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AMANAC WORKSHOP

BRUSSELS,BELGIUM | 03.07.2019

WHAT KIND OF BUILT ENVIRONMENT FOR FUTURE GENERATIONS?

DACOMAT – Damage Controlled Composite Materials

Jens Kjær Jørgensen
SINTEF

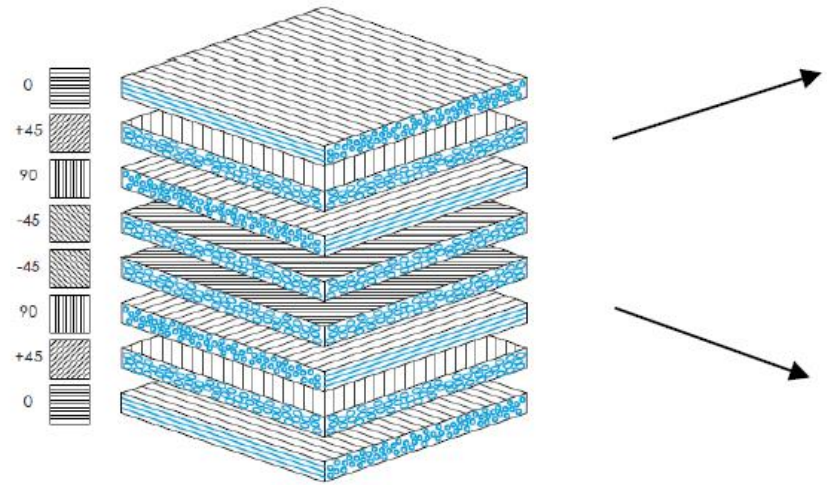
endurcrete

DACOMAT

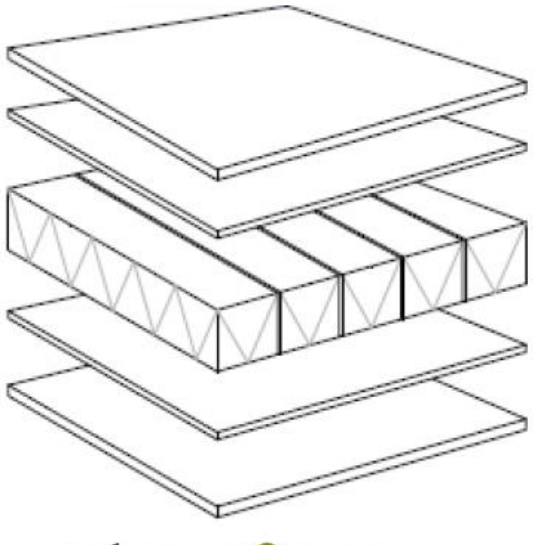
RESHEALIENCE
Ultra High Durability Concrete

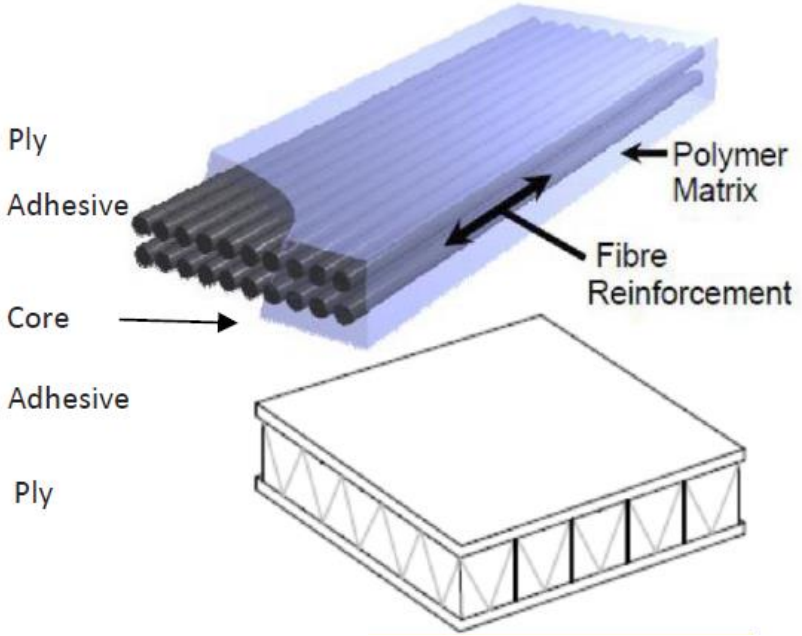
The projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760639 (EnDurCrete), 760824 (ReSHEALience) and 761072 (DACOMAT)

