

New EpOxy Composite with repairing properties through dynamic CROSSlinking

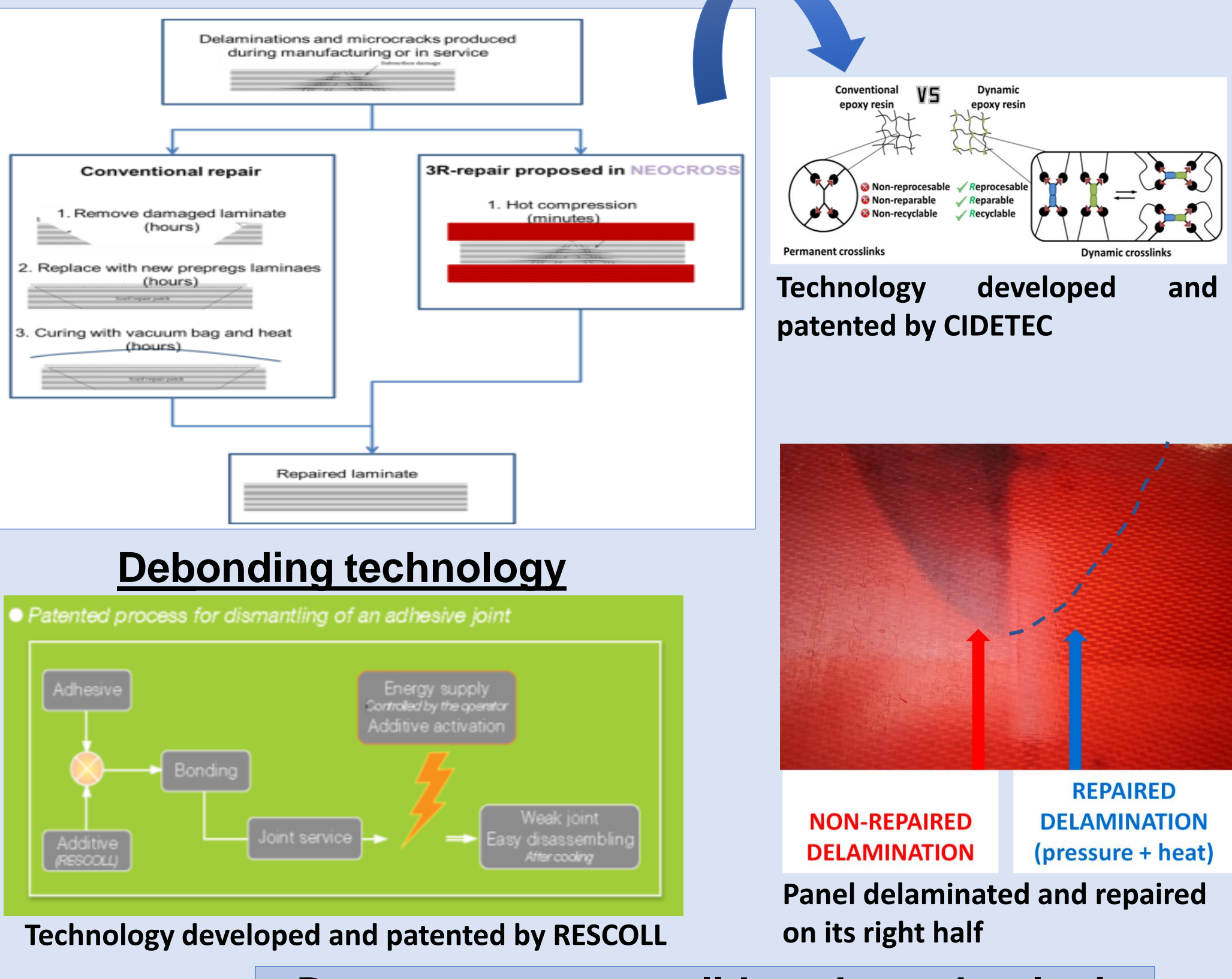
NEOCROSS

THE PROJECT

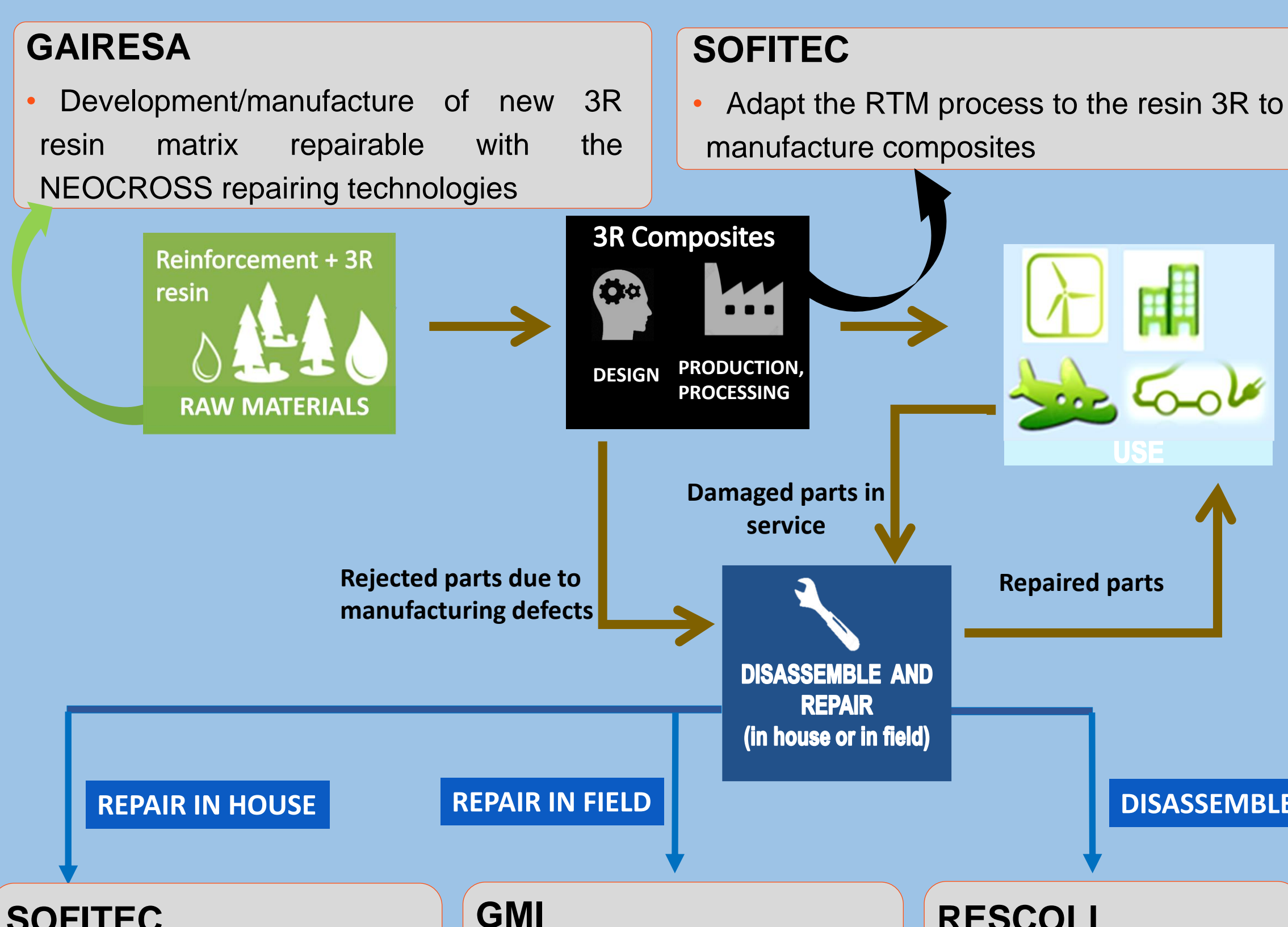
The project aims to develop a new generation of high-performance epoxy composites and adhesive debondable on command that can be manufactured by traditional methods, but unlike the current ones, they can be easily disassembled and repaired in terms of fibre/matrix delaminations by applying heat and pressure on the damaged area.

The final objective is to reduce costs by means of recovering rejected composite parts delaminated in production line or in service.

