



**Made in the EU: Creating markets for circular composites**



# Reshaping techniques: Giving a new life to aged composites



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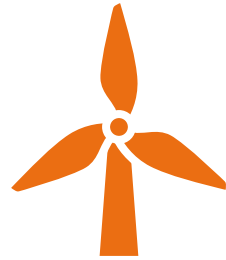
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# The issue



45 years



25 years



+ years



+ years

## Recycling Methods

Mechanical

Thermal

Chemical

An alternative to conventional ways?



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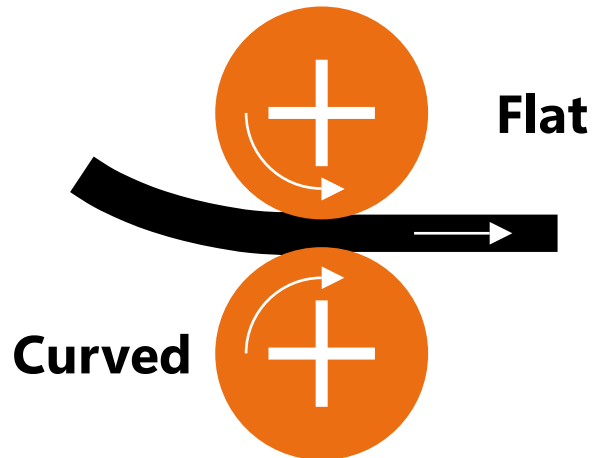


# Our contribution

## Temperature-assisted reshaping <sup>1</sup>

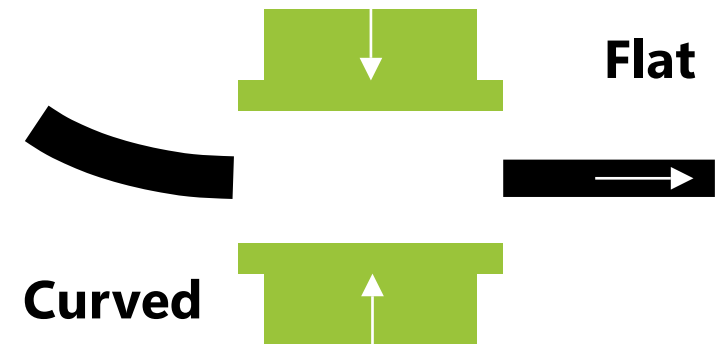
Semi-continuous process

Batch process



# Gaiker

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<sup>1</sup> Studied by Nouigues in 2021, intended for polyester/glass fiber composites



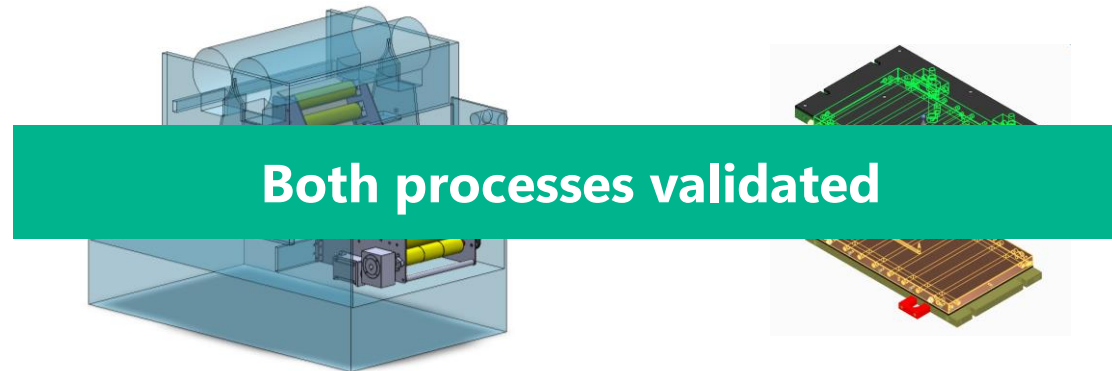
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## Experimental works

- Preparation of materials
  - Number of layers, orientation, surface density, fabrication method
- Characterization
  - Material performance under different load conditions

## Development of prototypes

- Operating parameters
  - Time, temperature, deformation
- Operating modes
  - Icam: inverting curvature
  - Gaiker: flattening



## Fabrication of sandwich panels <sup>1</sup>



## Compliance tests

- Key Performance Indicators (KPIs)
  - Demonstrator weight, dimensions
  - Bending strength, modulus
  - Thermal conductivity, stability
  - Acoustic isolation
  - Water absorption
  - Fire resistance

Process demonstrated at TRL6



# Challenges and solutions

## Main challenges

- EoL composites in increasing quantities
- Inadequate waste management
- Mechanically compromised recycled materials

## Innovation values

- Cost-effective reuse of reshaped composites
- Sustainable manufactured sources in railway vehicles
- Little to no loss in bending performance

## Development paths

- Feasibility tests on other materials
- From prototypes to industrialized stage





# Potential partnerships

## Limitations

- Constant radius of curvature
- Semi-cylindrical geometry
- Operating temperature < 100 °C
- Manual fabrication of sandwich panels
- Dimensions limited to recycled materials

## Project proposals

- Variable curvature
- Double curvature
- Higher temperatures
- One continuous process
- Joining (Splicing) sections





**Thanks for your time!**

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