Laminated Continous Fibre Reinforced Polymers



Typical laminate and ply orientation





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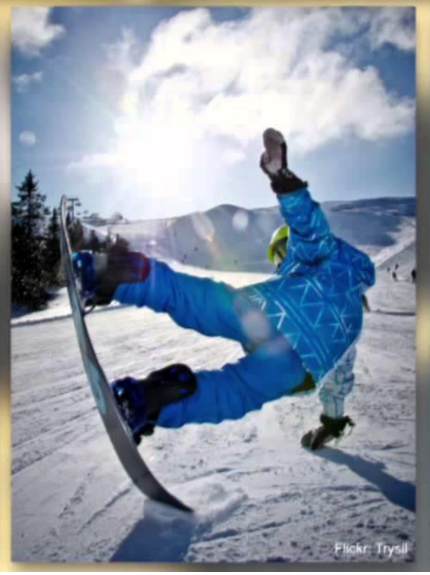
Dominates when high specific strength is required and affordable



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Variably used in various other applications

+ Environmental resistance
+ Freedom of shape
+ Low weight
÷ Immature, uncertainty
÷ Lack of standards
÷ Cost
÷ Recycling

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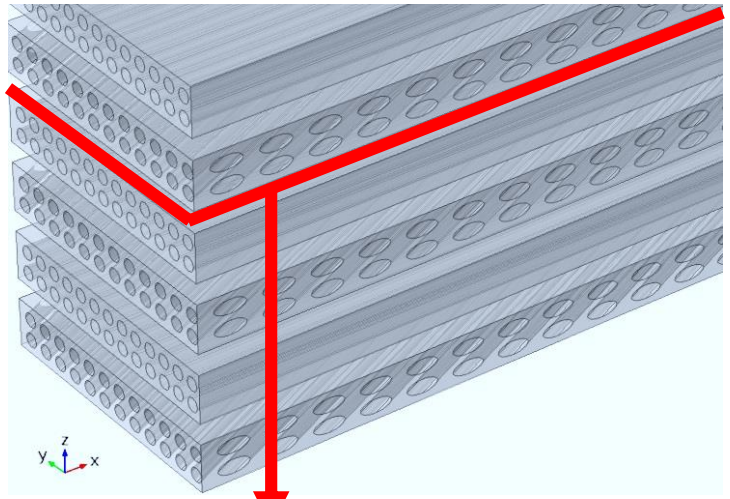
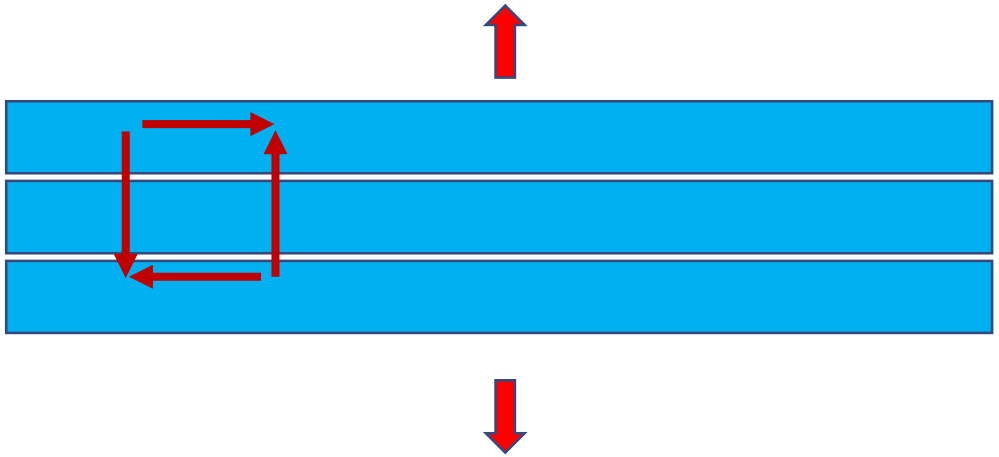
Focus on improving delamination resistance in low cost composites



