



ELG Carbon Fibre Ltd.
RECYCLED CARBON FIBRE

Elg Carbon Fibre turns recycled carbon fibres into reinforcements for thermoset and thermoplastic composites

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into the composites sector

Why recycle?



- ✓ **Cost:** recycled carbon fibre products can reduce the cost of lightweight structures and components.
- ✓ **Environmental benefits:** significantly reduced global warming potential.
- ✓ **Legislation:** increasing onerous legislation regarding the disposal of composite manufacturing and end-of life waste.
- ✓ **Supply chain security:** mitigates against shortages in virgin carbon fibre supply.

Recycled carbon fibre – recovery process



Feedstock



Dry



Prepreg



Laminate

Intermediate Processing



Shredding



Pyrolysis



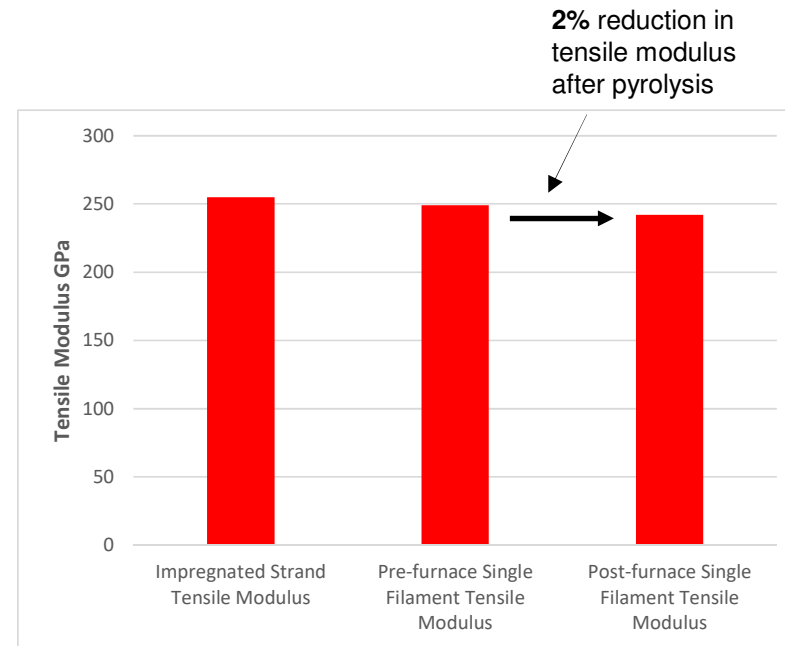
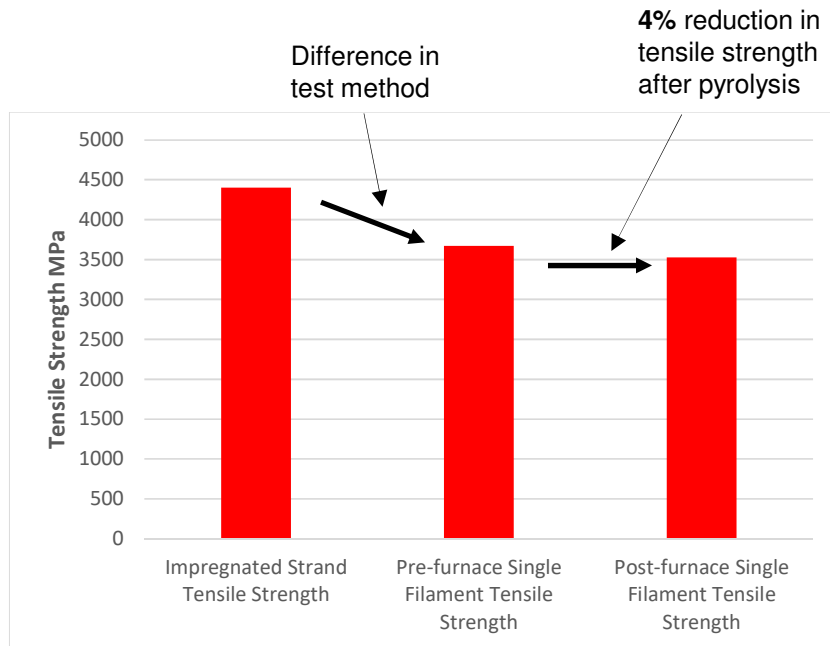
Chopping

