitly split traffic between passenger and freight transport, the breakdown of Annual Average Daily Traffic (AADT) between lighter vehicles (motorised two-wheelers and passenger cars) and heavier vehicles (buses and heavy goods vehicles) allows certain proxies to be used.

2. During the 2015 round, the secretariat received Shapefiles of traffic volumes from ten member States. Shapefiles are a geospatial file that allow characteristics (such as traffic volumes) to be shown on top of a geographic map, allowing corridor-specific analysis (see Figure 1).

Figure 1
2015 E-Road census results mapped

3. Despite the value of plotting countries' traffic results on this map, there was limits to the scale of analysis possible due to the large number of missing countries. Therefore, in the 2020 round, member States were encouraged to provide these Shapefiles wherever possible, including exploring alternative sources within their country.

4. The COVID-19 pandemic drastically affected traffic volumes in a number of countries for several months, and in addition sanitary measures and differing degrees of lockdown impacted the ability of many governments to collect the traffic information necessary. When sending reminders therefore, the secretariat recommended that if countries planned to record their 2020 results as normal, then data for 2019 were also requested, which would allow an assessment of a more typical year.

II. Status of 2020 results

5. As of 18 March 2022, fourteen countries had provided census results in some form: Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czechia, Finland, Hungary Ireland, Kazakhstan, Netherlands, Russian Federation, Serbia and Sweden. Of these countries, only three provided data as Shapefiles (Czechia (who provided July 2020-June 2021 data), Finland and Sweden). In addition, two countries (Croatia and Hungary) provided data in a geospatial basis but as a picture only (i.e. PDF or PNG format).

6. Some countries responded that no relevant information was available in their country or asked for more details on the specifics of what is required for the E-Road census. This included Albania, Greece, North Macedonia and Republic of Moldova.

7. A further group of countries indicated that the census would be delayed (typically due to the pandemic) or that the transmission of results would be delayed. This group included Austria, Germany (who delayed their collection to 2021), Poland, Romania, Slovakia (both of whom are delaying their collection to 2022) and Switzerland.

8. Countries are reminded to submit data for 2020 (or for another time period due to COVID-19) as soon as is feasible, particularly in a geospatial format.

III. Country summaries of results

9. While some countries could not provide all information requested in the census, the data that were available sometimes allowed an assessment of traffic differences in 2020 versus 2015, or in some cases with 2019. These are summarized as follows.

Armenia

10. Armenia provided limited information, but this did include the length of their E-Road network (769km, unchanged 2015-2020), which is split between the E-117 and E-691 roads. Vehicle-km data were provided which showed that while truck traffic has steadily increased (23 per cent 2015-2020), public transport (minibuses and trolleybuses) decreased 54 per cent and 27 per cent respectively, most of which was accounted for in a drop from 2019 to 2020 and thus can be attributed to the pandemic.

Azerbaijan

11. Azerbaijan provided data as this document was being prepared, and are not analyzed here.

Belarus

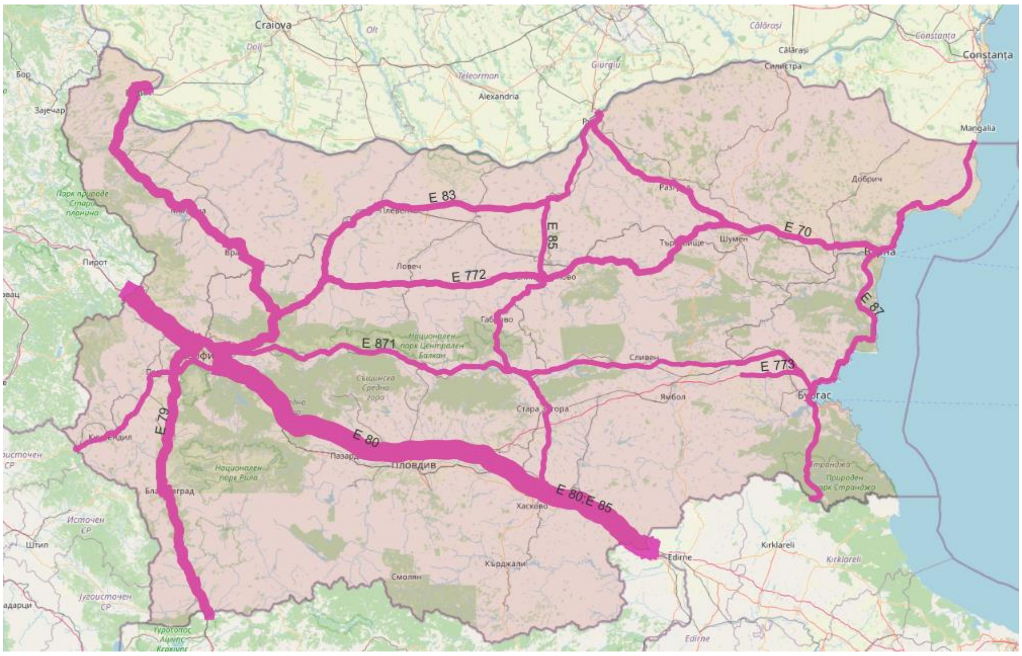
12. Belarus infrastructure data showed that 50 km of two-lane E-Roads had been upgraded to four-lane roads since 2020, with the total E-Road length growing from 1739 km to 1859 km. No traffic information was available, due to COVID restrictions.