THE CONCEPT



THE WORKFLOW

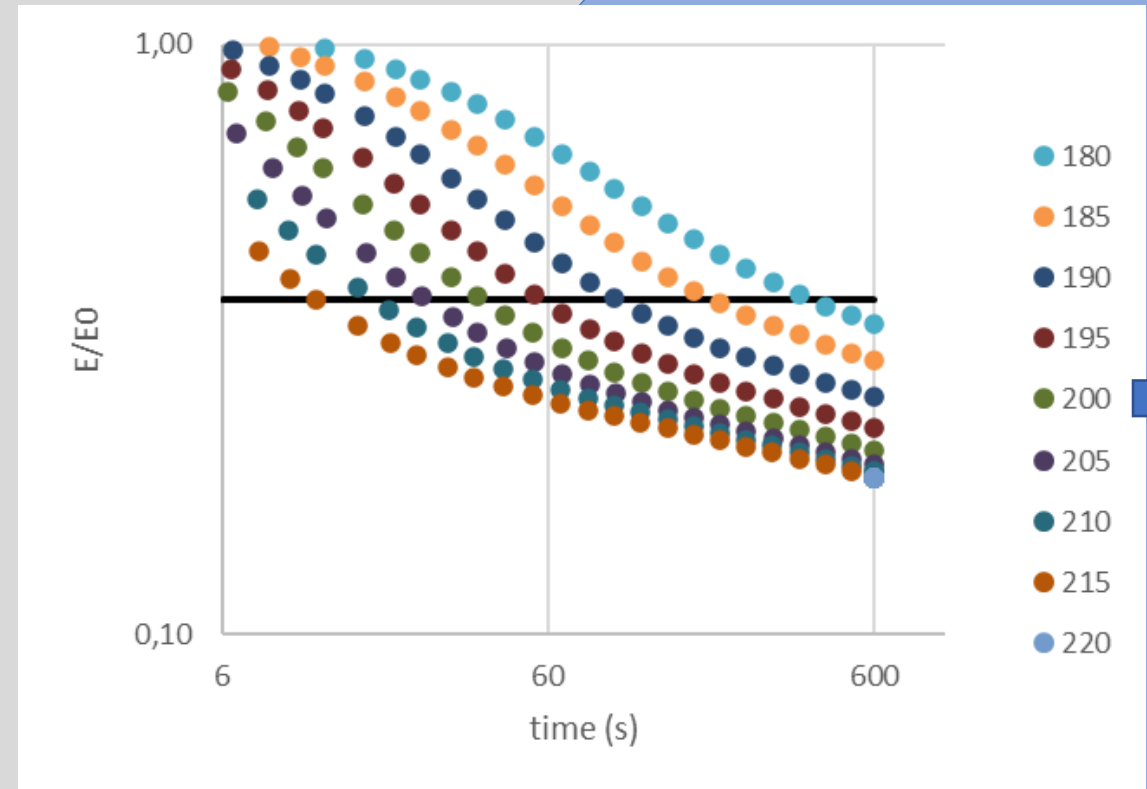


FIRST RESULTS

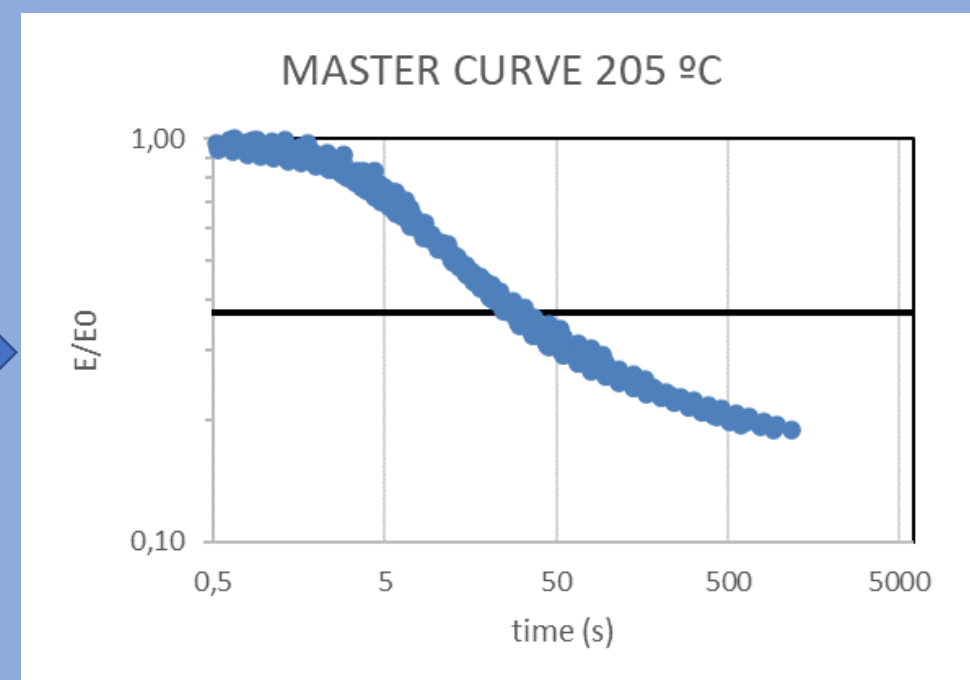
1. FORMULATION OF 3 R RESIN

Formulation: LAB 2294-8
Curing time: 1h @ 130°C + 0.5h @ 150°C

Stress relaxation indicates the rate of