Intermediate Product



Staple Carbon Fibre

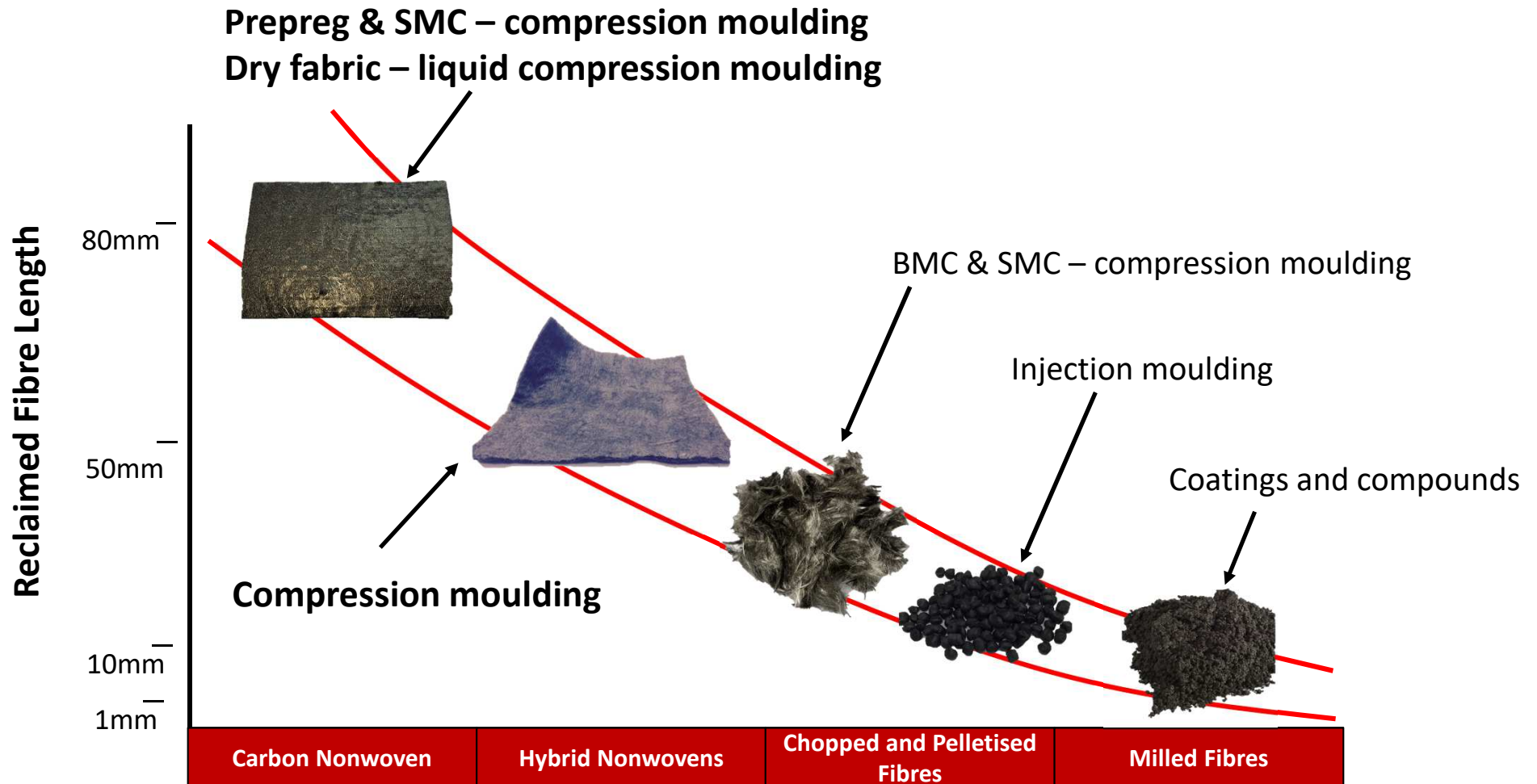
Recycled carbon fibre – recovery process



Based on single filament testing of 1484 fibre batches before and after fibre recovery by pyrolysis.