Bulgaria

13. Bulgaria data were also limited due to the pandemic. Infrastructure data showed a 19 per cent increase in the E-Road lengths compared to 2020. Traffic data were provided for AADT averages on each E-Road, as well as the special types of road traffic (night traffic, holiday traffic and peak-hour traffic), and vehicle-kilometres. After further correspondence with the Bulgarian XXX agency, an extensive table of traffic volumes has been provided for 2020, which gives 72 traffic counts (broken down by type of traffic and their location).

14. While Bulgaria did not provide any geospatial data directly, the AADT figures for each E-Road can be mapped relatively easily. This is done in Figure 2. It is important to note that taking an average of traffic on the entire road will obviously not be representative, in particular for roads that traverse the capital Sofia (such as the E-80). However, there is still value in comparing overall traffic on different roads.

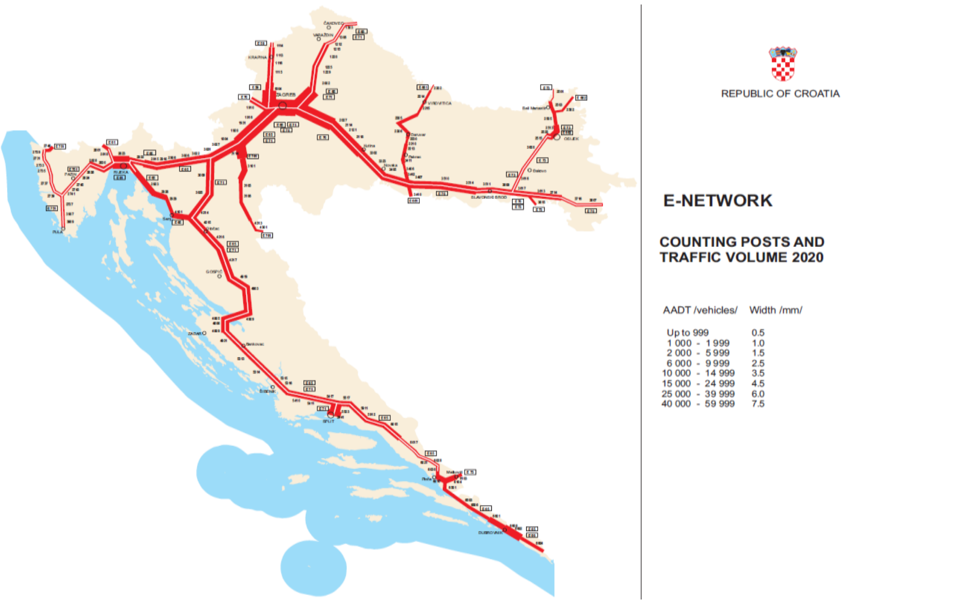
Figure 2
Average traffic volumes on E-Roads in Bulgaria, 2020. (Baselayer: © OpenStreetMap contributors)



Croatia

15. Data from Croatia were very complete. Traffic volumes on the E-Road network were down 10.2 per cent on average in 2020 compared to 2015. This compared to a 6.3 per cent drop in overall vehicle-km in that time. As noted, data were not provided in a geospatial format, but a map was provided as a picture, which is shown in Figure 3.

