

The Seat Belt of the Roads: Concrete Barriers



TÜRKÇİMENTO

General Situation in Traffic Accidents

According to the WHO report, deaths from traffic accidents are the **8th major cause** of death, with the highest share among all causes of death.

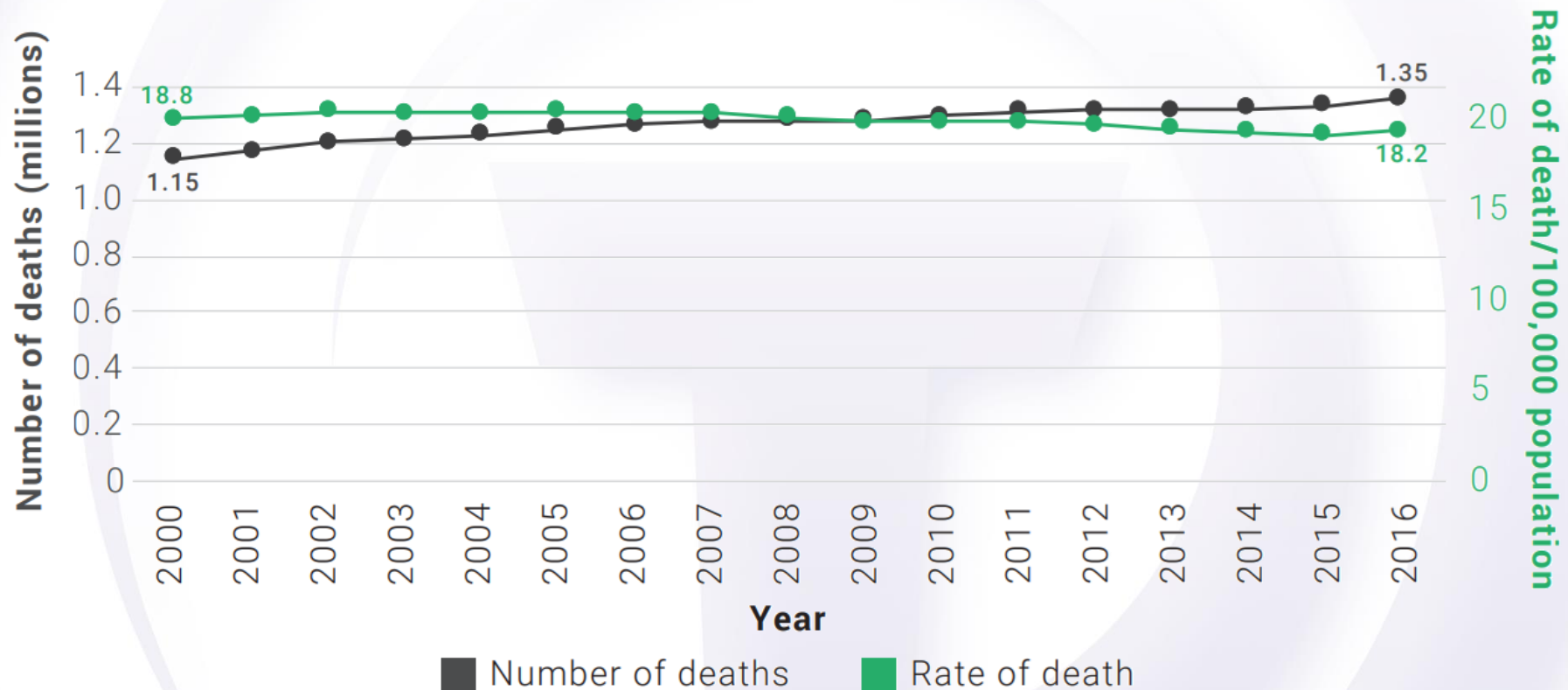
Rank	Cause	Mortality Rate (%)
1	Ischaemic heart disease	16.6
2	Stroke	10.2
3	Chronic obstructive pulmonary disease	5.4
4	Lower respiratory infections	5.2
5	Alzheimer's disease and other dementias	3.5
6	Trachea, bronchus, lung cancers	3.0
7	Diabetes mellitus	2.8
8	Traffic Accident	2.5
9	Diarrhoeal diseases	2.4
10	Tuberculosis	2.3

