Case Study

GR_HR_IT_ES
Rural road and motorway profiles

This case study focuses on how part of a network may be assessed from design plans for the safety provision built into the road and how it scores on the iRAP Star Rating (1-5, with 5 the safest). The case study shows a process using the application of the iRAP Demonstrator in providing 3-D design schematics in segments for the Star Rating for Designs (SR4D). It shows how 3-D descriptions of the road may be used to assess the safety of road elements before construction begins.

The examples are taken from the iRAP Demonstrator at https://demonstrator.vida.irap.org/calculate-star

Here, the differences in the default risk factors in design of a low standard rural carriageway are compared with the characteristics of a high standard rural carriageway and their risk ratings compared. Similar comparisons are made for a low standard motorway and a high standard version. Examples similar to these are to be found in many parts of Europe. They are four of the 15 3-D design stereotypes available for analysis in the Demonstrator.

Star Rating for Designs (SR4D)

The default values of the low-standard rural road (left half of Figure 1) in the iRAP Demonstrator rate as 1-Star for both vehicle occupants and motorcyclists whereas the high-standard rural road scores 3-star for both.

The accompanying Star Rating Scores are also shown in Figure 1 and the characteristics of these roads are described below:

• the low-standard rural road rates poorly because it has trees within 1-5 m of the carriageway, no shoulder rumble strips, is an undivided road with centre line median, has medium-quality road condition, medium lane width (2.75-3.25m), moderate curvature, poor delineation and operate at 100km/h.

• the high standard rural road has trees distanced from the carriageway (5-10m), has shoulder rumble strips, central hatching (>1m), wide lanes (>3.25m), is straight or gently curving, has good road condition and good delineation and also operates at 100km/h.

Figure 1. 3-D design plan schematic for rural roads and accompanying safety ratings
The default values of the low-standard motorway (left half of Figure 2) in the iRAP Demonstrator rate as 1-Star for both vehicle occupants and motorcyclists whereas the high-standard rural road scores 4-star for vehicle occupants and 3-star for motorcyclists. The accompanying Star Rating Scores are also shown in Figure 2 and the characteristics of these roads are described below:

- the low-standard motorway rates poorly because on the drivers' side it has a deep drainage ditch within 1m of the carriageway and trees within 1-5 m of the carriageway on the passengers' side, no shoulder rumble strips, has a physical median of 1-5m (but no barrier to separate opposing flows), has no lighting, poor delineation and operates at 100km/h.

- the high standard motorway has a median barrier on the drivers’ side 1-5m from the carriageway, a barrier 1-5m from the carriageway on the passengers’ side, a wide paved shoulder (2.4m or more), lighting, adequate delineation, centre line rumble strips and also operates at 100km/h.

A deeper knowledge and understanding of the role of the attributes and risk factors in generating the Star Rating may found in the iRAP methodology fact sheets at: https://www.irap.org/methodology/

**Conclusions**

This case study shows some of the detail behind the iRAP Demonstrator and shows four examples from a suite of 15 sample 3-D designs. In these examples the rationale is explained for why low-standard examples of the rural roads and motorways rate less well for safety that their higher-standard equivalents. The Demonstrator is an interactive tool and other example designs and multiple configurations may be trialed at: https://demonstrator.vida.irap.org/calculate-star