

Exel Composites Oyj

Kim Sjödahl

Senior Vice President
R&D and Technology

Tein gradutyöni EXELille koskien antennisuojeiden
pitkäaikaisominaisuuksia

Ydinosaaminen: Tuotekehitys ja komposiitit

Aktiivinen veneilijä, komposiittien puolestapuhuja





Taking steps towards sustainability

Concrete actions to find solutions to the challenges of everyday sustainability



Getting transparent about sustainability

The threat of climate change means sustainability has become increasingly high priority for all our customers.

Although we don't have all the answers yet, we're committed to honest conversations with our customers and continually developing more sustainable composite processes.

From our manufacturing lines to your end application and beyond, let's move your sustainable project forward.

How we're helping customers advance sustainability



- ◆ Increasing transparency for customers by adding a carbon footprint calculator to our costing process
- ◆ More social responsibility with specific community involvement, in line with the ISO 26000 standard.
- ◆ **Advancing waste management - reducing landfill wastage (to zero!) and ensuring 100% recycling of all recyclable waste**
- ◆ Continued sustainability innovation with ongoing research into alternative raw materials including bio-based resins and fibers
- ◆ Reducing our own carbon footprint by reducing energy consumption, own green powerplants and encouraging our supply chain to follow (80 / 20)



Reduce - Reuse - Recycle

The 3 R's

REDUCE

Reduce waste wherever you can.

REUSE

Many materials can be **Reused** - some value adding may be needed

RECYCLE

There is no waste! Our waste is **Recycled** as somebody else's raw material

EU legislation level

ENERGY RECOVERY

Energy recovery = burning for energy (not recycling, better than burning or landfill!)

BURNING

LANDFILL

Exel have a zero landfill target



REDUCE
REUSE
CYCLE

Recycling through co-process is best available technology today

KIMURA
PROCESS



II. Recycling of Composites is compliant with the EU recycling definition

The recycling of thermoset composite parts has been studied extensively for the last years. The European Composite Recycling Service Company (ECRC) commissioned several projects to prove that composite materials can successfully be fed into a cement kiln.

With the developed cement kiln route, composite waste is turned into valuable new material that finds its way in the final cement. The cement kiln route is a recycling process compliant with the recycling definition in the Waste Framework Directive.

In recycling thermoset composites through the cement kiln route, most of the material (approx. 2/3rd) is transferred into raw materials for cement. A small part of the waste, the organic part (approx. 1/3rd) is burnt, generating energy. This process translates as energy recovery according to the recycling definition.

The cement kiln route is not used to generate energy from burning composite waste. When feeding composite waste to a cement kiln, the main part of the material is turned into cement or a useful part of the cement composition. This process translates as reprocessing into materials or substances whether for the original or for other purposes in the recycling definition.

As a side effect, a minor amount of energy is generated by this process. As the cement kiln uses normally a high amount of energy in the form of oil or gas firing for calcination, the end effect of feeding composite waste to the kiln would be that the energy costs for the kiln is slightly reduced.



Composites to Composites

▶ Here's some of our forward-thinking in progress.



Internal waste as raw material (low hanging fruit)

Glassfiber dust



- ◆ Glassfiber dust from all post operations - cutting, grinding, milling
- ◆ Dust is 70% fiber, 30% resin
- ◆ Dust is pure and can be well defined
- ◆ Collection through cyclons into megabags, for waste disposal
- ◆ Difficult to use in KIMURA due to physical form