Ply interfaces that can delaminate



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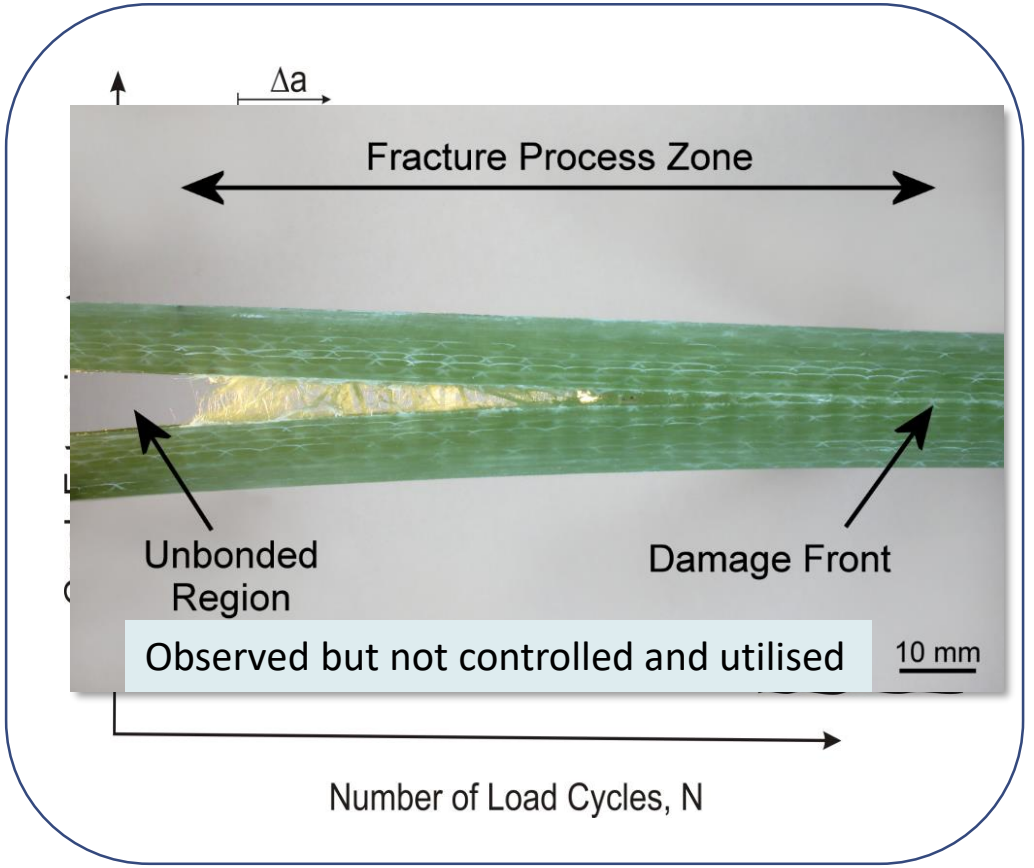
The "genome" of Damage Controlled Composite Materials – *Materials scale*

Characteristics

- Laminated materials with high fracture resistance that raise with crack size
- High fracture resistance achieved through extensive crack fibre bridging
- Maximum fracture resistance achieved by close parallel cracks (through local laminate design)

Benifits

- Well known damage mechanism
- High damage tolerance
- Higher tolerance to imperfections
- Better suited for monitoring



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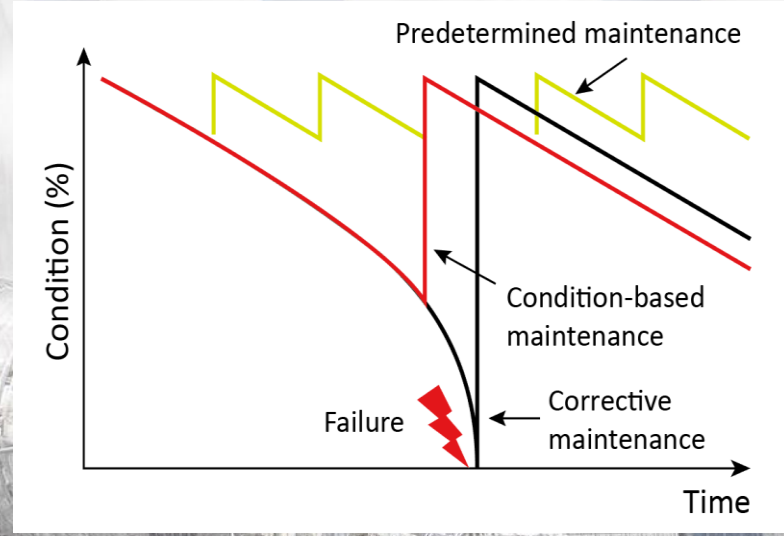
The "genome" of Damage Controlled Composite Materials – *Structural scale*

Characteristics

- Know or perhaps even choose by design the "hot spots" of your structure where damage will initiate
- Design "hot spots" to be damage tolerant
- Monitor damage development at "hot spots" with SOTA sensors and damage detection algorithms
  - *Cracks are stable up to a size well beyond the detection limit*.
- Assess damage and remaining capacity with fracture mechanics based models

Benefits

- Condition based maintenance
- Reliable assessment of residual capacity and life time
- Certainty for lower safety factors
- A more "ductile" structure



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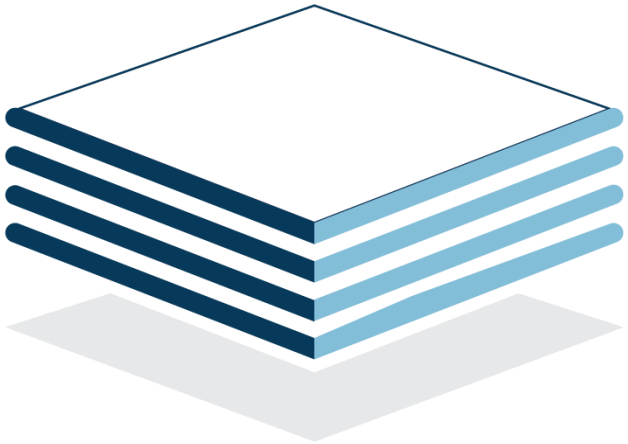
Thanks for your attention



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www.dacomat.eu

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