cross-link reorganization in dynamic covalent networks

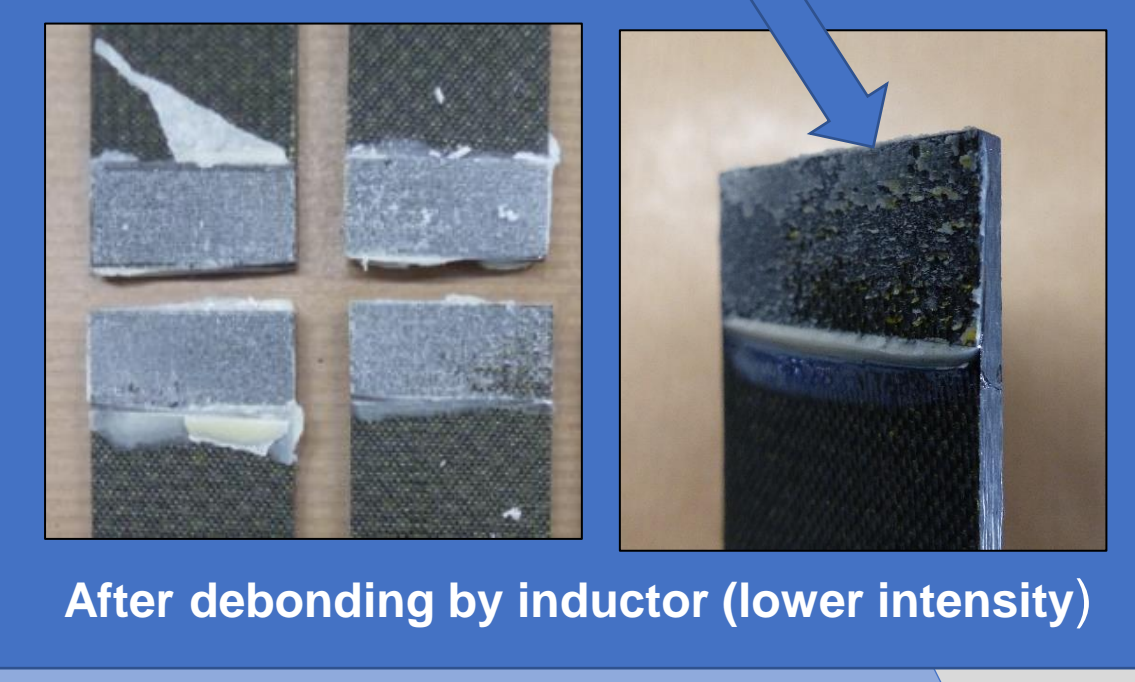


MECHANICAL CHARACTERIZATION-LAB 2294-8			
TEST	MODULI (MPa)	STRENGTH (MPa)	ELONGATION AT BREAK (%)
FLEXURAL	2930	141	7
COMPRESSION	1682	101	8
TENSILE	2880	84	6