The reclaiming process is optimised for the type of feedstock being treated

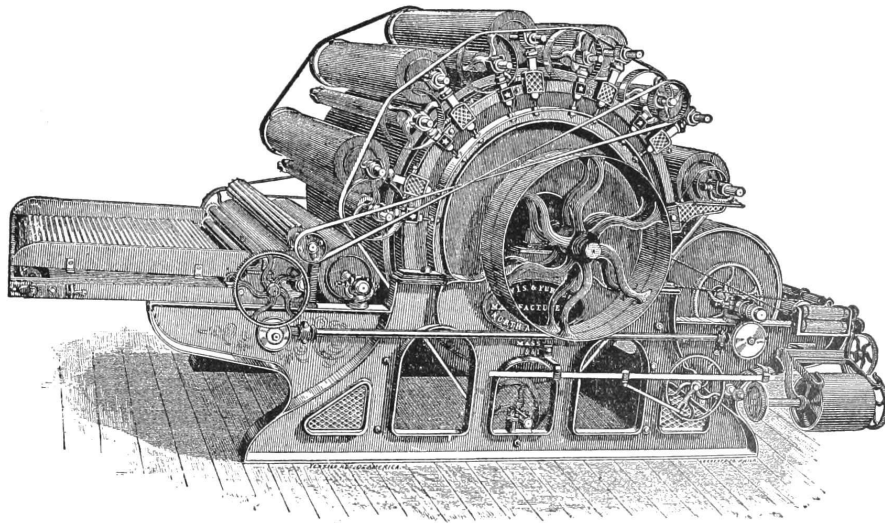
From wastes to new generation of reinforcements



Carbiso™ M and Carbiso™ TM



Carding process



Carbiso™ M and Carbiso™ TM



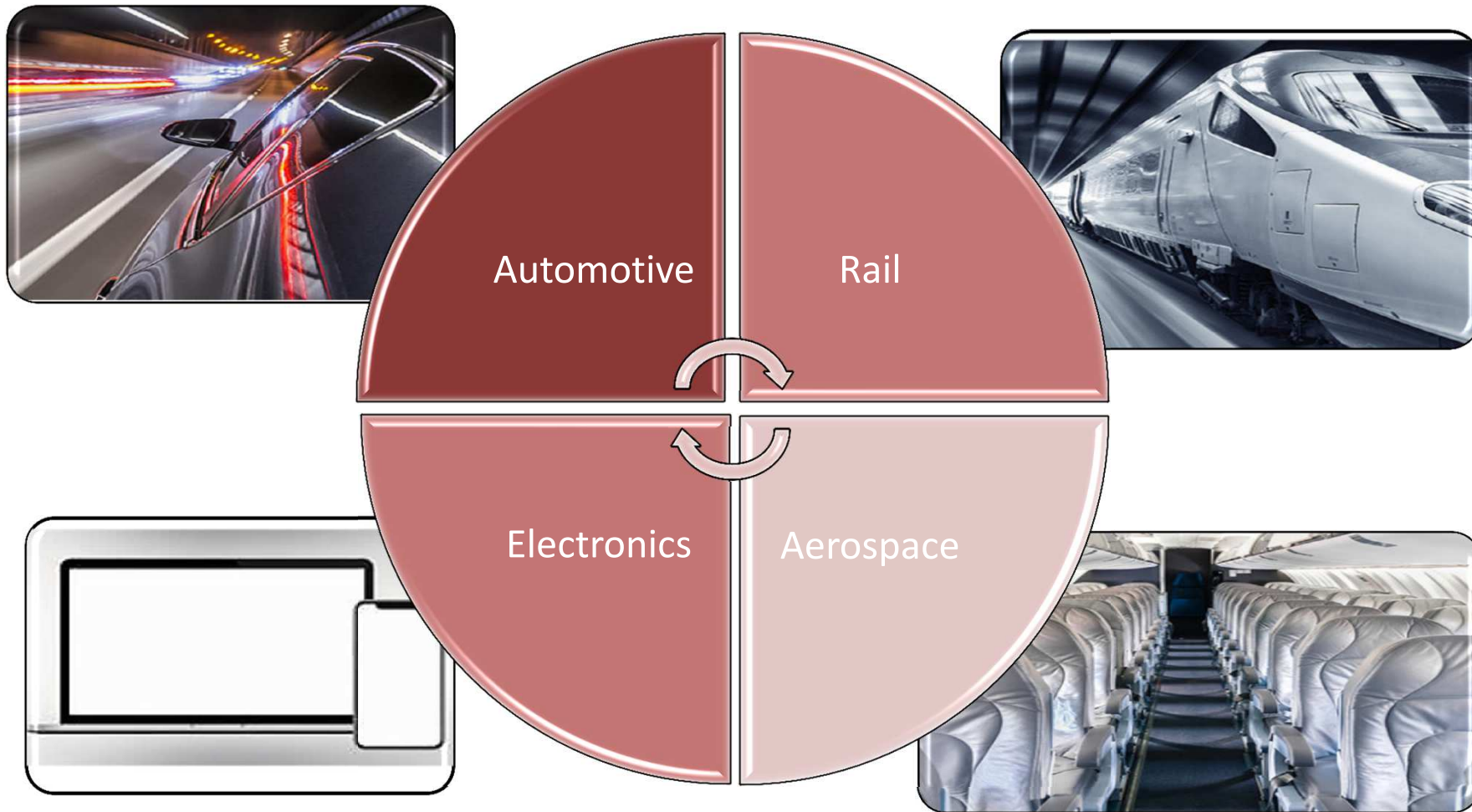
- 100% recycled carbon fibre
- 100 – 500 GSM
- Mechanically mingled
- Combined with resin system to produce component
- Epoxy, PU, Vinylester, Bio



