



ACTION 3. MANUFACTURING OF THE BARRIER

ACTION 3.2. Early trials of prototypes: characterization and selection

Description:

This action aims to evaluate the design and material behavior through reduced scale prototypes on crash test, prior to full scale vehicle crash test.

This concept and reduced-scale test will allow forecast if the design and concrete formula will have a proper behavior on impact, with reduced economic cost and timeline.

Methods employed:

- **HIGH ENERGY PENDULUM TEST**

High energy pendulum test allows impact a variable mass pendulum up to 1500 Kg weight against test samples at speeds up to 36 kph. This test method allows applying forces similar to full scale vehicle impact against a barrier, and evaluates the real behavior of particular design aspects, as section resistance.

1) Type of impact test

The test configuration is selected in order to reproduce similar conditions of the impact of crash test TB11. The following table shows the characteristics:

Impact trajectory	Transversal
Test mass	1500 kg
Target impact velocity	26 km/h
Target impact angle	90 °

Table 1. Test configuration.



The following picture shows the test area:

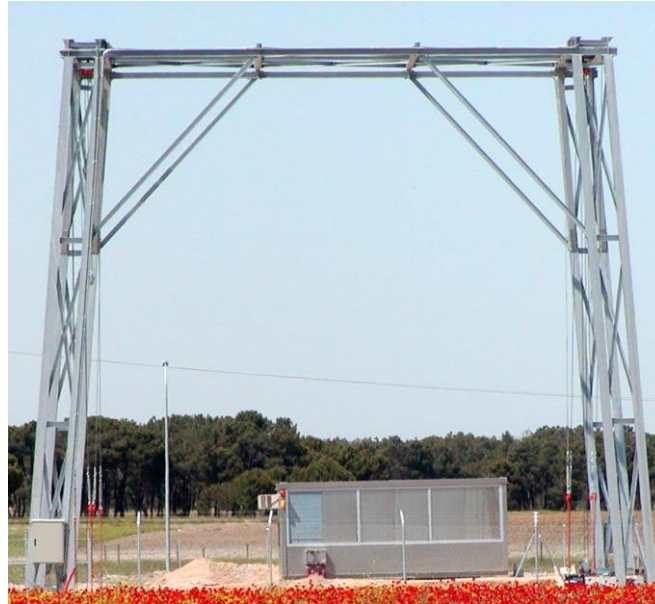


Figure 1. High energy pendulum

2) Filming coverage. Sequences

The following figure shows the filming coverage configuration:

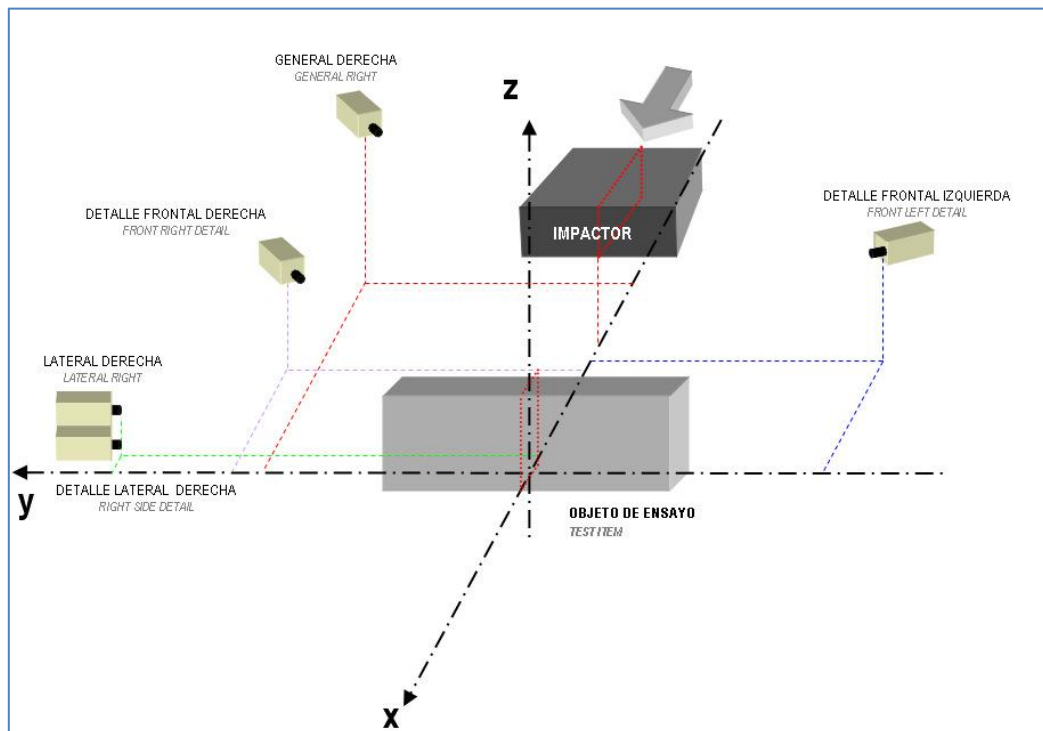


Figure 2. Filming coverage configuration.



2) Test prototypes

The following test specimens have been tested in order to compare their behavior on impact.



Description		Compression strength (MPa)
Conventional concrete		43 MPa
Rubber concrete		39,6 MPa

Table 2. Test specimens

3) Test results

The acceleration of impactor with respect to longitudinal X-axis (g) versus time (ms) is obtained. The results are similar in both cases as the following figures show:

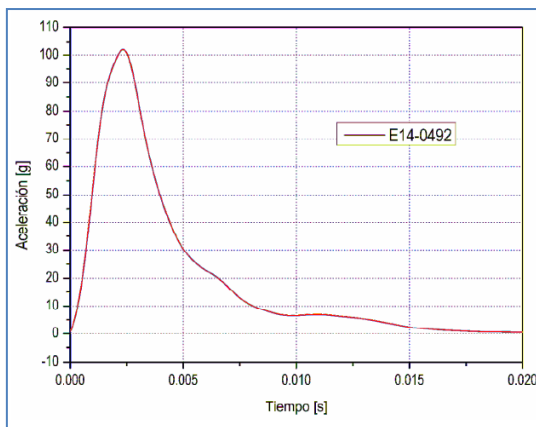


Figure 3. Conventional Concrete

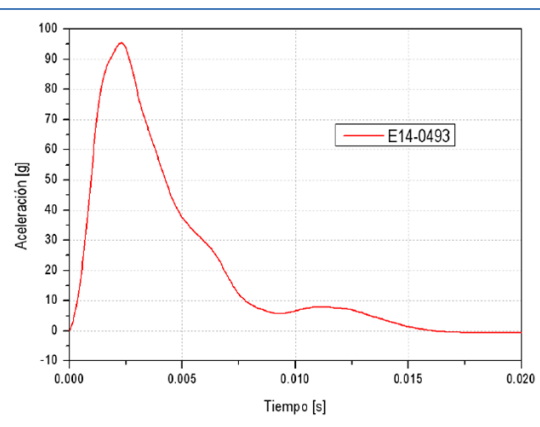


Figure 4. Rubber concrete



- **Conventional Concrete:**

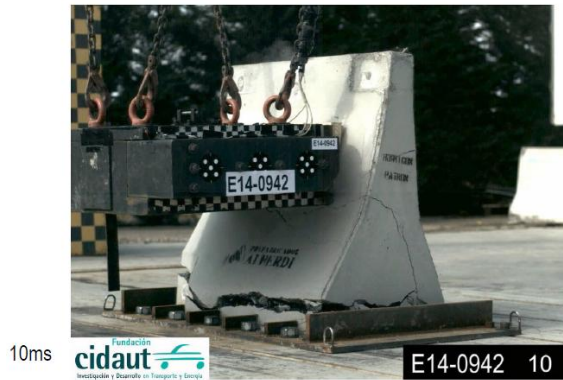


Figure 5. Right general



Figure 6. Front left detail

- **Rubber concrete:**



Figure 7. Right general



Figure 8. Front left detail

4) Conclusions

Taking into account the results of high energy pendulum test, significant differences in the behavior between the barrier with or without rubber are not observed.