inholland composites

Project description (First-time-right)

Realtime-visualisation-infusion-using-augmented-reality, internship / Graduation

Arnold Koetje, May 2018

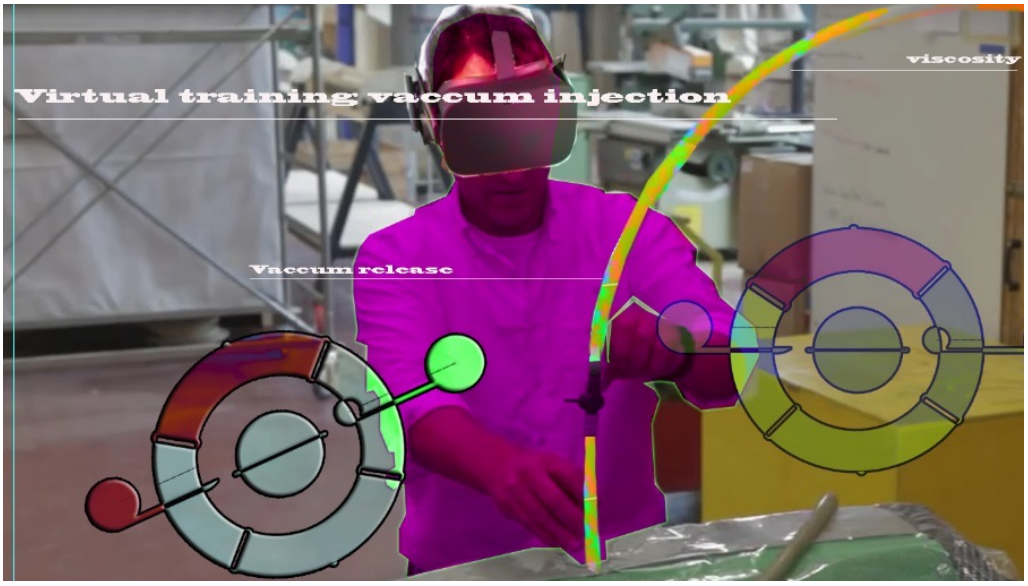
Background

Manufacturing of composites can involve a lot of manual labour, which makes it more expensive and less consistent. In order to decrease the manual labour automation production technologies for composites require further development. Inholland Composites started a RAAK-MKB research project in September 2014 , *Robocompo,* together with 10 SMEs with the aim to automate the vacuum infusion process. The project was a great success and the result can be seen in the Composite Labs in the form of a robot with several end-effectors.

One of the conclusions of the project was that almost the whole process can be automated, but the biggest challenge is controlling the infusion process itself. This subject resulted in a new RAAK-MKB project named: *First-time-right injections for the production of one-off or small series of composite products. More information is available on* http://r1ght.nl

Project description

For this research project an alternative solution has to be investigated for visualising the simulated infusion model. The vacuum infusion simulation model from Polyworx is now presented as a polygon mesh (3D render) on a PC screen. To make significant steps in simplifying and improving the vacuum infusion for out-of-autoclave composites production a much director projection of the simulated model is desired. With the recent introduction of augmented reality it would be feasible to integrate this in the production process in such a way that the simulated model is visualised directly on the mould while the infusion is being executed. The ultimate goal is to make this a training system for new composites engineers which can accurately predict an infusion.

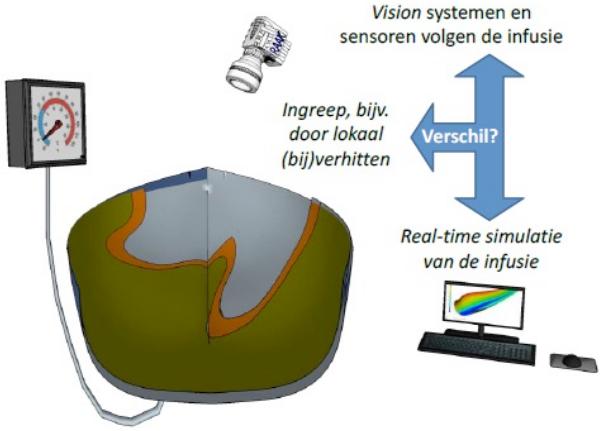


Activities

This internship is a chance to improve your expertise in composite materials and out-of-autoclave production methods. You will get familiar with technologies used in the Smart-Industry and have an opportunity to enhance your systems-engineering skills.

To validate the feasibility you will learn how to simulate an existing CAD model in RTM-Worx and develop an application, which can visualise this directly on the mould using augmented reality.

Scope of work



During all projects at the First-Time-Right-projects it is intended for the student to gain practical experience with composites. So, even if you're working on a 'theoretical' business-case, you will have to get your hands dirty in the lab. Thus, during design you will learn about manufacturing methods and materials. We are striving to create physical demonstrators in the design projects. Furthermore, a typical scope of work consists of these elements:

- Project plan, research questions, research method
- Literature study, research on sensoring- and mixed reality technologies.
- Concept and detailed design
- Demonstrator
- Analysis of test results
- Communication and interaction with stakeholders, companies and experts.
- Communication through http://r1ght.nl (status updates to consortium, video's)
- Technical report

Company information

Inholland Composites, located at Inholland in Delft and Alkmaar, is a very well equipped, high-tech laboratory in the field of composite materials and structures. The focus is on fibre reinforced plastics which provide durable and lightweight solutions in a wide range of applications. Inholland Composites needs students from various technical departments and it's our mission to put theory into practice and provide students with up-to-date education, which connects to today's business.

Internship period: September 2018 / January 2019

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