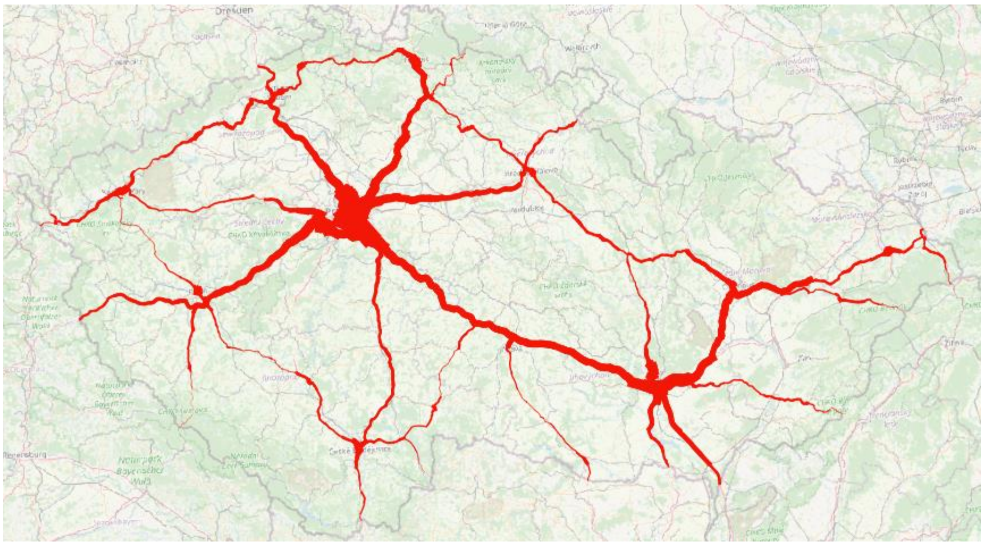
Figure 3
Croatia E-Road Traffic Map, 2020



Czechia

16. As noted, Czechia data were provided for the July 2020 to June 2021 period, exceptionally due to the COVID19 pandemic. Czechia provided detailed methodoogy on how the census was conducted. This specified, for example, that this census round used a grerater number of short-term manual counting posts than 2016. The results of the census showed a decrease of 7 per cent in E-Road traffic compared to the 2016 census. The vehicle breakdown showed that category D vehicles, namely buses and passenger coaches, saw the biggest drop in traffic (38 per cent), whereas heavy goods vehicles saw an increase in traffic. Data for 800 specific counting posts were provided. Figure 4 shows a representation of the Czechia AADT in the 2020/2021 period.

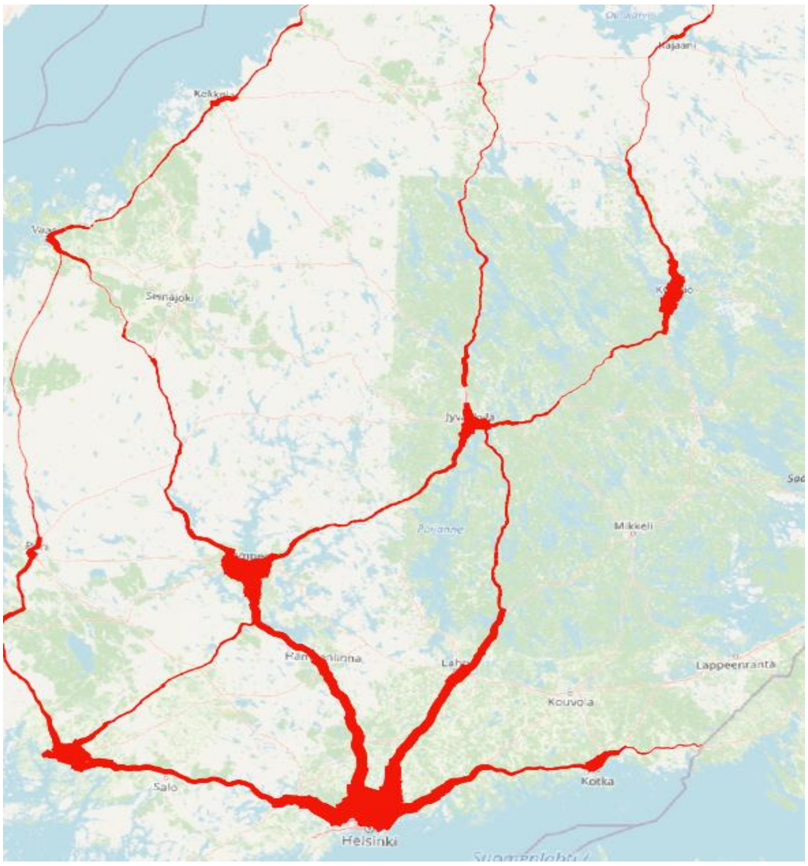
Figure 4
Czechia AADT 2020/2021, directly from Shapefile (Baselayer: © OpenStreetMap contributors)



