

Introduction

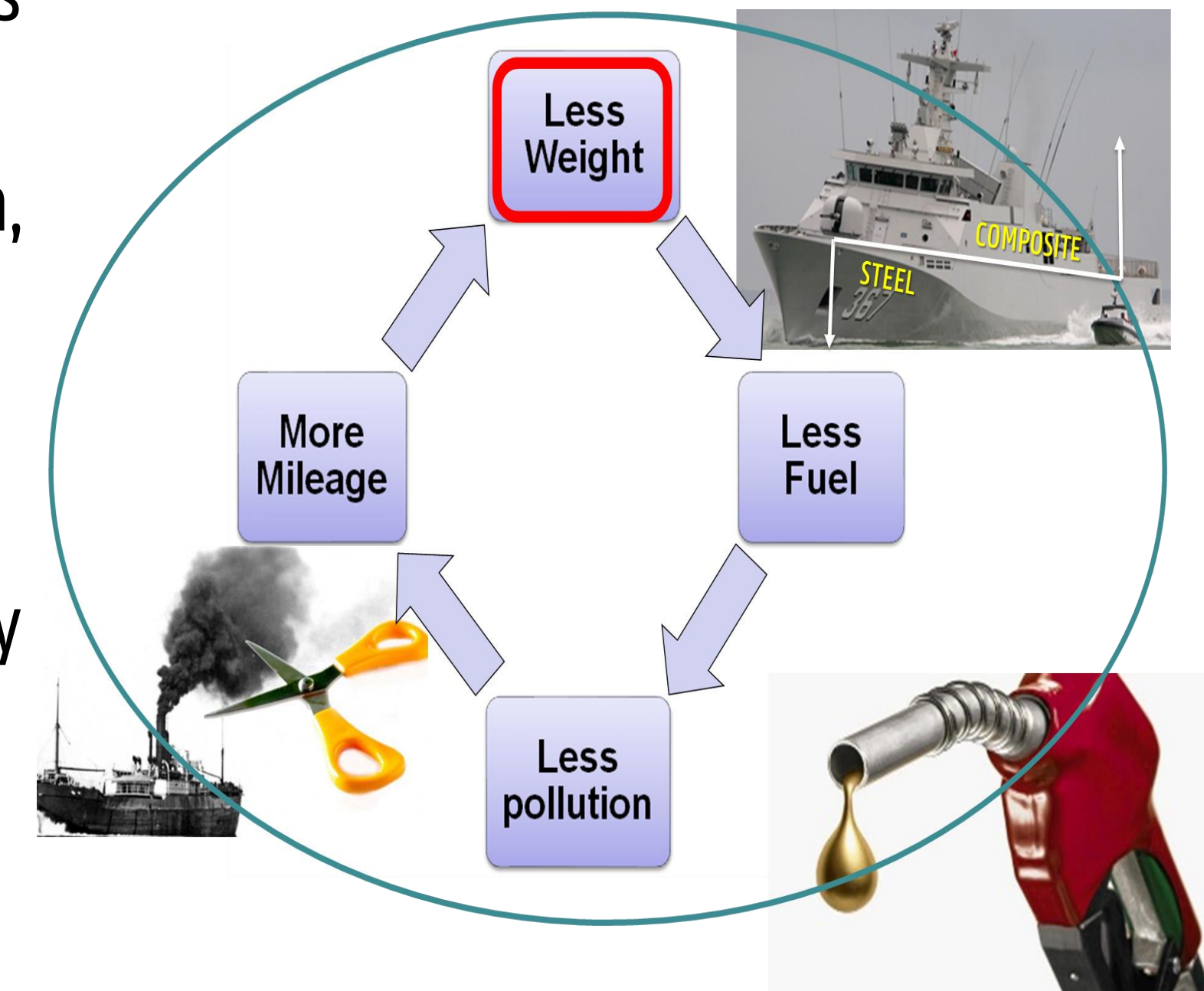
- Need for weight reduction of heavily loaded structures → development of durable and lightweight solutions that can withstand such loads under extreme environmental conditions.