SIDE STREAMS

MANUFACTURING PROCESS

SIDE STREAMS



Waste resin - leftover from EOP



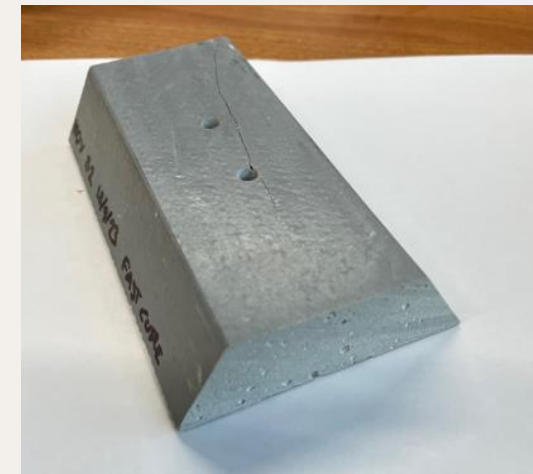
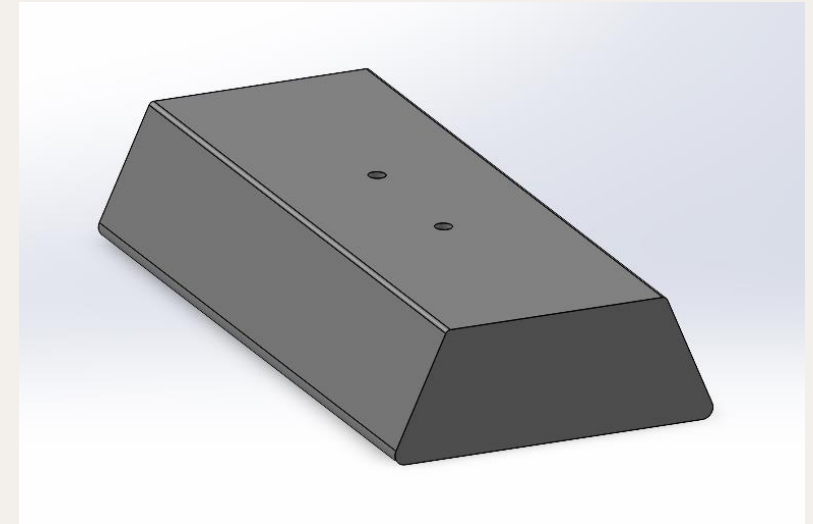
- ◆ Resin mixing is made for multiple baths/lines, when production stops resin left in baths can not be reused
- ◆ Resin is pure and can be well defined, but already have catalyst in it (limited potlife)
- ◆ Collected and RT cured for KIMURA

Composite blocks for cable tray supports for solar PV installation



“The Block”

- ◆ 3D design to make for easy demolding
 - Made in long molds (trough), cut to fit customer need
- ◆ Composition of 50/50 resin and saw/grinding dust
 - Added MEKP to resin to facilitate RT cure
- ◆ Valued long lasting solution for the customer
 - End product weight ca 3kg



Internal profile waste as raw material (little more challenging)

- ◆ Combination of three waste streams
 - Glassfiber profiles for different applications; tubes, rods, hollow profiles. Out of spec, startup and shutdown scraps
 - Glassfiber mats from roll ends, cutoffs and trimmings
 - Resin leftover

- ◆ Currently recycled locally
 - Finland through KIMURA
 - USA through local waste incineration plant (thermal recovery)



Shower cubicles!

Shower basin



Shower panels / walls

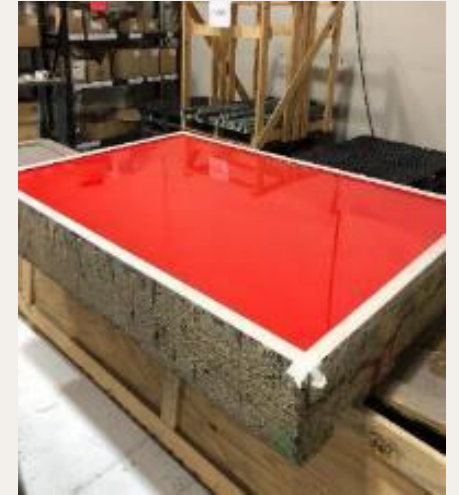


The driving force



“Shower cubicle”

- ◆ 3D design to make for easy demolding
- ◆ Tooling made by local shops
- ◆ Waste preparations
 - Preparation of profiles similar to KIMURA
 - cutting and shredding to suitable size (hammer mill)
 - Mats collected, sorted, cut
 - Resins collected
- ◆ End product regular construction
 - Gelcoat surface
 - Mat layer
 - Filling in of bulk with mix of crushed composite, resin and dust



exel | FOR
FORWARD
THINKERS