

Werken aan de top van de technologie

Het Nederlands Lucht- en Ruimtevaartcentrum (NLR) is dé organisatie in Nederland op het gebied van lucht- en ruimtevaart. Het is dé plek voor iedereen met een passie voor techniek. Wil jij je talenten benutten en je professioneel ontwikkelen? Als stagiair krijg je bij het NLR alle ruimte!

MSc Assignment

“De-welding of thermoplastic composites by induction heating”

Description of the assignment

In the aerospace sector, there is an ever-growing interest in manufacturing the aircraft parts more sustainably. Accomplishing this goal requires the use of thermoplastic composites along with recycling, repair, and reuse of the parts. One of the biggest advantages of thermoplastic composites is their weldability, which yields significant weight reductions by preventing the use of mechanical fasteners. The welding technologies for aircraft has reached a mature level and more and more welded structures are certified to fly. Next step in sustainable manufacturing is to “de-weld”; in other words, “un-weld” the welded components to be able to reposition or disassemble them for replacement or repair.

This project focuses on the de-welding of thermoplastic composites by means of **induction heating**. A conductive layer placed between the welded components prior to welding will be heated by induction to soften the bond and to eventually enable disassembly. An induction welding setup is already available in our laboratory. The **focus** will be on

- investigating how the induction welding setup needs to be modified to enable de-welding (of simple geometries such as flat plates)
- developing a new setup for the de-welding of complex geometries. The assignment will involve
- a literature survey of the de-welding process and the novel heating elements
- manufacturing the novel heating element when necessary
- modifying the current and/or developing a novel de-welding test setup
- investigating the influence of processing parameters on the de-welding (forces, time, quality of laminates after de-welding)

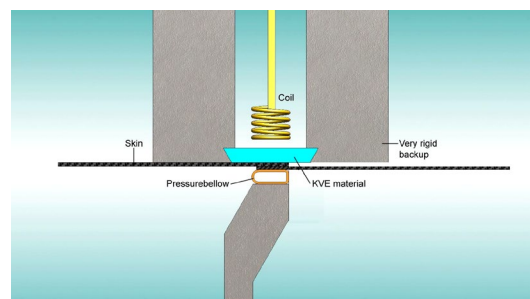


Illustration of an induction welding setup

[<https://www.compositesworld.com/articles/new-horizons-in-welding-thermoplastic-composites>]



Duration and location of the assignment

6-10 months in Marknesse

Requirements of the assignment

- Mechanical or Aerospace Engineering Bachelor's degree
- Basic understanding of composites and their processing

Informatie

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Expected Results

A thesis report covering the literature survey in this novel field of research, manufacturing, welding and de-welding tests and the influence of processing parameters.

Background Information

<https://www.nlr.org/capabilities/composite-manufacturing-technologies/>

Informatie

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