

PLASTICS and COMPOSITES



GOI ESKOLA
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The main objective is to generate and disseminate new knowledge related to the next-generation composite materials, with special emphasis on those whose energy absorbing and damage tolerant are outstanding, and are manufactured by liquid moulding techniques (RTM, WCM, infusion, pultrusion).

Our holistic approach, covering from material characterisation to process/structural simulation and experimental trials, favours the solvency to be involved in projects going from TRL1 up to TRL 6.

Research areas

Fast-Design Lab

Design

- Conceptual Design (CAD, LCA/C)
- Design for manufacturing
- Materials selection

Materials characterisation

- Process
- Mechanical: Tensile, Fatigue, Impact

Optimization

- Finite Element Analysis
- Structural
- Process

Fast tooling (3D printing)

- Drapeability
- RTM
- Vacuum bag

Liquid Composite Moulding

Compression RTM (CRTM)

Thermoplastic RTM (TP-RTM)

Wet Compression Moulding (WCM)

Process Monitoring

- Pressure and temperature
- Electric sensor
- Fibre optic sensor
- Ultrasound sensors

Materials characterisation

- Curing
- Rheology
- Permeability

Simulation

- PAM-RTM
- PAM-FORM

Out of die curing

+

Pulling by robot

New resins

- Impact resistant
- Fire resistant
- Aesthetics
- VOC free

Alternative curing technology

- Ultraviolet
- Microwave
- Infrared

Contact-less monitoring technology

- IR thermography
- THz spectroscopy

Robotics

- From CAD to path programming
- Adaptive control

3D Pultrusion

Metal-Composite hybrid materials

Fibre-Metal-Laminates (FML)

- Aluminium
- Magnesium
- Shape Memory Alloy
- Epoxy-glass fibre
- Organosheets
- Self-reinforced composites

Processing FML

- Infusion/VACRTM
- Stamp forming

Performances

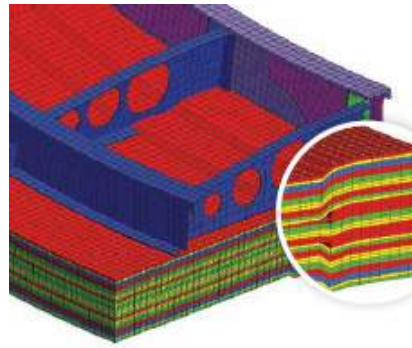
- Impact
- NVH
- Fire
- Morphing



IVAN GALLEGO

Responsible for Innovation Projects
MONDRAGON Automoción

*“Outstanding composite skills for automotive industry.
They are enthusiasts, rigorous, easy to communicate”*



2014
2015

5 PhD
Students

2
European
Projects

4 PHD

5 industrial
contrats

350 000 €
budget

9 JCR
papers

8
international
conferences

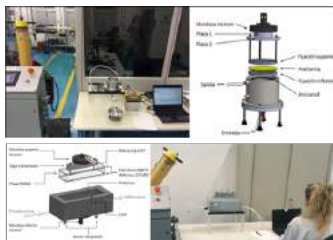
11 national
conferences

FACILITIES

PAM-RTM
PAM-FORM



Permeability (in plane + z)



Curing (DSC)



Rheology



Monitoring
Curing
Pressure
Temperature

RADIUS electric injection system

Pressure and flow control

Flow rate 500 cc/min

2100 cc

27 bar

280 °C



400 t

800 mm/s

2400 mm × 1200 mm



4 t

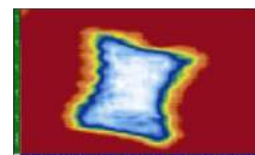
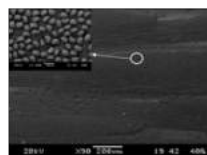
200 mm/s

Ram stroke 400 mm



Quality (density, fibre %, porosity, delamination, dry zones): SEM, C-Scan

Mechanical: Tensile, Fracture mechanics, ILSS, Impact, Fatigue, Biaxial, Digital Image Correlation, Fibre Optic Sensor



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