Finland

17. The Finnish census showed differences in traffic compared to 2019, with a seven per cent reduction year-on-year. Breakdowns by type of vehicle traffic were not available. Figure 5 shows 2020 traffic levels in lower Finland.

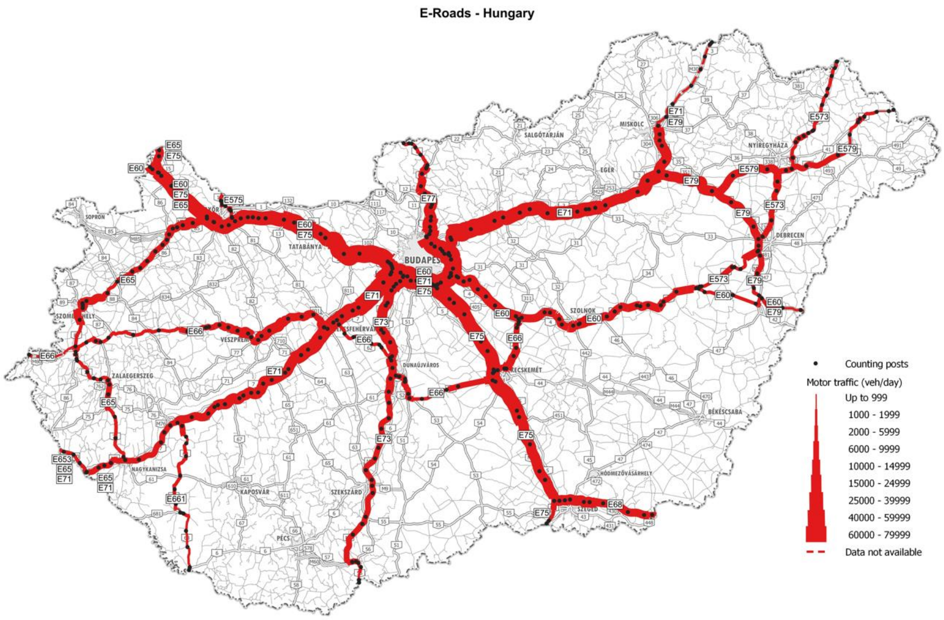
Figure 5
Finland (lower) AADT 2020, directly from Shapefile (Baselayer: © OpenStreetMap contributors)



Hungary

18. Data for Hungary show that vehicle-km on the E-Road network was largely flat in 2020 compared to 2015, while the vehicle breakdown showed a 5 per cent drop in buses and coaches similar to other countries. The AADT for 2020 is shown in Figure 6.

Figure 6
Hungary E-Road Traffic Map, 2020



19. Kazakhstan provided E-Road census data for the first time in 2020, including infrastructure and traffic information. Total traffic (in vehicle-km) on the E-Road network was 39 per cent higher than in 2015, compared to a 31 per cent increase on other roads. Detailed traffic count data for 319 posts was available, with descriptions of where each post lay.

Ireland

20. Ireland shared an interactive map produced by Transport Infrastructure Ireland[1], which had not been analysed as this document was prepared.

Netherlands

21. The Netherlands provided census information covering 2020 only, with detailed traffic counter information for 2169 posts along their roads.

Russian Federation

22. Russian Federation provided infrastructure information as well as some average count data for each E-Road. This was mapped onto the network on a road-by-road basis in similar fashion to Bulgaria, which is shown in Figure 7.

[1] https://trafficdata.tii.ie/publicmultinodemap.asp.

Figure 7
Average traffic volumes on E-Roads in Russian Federation, 2020. (Baselayer: © OpenStreetMap contributors)

Serbia

23. Serbia provided updated infrastructure information, but no updated traffic information since the 2015 census was available.