2016 WHO Global Health Estimates



General Situation in Traffic Accidents

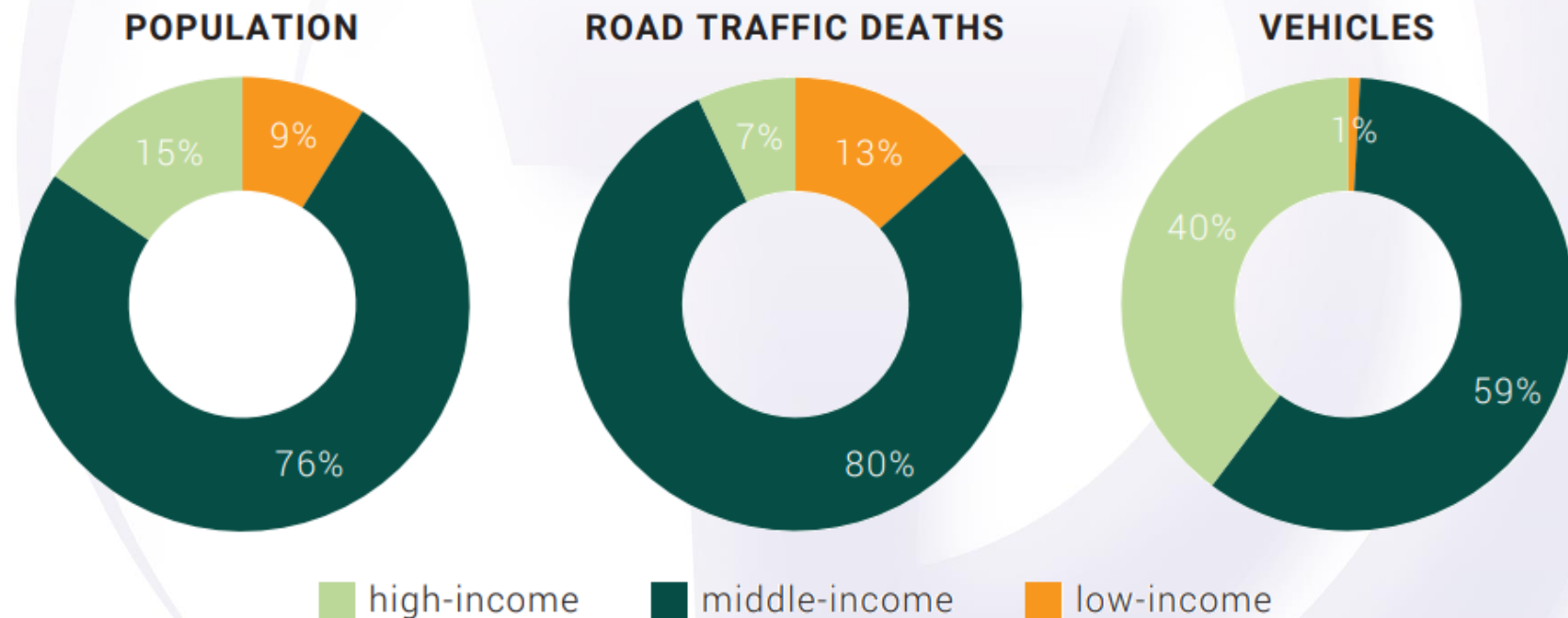
- Globally, **1.35 million people** die in traffic accidents every year.
- For people aged between 5 and 29, traffic accidents are the leading cause of death.



General Situation in Traffic Accidents

In developing and underdeveloped countries, the risk of death in traffic accidents is **3 times** higher than in developed countries. Among the main reasons for this situation;

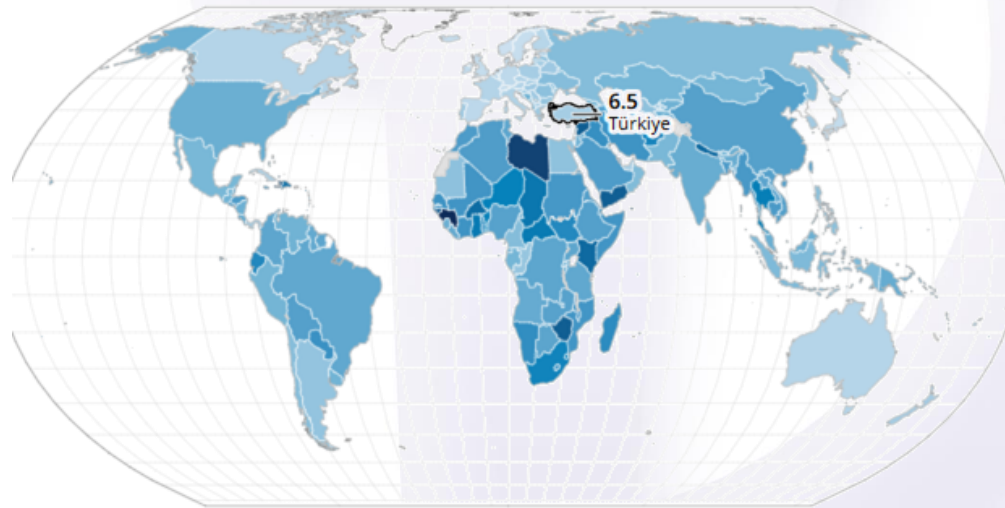
- **Driver behavior,**
- **Inadequate traffic control,**
- **Safety systems in vehicles and**
- **Low traffic safety culture.**



