

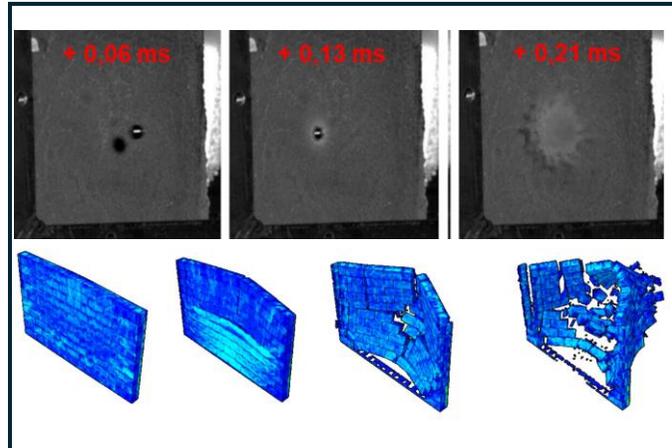
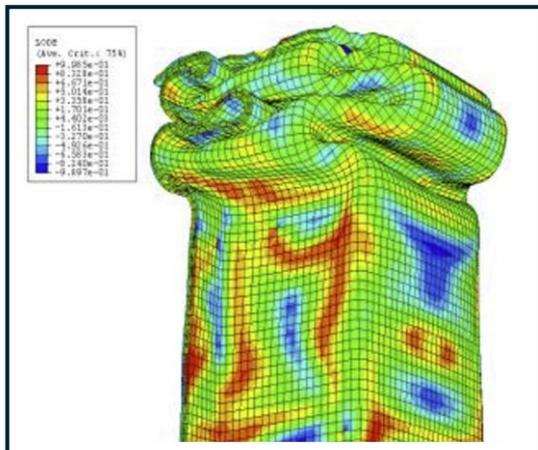
## Security and defense of people, mobile systems, and infrastructures subjected to impulsive loads

### Summary/Characteristics

Researchers from the Structural Elements Dynamics and Fracture group at Universidad Carlos III de Madrid apply solid mechanics-based analysis to develop protections for people, vehicles, aircraft, and infrastructures against impulsive loads.

They provide solutions for analyzing, simulating, and mitigating effects from explosions and impacts, combining numerical modeling, experimental testing, and resilient design.

Support is offered for research projects and experimental testing for technology centers, research institutions, and companies in transportation, defense, and industry.



### Innovative Aspects

- State-of-the-art experimental laboratory for conducting impulsive tests: impactor propulsion systems with calibers of 5–500 mm and energies up to 120,000 J; gravitational and pneumatic drop towers; ultra-high-speed cameras for filming; high-frequency data acquisition systems with image-data synchronization.
- Extensive experience in the use of numerical modeling codes for impulsive problems.
- Development of user subroutines for materials under high-strain-rate deformation.

Department of Continuum Mechanics and Structural Theory  
 Investigators: José Antonio Loya Lorenzo, Ángel Arias Hernández and Ramón Zaera Polo

### Competitive Advantages

- Reduction of human and structural risk against intentional or accidental threats.
- Established predictive modeling for complex scenarios without the need for destructive testing.
- Validation in controlled environments and support for certifications.
- Solutions adapted for both defense and critical civilian infrastructures.

#### Technology readiness level:

Developed and ready for its application. TRL 8.

#### Intellectual and Industrial Property Status:

Industrial secret– *know how*

#### Type of collaboration sought:

Cooperation agreements in R&D&I, industrially oriented PhDs, and execution of experimental campaigns with research groups and technology companies operating in the transportation, defense, and industrial sectors.