- Recycled carbon co-mingled with
- PA6, PA66, PP, PPS, PET, PC
- Heat and pressure applied to produce component
- Used in overmoulding

Key Point: rCF can be combined with any thermosets or thermoplastics

Applications for thermoset and thermoplastic processes into the composites sector





Seat back and structural panels



- á Compression moulded Carbiso Tmpa6 60% SM45D
- á Typically **75%** lighter than steel frame
- á Possibility to incorporate fittings
- á Part cost: \$32

- á Epoxy prepreg for high volume compression moulding
- á Class A finish achievable
- á Going into series production





Finish



Drappable material for complex shapes formability

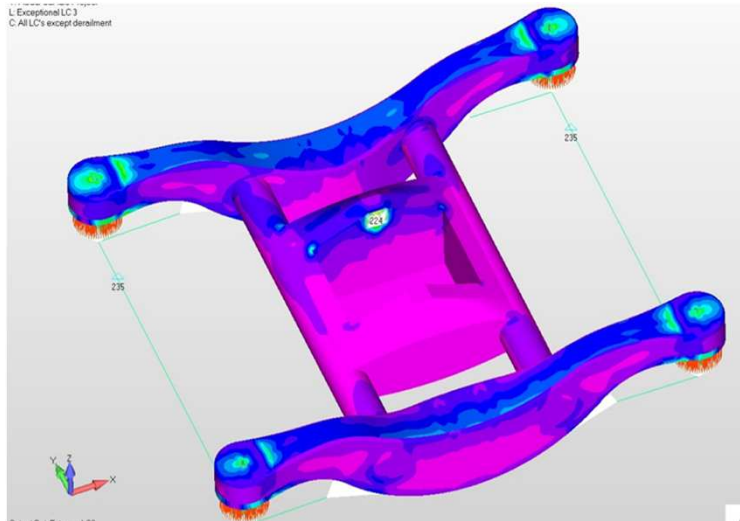


Cosmetic finish achievable: paint, lacquer, matt





Bogie



ALSTOM



UNIVERSITY OF BIRMINGHAM



Conclusion



- Carbisio nonwoven range is proved to be an **successful alternative** to virgin carbon as well as glass materials or other metals;
- Design data (**static and dynamic**) are being developed through ELG project and internal Research & Development programs;
- Focus on products suitable for **high volume manufacturing**;
- **Stable sources** of raw material from existing manufacturing programs, raw material availability will grow as carbon fibre industry expands and existing products reach end-of-life