

TPAC in your Mailbox!

Welcome to the first newsletter of our ThermoPlastic composites Application Centre – TPAC!

Over the last years, our group, our network of partners and the range of projects we work on together has seen a significant growth. We thank all our project partners for that: without their support, this would not have been possible!



With this growth comes an increasing amount of developments that is of interest of be shared amongst all TPAC-partners. Through this newsletter we aim to keep you informed more frequently on the latest developments at TPAC.

We hope you enjoy reading through this newsletter. In addition, you can always follow the latest on TPAC on:



thermoplasticcomposites.nl



[linkedin.com/company/thermoplasticcomposites](https://www.linkedin.com/company/thermoplasticcomposites)



twitter.com/TPACNL

Kind regards, Ferrie van Hattum

TPC-Cycle

After four years the project 'TPC-Cycle' was completed. In this project high-tech processes have been developed to process high-tech materials from aviation production. Nowadays, 505 of the most modern airplanes consist of this new kind of materials. Although the value of TPC may amount to more than 100 €/kg, little was known about needed technologies for recycling and the TPC waste is typically incinerated.

In this project applied research was carried out by developing recycling processes in which fibre length is retained as long as possible, so that stiffness and strength are kept at the highest possible level and the material can meet the extreme demands.

Different tools have been developed to analyse and optimise relevant parameters in every step of the process. Different demonstrator products have been developed, among which the nose cap of working shoes, (weight reduction: 20%), a bracket for airplane engine suspension (weight reduction: 50%) and an access panel door for GKN Fokker (weight reduction: 10%).

Newsflashes

SBB accreditation

Our lab manager Remi Hoefman was accredited by the Foundation for Cooperation on Vocational Education, Training and Labour Market (SBB). This means that vocational education (MBO) trainees can officially do their traineeships at TPAC. At this moment we have two MBO level-4 mechatronics students working on several projects at our lab.

TPC recycles in the air!

TPAC developed compression-molded access panels for the revolutionary #V280Valor Tiltrotor, made from recycled TPC.



We are proud that the TPC-Cycle access panel was selected as CAMX (USA) Unsurpassed innovation Award finalist. Developed with GKNFokker, TPRC, TorayTAC, Cato Composites, DTC, NRT!

SAMPE Europe

In September TPAC was visiting SampeEurope 2019 in Nantes. Here Ilse ten Bruggencate presented her research "Design, manufacturing and testing of a Safety shoe nose cap from recycled Glass fibre Polypropylene".

TIV 2019

From 17 till 19 September TPAC was present at the Technical Industrial Trade Fair (TIV), Hardenberg, NL. At the TIV more than 6.000 professionals met each other to share knowledge and innovation.

SAMPE Benelux bridge contest

2nd place with the strongest (24 kN) and stiffest bridge design by our Saxion students!

Particularly the latter demonstrator product underlines the success of this project, since not only costly waste materials from the production processes get a useful application, it also led to much faster cycle times and indeed was applied in a new prototype flying object. In the meantime additional projects are planned to develop even more products from TPC recyclates.



Thomas de Bruijn

This research is co-financed by Regieorgaan SIA, part of the Dutch organization of scientific research (NWO).

TPC-Future

Thermoplastic composite (TPC) materials offer interesting advantages when it comes to sustainability, circularity, mechanical properties and material-efficiency during production. In this project applied research was carried out on technical limitations, that form thusfar an obstacle for further automation of production with TPC, focusing on:

- Development of critical parts of processes (insert moulding, joining/bonding), using the further elaborated 3D tape-application technologies and joining of sandwich panels
- Automation of production (autonomous robot and integration in production) – Using ROS, different universal software connections between sub process-steps were developed
- Increasing flexibility of production (configuration, modularity and detection), using flexible mould technology and vision.

Because both TPC technology and automation come together, the lectorate Lightweight Structures worked closely together with the lectorate Mechatronics.



This research is co-financed by Regieorgaan SIA, part of the Dutch organization of scientific research (NWO).

FibreRec

In recent years, several (RAAK-VANG) projects have demonstrated the feasibility of using (possibly

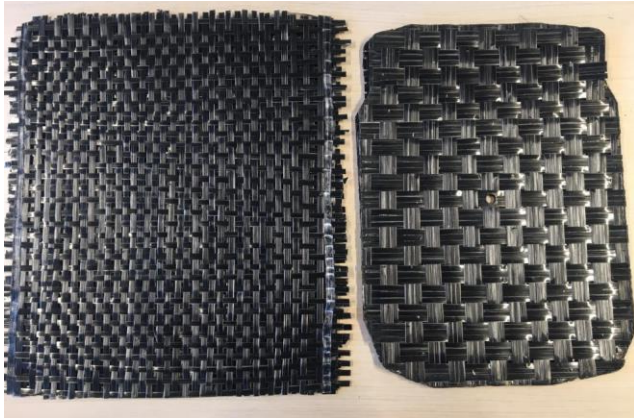
contaminated) recyclates in TPCs. These projects showed that the mechanical performance of TPCs with recycled material match that of virgin materials. Because recyclates generally have poorer properties, and often have a lower market value, a breeding ground is created for an interesting platform for the application of recyclates in TPC, or in other words: the use of continuous (glass) fibers in recycled products. The current project focuses on the above innovations.

Among other things, the following sub-questions are central for this project:

- A. How broad can the needed technology be applied in view of the many types of material and their critical processing properties (eg MFI, degradation, adhesion, process window)? The manufacturability and processability of rTape are subject to research.
- B. Which techniques can be developed to use rTape inserts / reinforcements, better and reproducible, in rotation molding and injection molding processes?
- C. Which problems arise in practice with serial production of rTape inserts / reinforcement during rotation and injection molding processes and how can these be solved?


For FibreRec different weaves have been made for testing the overmoulding possibilities. These weaves are braided, cut in the desired shape, stacked to the desired thickness and will then be overmoulded to a test panel. The production of the weaves is done and shown below. Soon the first overmoulding tests will be held. After this, tests with recyclates and rTapes will be scheduled.





Colofon

If you might have any questions after reading this newsletter, please contact TPAC directly:

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Apart from the weaves a new tape production starts soon. This included different variations of PP, PE and PET, such as virgin material, contaminated PP/PE, and recycled PP/PE/PET.



Ilse ten Bruggencate

This research is co-financed by Regieorgaan SIA, part of the Dutch organization of scientific research (NWO).

Smart Production INTERREG



In the project 'Smart Production' we are developing technologies to apply continuous fibre reinforcements onto double-curved surfaces. In the project the Fachhochschule Niederrhein develops a thermoforming process on a flexibly configurable surface.

The composite fibre application head was further developed on our Fanuc robot, in an even more compact configuration. Besides the software is now ready to generate the robot movements directly from a 3D CAD model, and apply the tape in one go onto any shape! We have now have all technologies to reinforce any 3D shape, no matter if it was thermoformed or otherwise produced. In the coming months we will continue working on further standardisation of the technology.