Traffic Accidents in Türkiye

The average number of traffic accidents in our country every day;

- **20 citizens lost their lives,**
- **850 citizens are injured and**
- **65 citizens remain disabled.**
- In Türkiye, the **road traffic mortality rate (per 100 000 population)** has been **6.5 deaths per 100 000** in 2021.
- The direct and indirect costs of traffic accidents amount to 1.5% of GNP.



deaths per 100 000

Min | Max
0 | 37.4

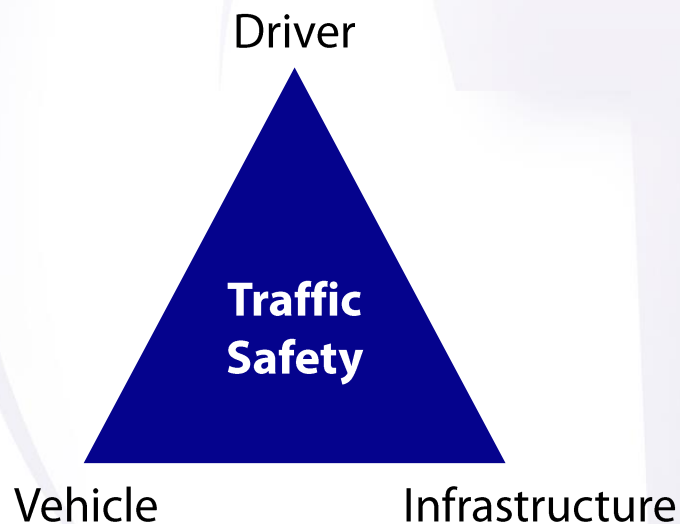


Traffic Accidents in Türkiye

According to the General Directorate of Security Traffic Statistics Bulletin, the 3 types of occurrence have the highest share in fatal/injury traffic accidents:

- Side impact
- Pedestrian collision and
- Run-off-the-road.

Integrated Traffic Safety Approach



Roadside Safety Elements

According to TS EN 1317 standard, Roadside Restraint Elements are grouped as follows:

- Barriers
- Impact cushions
- Transition elements
- End elements
- Motorcycle protection systems
- Pedestrian parapets



Roadside Safety Elements - Barriers

The main purpose of barriers is defined in the standards as follows.

'To prevent errant vehicles from leaving the road, slow them down or return them to the road'

Therefore, it can be said that **barriers are the main element** in preventing death/injury traffic accidents caused by **run-off-the-road**.

Barriers:

- They can be manufactured using steel, concrete, wood or composite materials.
- They are placed at the roadside or in the center median.
- Their design is tailor-made and designed according to the **performance parameters** defined in **TS EN 1317-2**.



Roadside Safety Elements - Barriers

Following crash tests according to EN 1317 standard, the following performance parameters are determined for the designed barrier type.

- Protection level (road-keeping level)
- Impact severity (possible damage to the driver)
- Working width (stretching of the barrier)
- Dynamic displacement
- Vehicle violation distance
- Guidance after an accident



Concrete Barriers

Concrete barriers can be manufactured in 2 different ways: **in-situ** and **prefabricated**. Both production methods can have different advantages and disadvantages. Therefore, it is the ideal option to produce a **project-specific solution**.

In-situ



- Zero slump concrete
- Surface smoothing (roughening)
- Chemical curing
- Joint cutting

Prefabricated

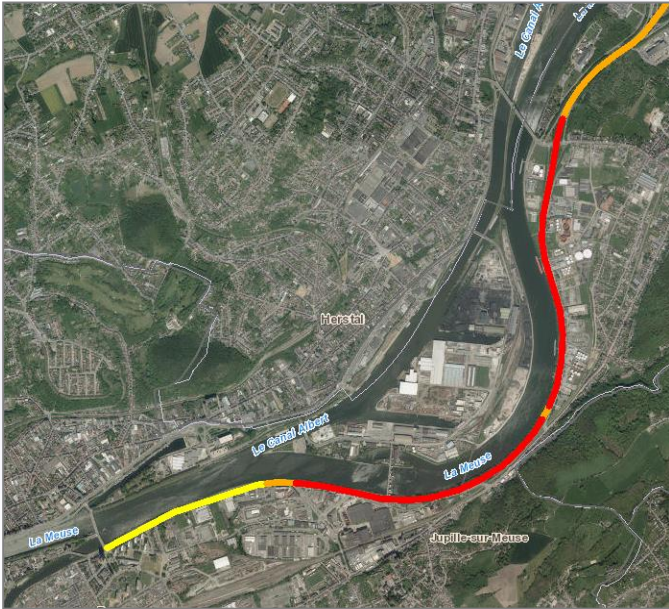


- Produced in a controlled condition.
- Curing
- Assembly on site
- Enables modular and fast production.



