

ADVANCING THERMOPLASTIC COMPOSITE TECHNOLOGIES

The ThermoPlastic composites Research Center (www.tprc.nl) is an open research center for fiber reinforced thermoplastic composites. TPRC performs research in co-operation with national and international partners, such as GKN/Fokker, Toray and Boeing, on the processing and performance of thermoplastic composites. TPRC would like to reinforce its research team with an intern or graduation student on the topic of:

REPAIR THERMOPLASTIC COMPOSITES WITH PATCHES

Continuous fiber reinforced thermoplastic composites (TPCs) are increasingly used by the aviation industry due to their exceptional specific mechanical properties, rapid processing capabilities, and recyclability. To ensure the successful integration of TPCs in aerospace structures, it is crucial to establish a well-defined approach for repairing TPC components that may experience damage during manufacturing or in-service operations.

One advantageous aspect of TPCs lies in the melt-processable nature of the thermoplastic matrix, which enables repair through reconsolidation or welding, eliminating the need for conventional adhesives or heavy bolt-on metal plates. Consequently, defects such as delaminations or transverse cracks can potentially be healed by reconsolidating the affected region or by applying a TPC patch.

However, to implement these repair techniques effectively, it is essential to develop a comprehensive understanding of the mechanical performance of the repaired part. This necessitates the to define suitable test methodologies to quantify the mechanical performance of the repaired component.

Tasks

You are asked to perform an experimental study on repairing TPCs with a focus on the patch repair method. For this purpose, the following tasks have been identified:

- Literature study of mechanical characterization methods for assessing repaired composite structures
- Manufacturing of laminates and afterwards 2D patches to use as test coupons
- Define correct testing protocol to characterize tensile properties of 2D patches and compare to the mechanical performance of pristine laminates
- Discussion of the results in a written scientific report

Other information

The project is to be performed within a time frame of six-nine months. You will have a desk at TPRC and receive a monthly trainee remuneration of 250 Euro. Please contact Erik Krämer (erik.kramer@tprc.nl or 0618587793) for additional information.