2. FORMULATION OF DEBONDABLE ADHESIVE

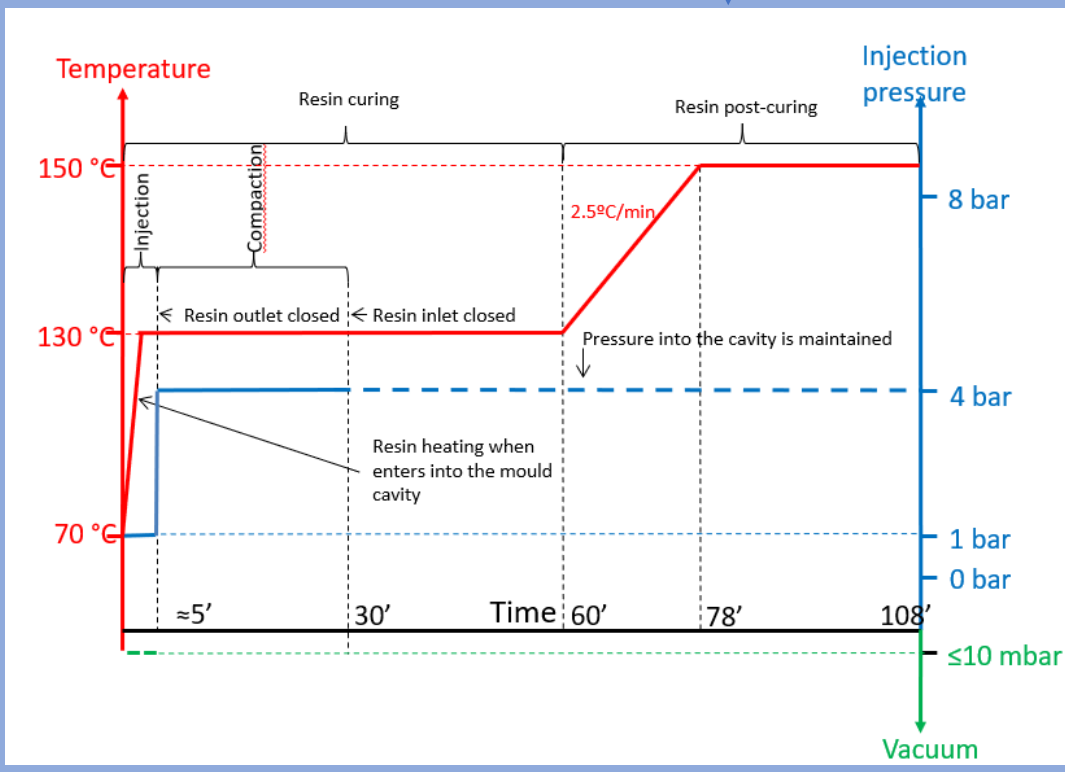
Composition final adhesive:
Part A : Epoxy resin
Part B: Mix of polyamine/polyamide hardener
Aditives: Diluents, catalyst, pigments,...



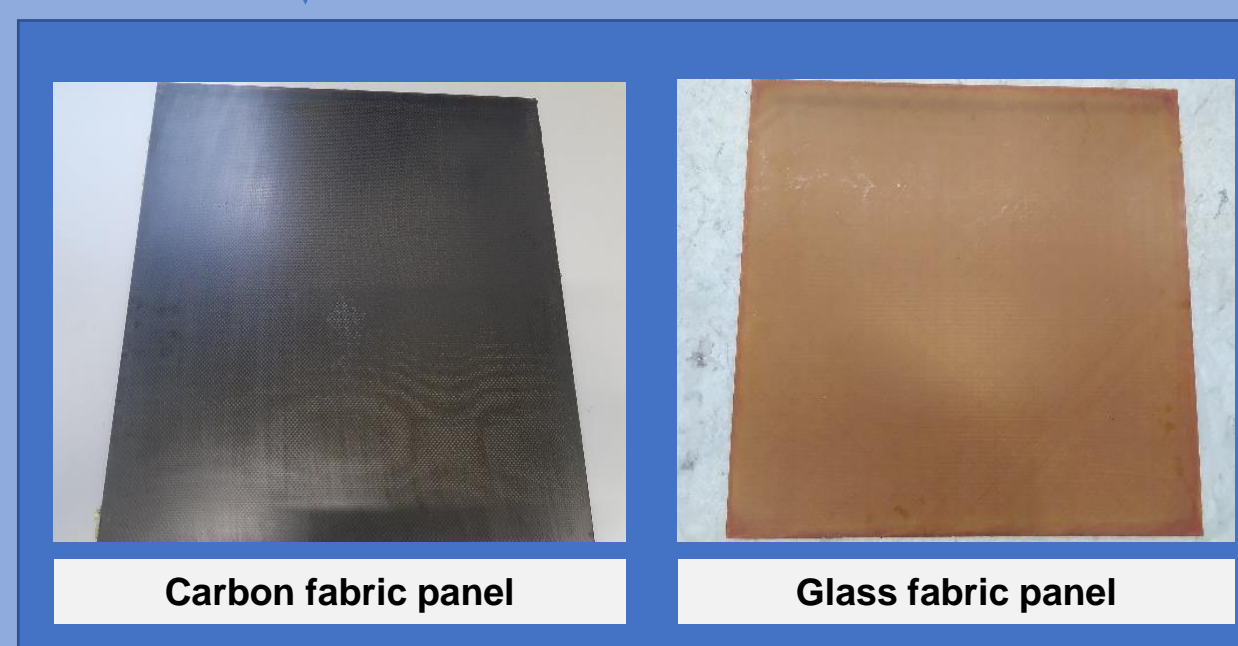
Tensile at break before activation	15,1 ± 1,0 MPa (CF)		
Activation method	Oven	Inductor	Heat gun
After activation	Residual strength : 4,3 MPa (CF)	All self-debond @ 160°C	All self-debond @ 160°C