Concrete Barriers-Belgium Example

A25 Motorway (2001-2010)



- The A25 Motorway consists of **medium and high risk** sections.
- 66% of deadly traffic accidents are caused by hitting an obstacle in the road's periphery.
- Based on this analysis, the Belgian government decided to **replace the steel barriers with concrete barriers**.



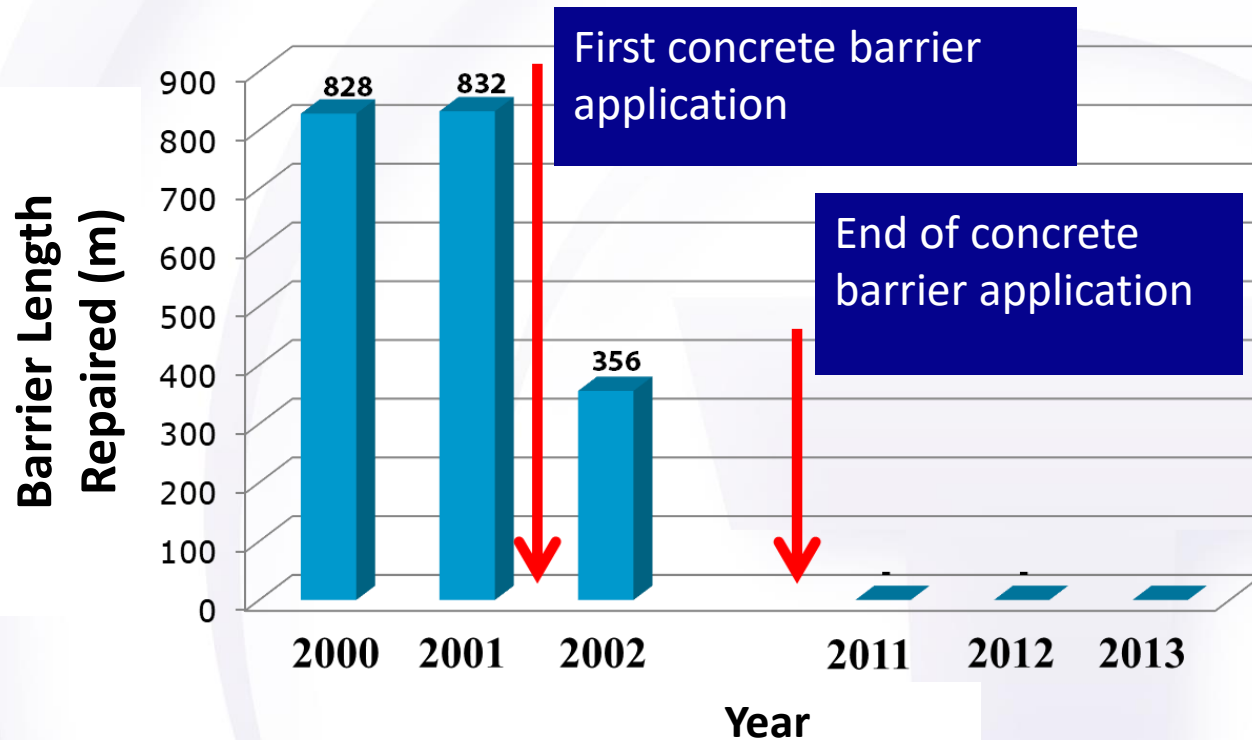
Concrete Barriers-Belgium Example

Within the 5-stage action plan:

- Some of the Type A steel barriers in the refuge were replaced with in-situ concrete New Jersey type barriers (2985 meters in total).
- The other part of the steel barrier in the median was replaced with prefabricated concrete H4b-W6-B type barriers. (Total 3100 meters).



Concrete Barriers-Belgium Example



As a result of a 9-year pilot project on the A25 highway, **concrete barriers were preferred to steel barriers** and **successful results** were obtained to prevent deadly accidents.



Concrete Barriers-Belgium Example



Concrete Barriers and Motorcyclists

A motorcyclist who hits a barrier is **7 times more** likely to die than a car driver.

Steel barriers are **1.4 times more likely** to cause serious injury than concrete barriers, even if the motorcyclist is wearing a crash helmet. The use of **concrete barriers instead of steel barriers was found to reduce the risk of death for motorcyclists by 36%**.



Concrete Barrier Usage in the World

- Concrete barriers are widely used in Europe, **reducing the death rate** in traffic accidents by around **20%**.
- In the UK and Ireland, the use of concrete barriers is **legally mandatory** in central refuges due to their advantages.
- With the use of concrete barriers in our country, we can save **13 thousand lives in 10 years**.



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