Case Study
C-Spain
Corridor C-55 / C-58

The information detailed in this case study has been provided by GenCat. It describes the effect of installing a 2+1 lane configuration with a median barrier and how the iRAP Star Rating protocol can be a valuable tool for testing the potential effectiveness of any planned countermeasure before it is actually implemented.

The corridor C-55 C-58 allows toll-free journeys between two important cities of Catalonia: Terrassa and Manresa. This means that traffic volumes are very high (in some sections around 30,000 vehicles per day), and the head-on crash rate before countermeasures were installed was also very high.

Problem Definition
In Table 1 the crash history 2010-2015 (before any interventions) is shown.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatal and Serious Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>10</td>
</tr>
<tr>
<td>2011</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
</tr>
<tr>
<td>2013</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>11</td>
</tr>
<tr>
<td>2015</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 1. Crash data (2010-2015)
Pictures 1-3 show the aftermath of some crashes prior to treatment and the related media coverage.
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Risk Assessment

Prior to remedial measures, the carriageway of this corridor was an undivided carriageway with moderate curves. The operating speeds were relatively high. The iRAP Star Rating results before any improvements were implemented is shown in Figure 2.

Countermeasures Implemented

Countermeasures have provided a physical separation of traffic flows in a way that prevents head-on collisions.

In the “before” situation the road is predominantly 2-star around the area of Castellgalí (near the mid-point of the road in Figure 2 and where measures were implemented (Figure 5)).

The Road Authority implemented interventions over a 18km length of the road corridor at a cost of €7.6 M (Figures 5 and Pictures 4-6).

Figures 4 and 5 below show what the risk rating would be after the planned implementation of a 2+1 with median barrier.

The proposal was for concrete median barriers to be used in straight sections and in curved sections specific metal barriers would be used, thereby guaranteeing necessary sight distances. Prior to implementation, the iRAP Star Rating showed that the road would rate 3-star on the sections where the barriers would be installed.
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Figure 5. Types of barrier in corridor C-55-C-58

Picture 4. Construction works

Picture 5. Construction works

Picture 6. Construction works implemented
Results

Pictures 7-9 show the road after the interventions.

Chart 1. Crash data records

Chart 1 shows the crash data recorded the period 2008-2018, including the road condition ‘before’ and ‘after’ the 2+1 with barrier carriageway transformation which occurred in 2015.

Figure 6. Fatal and serious crashes ‘before’ and ‘after’ road carriageway transformation
Physical separation of opposing flows in corridor C-55 and C-58 have provided positive results:

- **Before 2+1 implementation:** 56 deaths and serious injuries in the 3 years prior to the works (an average of 18.6 / year).
- **After 2+1 implementation:** 31 deaths and serious injuries in the 3 years after the works (an average of 10.3 / year).

Results in terms of fatal crashes are much more significant, with 16 deaths in the three years before carriageway transformation, whilst in the 3 years after the works only one death has been recorded (a decrease 94% of fatalities).

**Conclusions**

This case study describes the benefits of implementation of a 2+1 median barrier over a road segment where high operating speeds are recorded and high number of fatal crashes occurred.

Modelling the effect of the proposed countermeasures showed that the iRAP Star Rating would increase from 2-star to 3-star for the relevant sections of road where median barrier was installed. Fatal and serious injuries in the three years after implementation were almost half the number in the three years before. The number of fatalities was reduced from 16 to 1.