Sweden

24. Sweden provided infrastructure, AADT and vehicle-km information, which showed that E-Road vehicle-km increased 14 per cent compared to 2015, and average AADT (for all counting posts) increased 9.2% since 2015. Figure 8 shows the 2020 traffic in lower Sweden.

Figure 8

Sweden (lower) AADT 2020, directly from Shapefile (Baselayer: © OpenStreetMap contributors)

IV. Publication of results

25. All census contributions received thus far have been uploaded to the website at https://unece.org/transport/transport-statistics/traffic-census-2020, and Shapefiles for the countries providing them were added to the interactive UNECE map at https://unece.org/traffic-census-map. In this update, the proportion of heavy traffic has been added as a separate layer (made up of category C and category D traffic representing heavy goods vehicles and buses and coaches, respectively). This can be used as a reasonable proxy for goods traffic, given the relatively low numbers of buses and coaches typically using the E-Road network. Figure 9 shows the heavy traffic layer of Czechia.

Figure 9

Czechia heavy vehicle (categories C+D) AADT, 2020/2021

V. Quality of results and improving comparability

26. As can be seen in the above descriptive statistics, data availability and quality vary enormously between countries, and even within the same country between census years (although this was exacerbated by COVID-19 causing collection difficulties). Both for the 2020 round and the future, countries are encouraged to share their views on how to extract the most value from the census exercise.

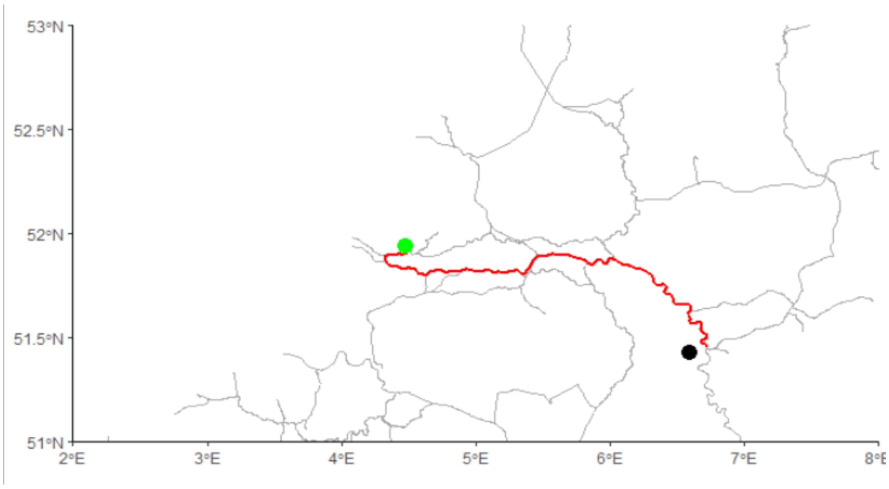
27. The secretariat believes that the greatest added value in the census exercise comes from having traffic information in a geospatial format. Infrastructure information and top-level vehicle-km have important uses but are collected through other means. Geospatial traffic data, however, is not otherwise collected at the international level and has the most potential to be used to add value to international transport statistics.

VI. Mapping possibilities

28. The examples of Bulgaria and Russian Federation above show what can be achieved with very minimal geospatial data. Even just a single number can be mapped in a useful way when it is known which road it relates to, and the corresponding Shapefiles are available. To expand on this, data from the Netherlands, Kazakhstan and others show that traffic counter data can be available in a detailed form, but without a way to relate it to the real network, it cannot be used.

29. If in the future, the spatial coordinates of each counting post can be provided, then there should be relatively simple ways to translate a traffic count at a specific post to a segment of the E-Road network. This may be possible using open-source software, either using geospatial software such as QGIS, or statistical software such as R. Figure 10 shows how origin and destination point can be translated onto a given network using geospatial software. In the case of the census, an equivalent task would need to project the locations on to segments defined by their proximity to a particular counting post.

Figure 10
Creating a network segment based on two given points



30. To enable this kind of analysis and allow countries without Shapefiles to experiment with mapping traffic count data onto the E-Road network, the secretariat will shortly make available country-specific E-Road Shapefiles on the website.

VII. Future Development

31. The current excel questionnaire is not particularly user-friendly to provide data with, and much useful information may be buried from users. In the future, a simpler questionnaire

that focusses on traffic counter data, with corresponding geographical coordinates, may be considered if this is deemed more useful and easier to provide data on.