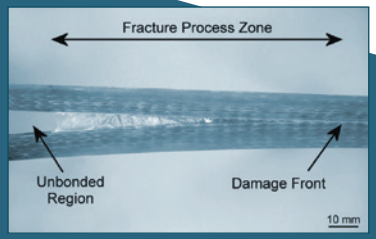
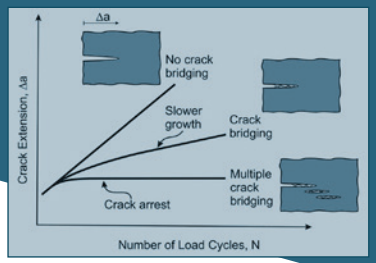
Technical developments

- Optimised systems of resins, fibres and fabrics to control and enhance fracture mechanical properties at micro and macro level
- Design to control initiation and arrest of cracks
- Combined fibre optics and acoustic damage detection tools
- Fracture mechanics based modelling tools for composite design



Delamination with fibre bridging



Fracture resistance enhancement due to fibre bridging and parallel cracks

Project info

Duration: January 2018 - December 2021
Budget: 5.9 M€
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Consortium

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DACOMAT
Damage Controlled Composite Materials

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Objective & Impact

The objective of DACOMAT is to develop more damage tolerant and damage predictable low cost composite materials in particular aimed for use in large load carrying constructions like bridges, buildings, wind-turbine blades and off-shore structures. The developed materials and condition monitoring solutions will provide high tolerance for manufacturing imperfections and high capacity to sustain damages. This will enable large composite structures to be manufactured and maintained at low cost.

Photo: FIRECO

Outcomes

- Composite materials and structures with significantly improved durability and damage tolerance
- Guidelines and modeling tools for reliable design of critical load carrying composite structures
- Guidelines for materials qualification
- Structural health monitoring and damage assessment solutions
- LCCA & LCA methodology for large composite constructions

Demonstration case 1

Bridges targeting 30 % improvement in durability and 30 % lifetime cost reduction

Challenges

- High maintenance cost
- Severe traffic interruption in construction phase
- Large need for reinforcement of deteriorated old bridges

DACOMAT solution

- High environmental resistance and mechanical durability
- Fast installation of prefabricated light weight elements
- Reinforcement adding minimal additional weight preventing need for new fundamentation

Demonstration case 2

Wind turbine blades targeting 30 % improvement in durability, and considerable reduction in blade related costs (offshore)

Challenges

- Low accessibility for inspection and maintenance
- Revenue loss due to downtime
- High demands to upscaling at low costs

DACOMAT solution

- Remote damage detection and assessment.
- High damage tolerance preventing need for shutdown
- Higher tolerance for production imperfections and lower safety factors