RE CREATE How to dismantle layered material for re-use and recycling? Application for Composite Laminates

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RE How to Separate....cream and cake for a strawberry "Mille feuilles" ?





RE We do Minimal Invasive and selective disassembling

Our "millefeuilles" : <u>Carbon Epoxy Laminate :</u>

Long Carbon Fibers implemented in Polymer Epoxy and Assemblied by Layers (Called Ply) with different fiber direction



Create local damage delamination between plies



RE How to extract high-value materials separately from structure to a new one?



In keep material integrity... for new structures manufacturing



Minimal Invasive and selective disassembling using laser Shock

Two scenarios



Produced controlled mechanical tensile (and local delamination) on the selected inter-ply in playing with laser beams parameters



Minimal Invasive and selective disassembling using laser Shock

<u>Two scenarios</u>

Ply disassembly

Laminate disassembly



- 1. Direct re-use for new structure
- 2. For Long Fiber Extraction
- 3. Patches to reinforce/repair structure



RE Our Dismantling process for reuse - Demonstration





RE Our Dismantling process for reuse:



Minimal Invasive and selective disassembling using laser Shock

Awards ECCM21 8th ICLPRP

Versatile for all layered composites No contact technology Non invasive delamination

On-line Process control by SHM

(Delamination surface progress and Location - State of the material) Design by numerical modeling

-All technologies available

(Laser, optics, Robots, Process control, Design by simulations...) -R&D expertise (@CNRS) and demonstration lab (@Rescoll @CNRS)

-Need Effort for implementation for dismantling and recycling work flow.

-Need engaged Endusers (Planned Airbus meeting in june 2025)

-Go outside the lab...



Thank you for your attention!



RE



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Where in Recreate's scenario?



