

# ADVANCED PASSIVE SAFETY DEVICES FOR VEHICLES

**P** PATENTED TECHNOLOGY

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## ABSTRACT

A Spanish University Research Group has developed a new technology (PCT patent pending) with high performance to absorb the mechanical energy generated in a collision of a vehicle. This system can complement to classical safety systems as belts or airbags.

This technology is based on advanced materials and design with high performance, with a minimal volume and weight. The Research Group is looking for industrial partners interested in further development and new applications.



## TECHNICAL DESCRIPTION

The passive safety systems are elements incorporated to the vehicles in order to minimize the consequences of an accident that implies the collision of the vehicle. The use of standard technologies in motor vehicles does not avoid completely the consequences of the accidents and thus a high number of them are mortals. Moreover, thousands of persons including children and elderly are gravely wounded or died each year in traffic accidents.

This technology developed lets the production of new advanced safety devices with an internal structure and an innovator design (fractal structure) that improves the absorption of the mechanical energy generated in a collision of a vehicle. This system is complementary to the standard safety systems as the belt or airbags.

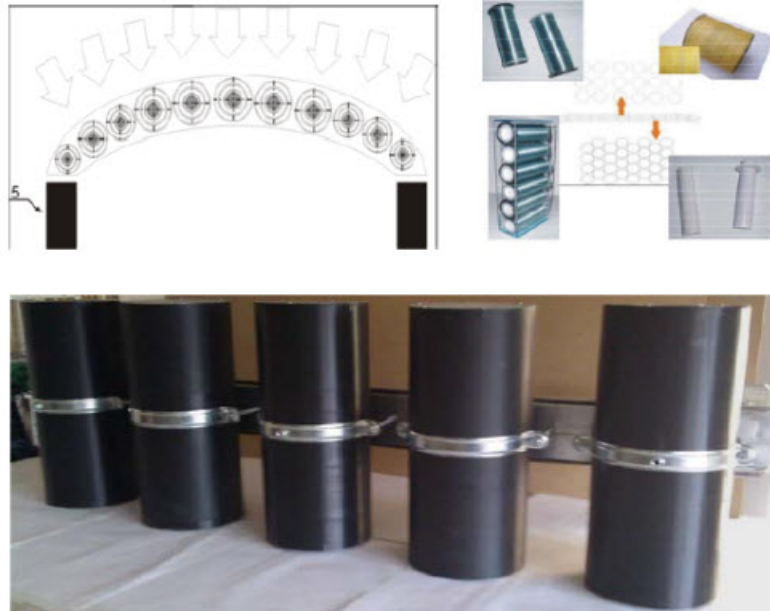
The advanced materials used and the design of the internal structure of parts and components let to develop new systems with light weight and a high efficiency rate compared to the standard devices: metallic tubes, standard bumpers, program of structural deformation, etc.

Redesigning the internal structure of standard components or by means of the development of new devices specifically designed for this use, this technology could be incorporated in any type of vehicle.

The technology could be incorporated to the standard industrial production methods and does not affect to the standard safety systems of the vehicles.

Parts, components and specific devices with the same external shape than the standard ones but with a higher performance could be developed. In cars and other vehicles, the chassis, bumpers, the engine supports and the perimeter of the passengers' box could incorporate this technology.

The tests with prototypes based on the technology reach a high capacity of absorption energy up to  $1 \text{ MJ/m}^3$  with a gradual absorption.



#### TECHNOLOGY ADVANTAGES AND INNOVATIVE ASPECTS

The most important advantages and innovative aspects are:

- The technology can be incorporated to any vehicle or component: heavy and light vehicles, industrial vehicles, cars, trucks, body car, bumpers, passenger box, etc.
- Innovator design with a high performance in absorption of mechanical energy.
- Advanced materials let a high performance and low weight: composites with an advanced micro/nano structure, fiber/metal materials combination.
- New devices with high capacity of mechanical energy absorption could be developed. The energy is absorbed in a gradual manner.
- The absorption of standard components could be improved by means of the redesigning their internal structure with this technology.
- Quick design of parts and components with high performance and lightweight.
- Easy implementation on a large scale production.
- The standard safety systems of the vehicle are not affected by the use of this technology.

#### CURRENT STATE OF DEVELOPMENT

Development phase (laboratory tested).

#### MARKET APPLICATIONS

Application sectors for these materials are those related to chassis, bumpers, engine supports, passengers' box, crash protection, improvement the performance in a vehicle collision, design of components in electric vehicles and improvement of passive safety (car, truck, bus).

#### COLLABORATION SOUGHT

The research group is looking for companies interested in acquiring this technology for its commercial exploitation.

- Type of partner sought: enterprise, SME or large company.
- Specific area of activity of the partner: automotion company, component manufacturer, vehicle manufacturer: car, bus, truck, electric vehicle, industrial vehicle.
- Task to be performed: development of new components or redesign of standard components.

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#### INTELLECTUAL PROPERTY RIGHTS

This technology is protected by patent:

Application number: P200901855.

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#### MARKET APPLICATION (2)

Materials and Nanotechnology  
Transport and Automotive