3. PRODUCTION OF RTM PANELS WITH GLASS FABRIC AND CARBON FABRIC

Optimization of injection cycle



RTM panels (500x500 mm²)

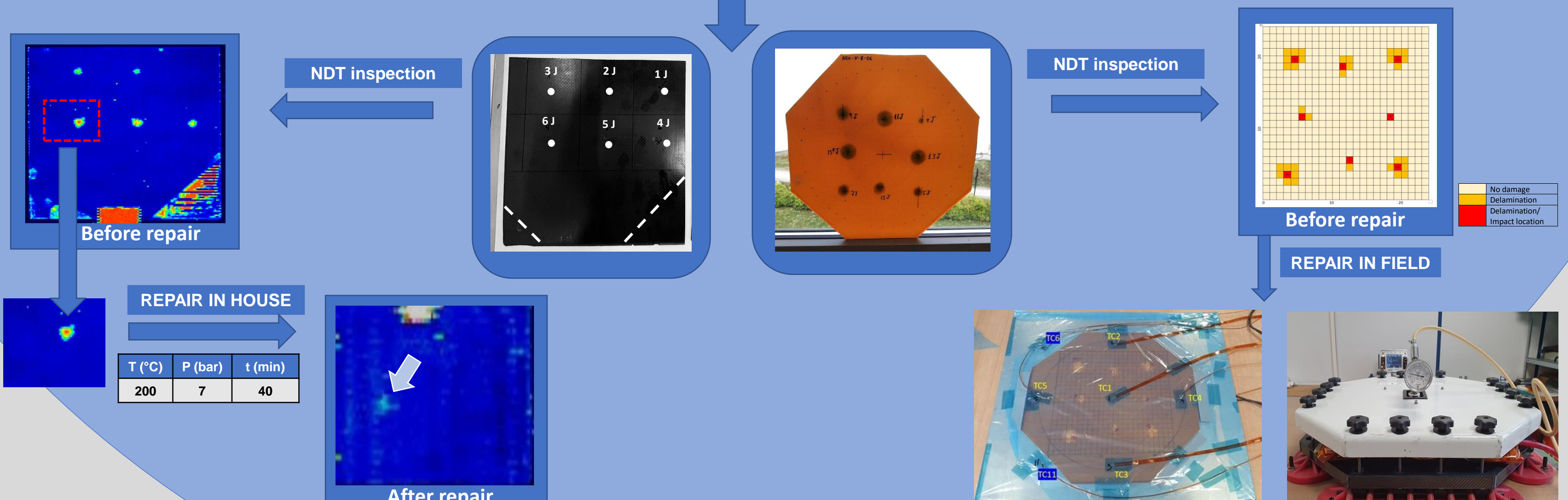


Properties of RTM panels

Property	Unit	Carbon fabric	Glass fabric
Fibre volume content (FVC)	%	44	52
Tensile strength/modulus	MPa/GPa	678 / 54	143/12
Compression strength	MPa	496	127
Interlaminar shear strength	MPa	70	40

4. DEVELOPMENT OF REPAIR METHODS

Generation of delaminations in a controlled way



PARTNERS



Project ID: 11 4312
Start date: 01-11-2020