- For marine vessels, **hybrid composite-to-metal adhesive joints** can reduce weight while preserving strength, leading to lighter and stronger structures.

Ambition of Qualify project

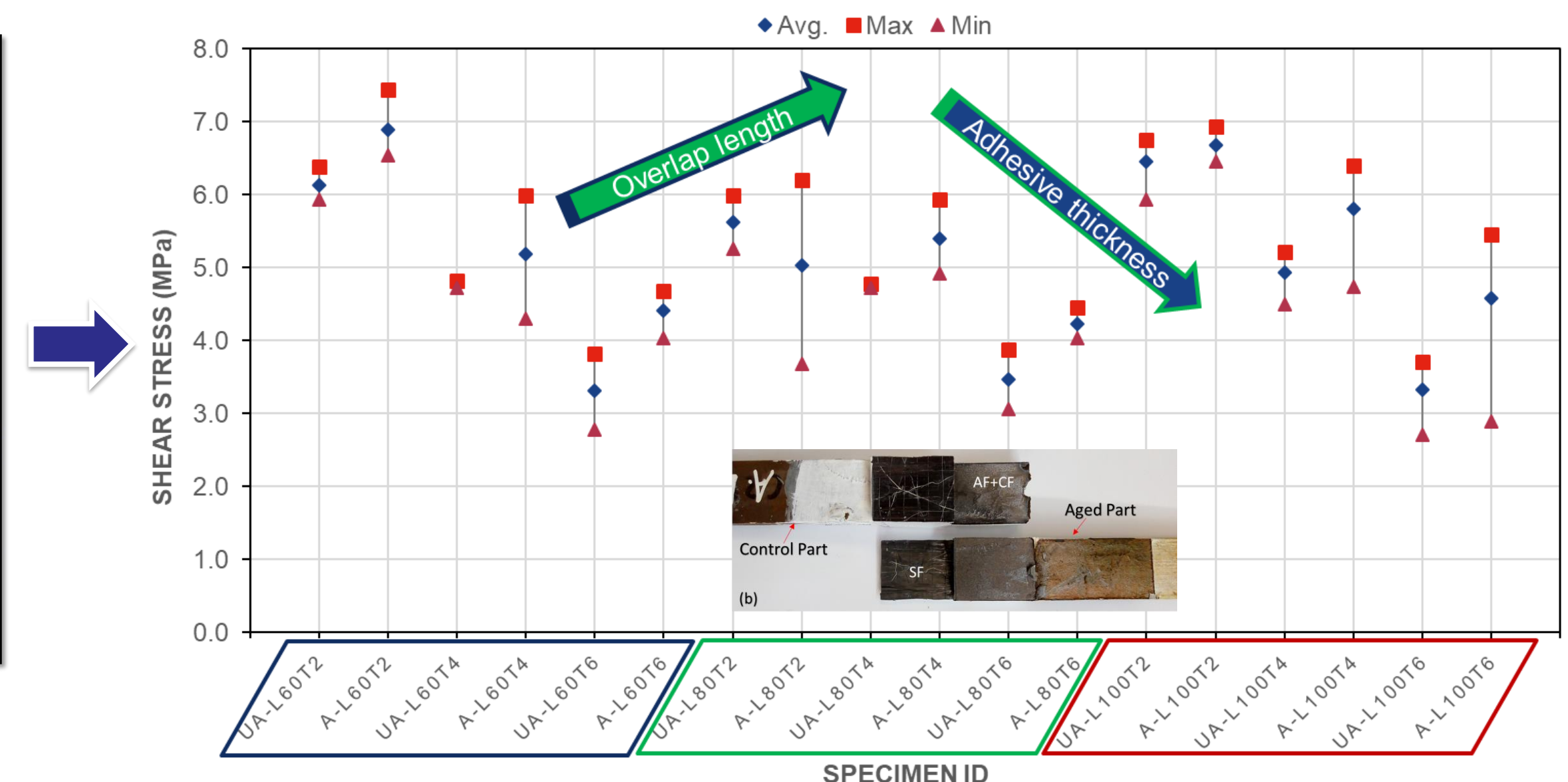
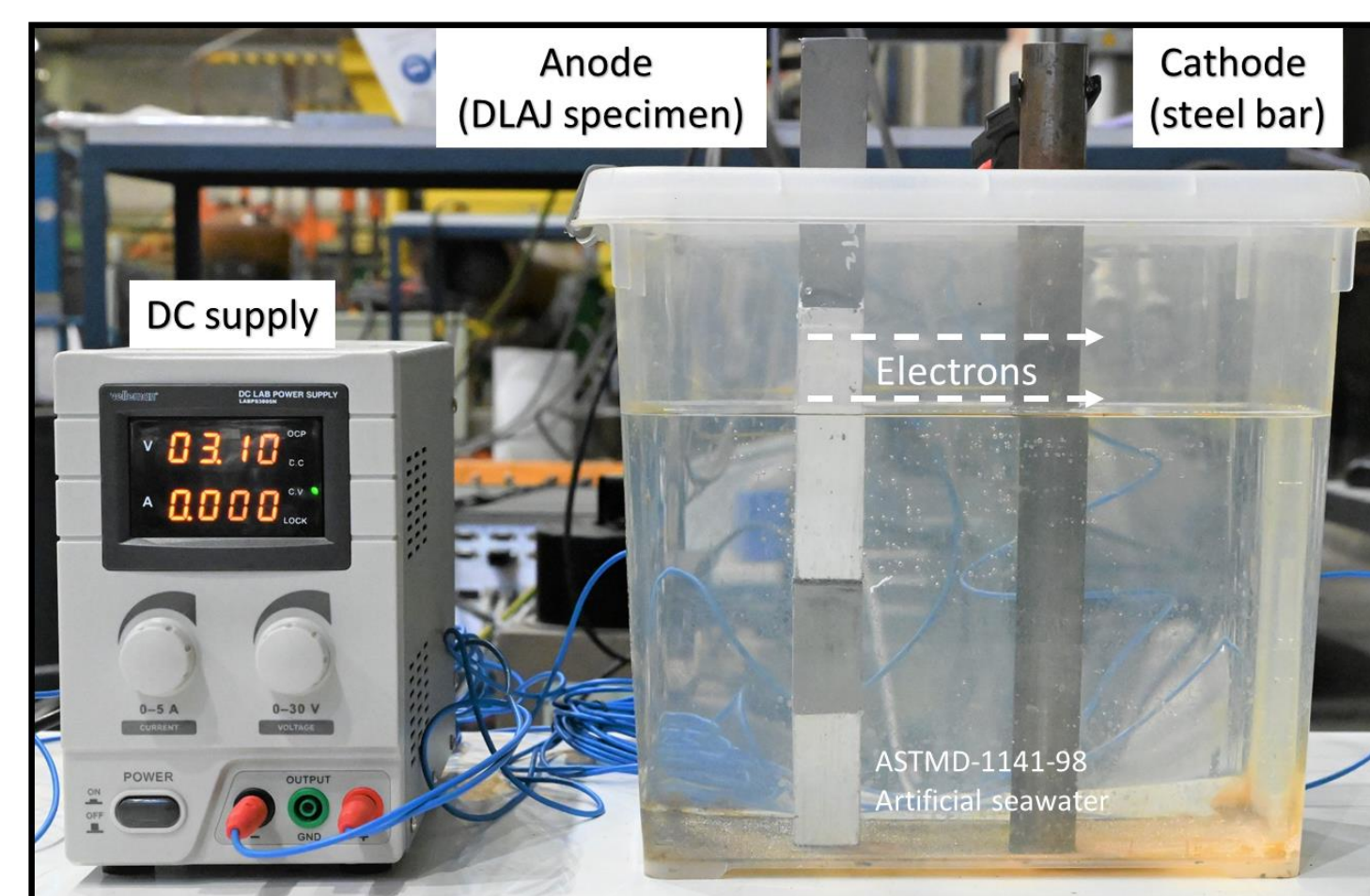
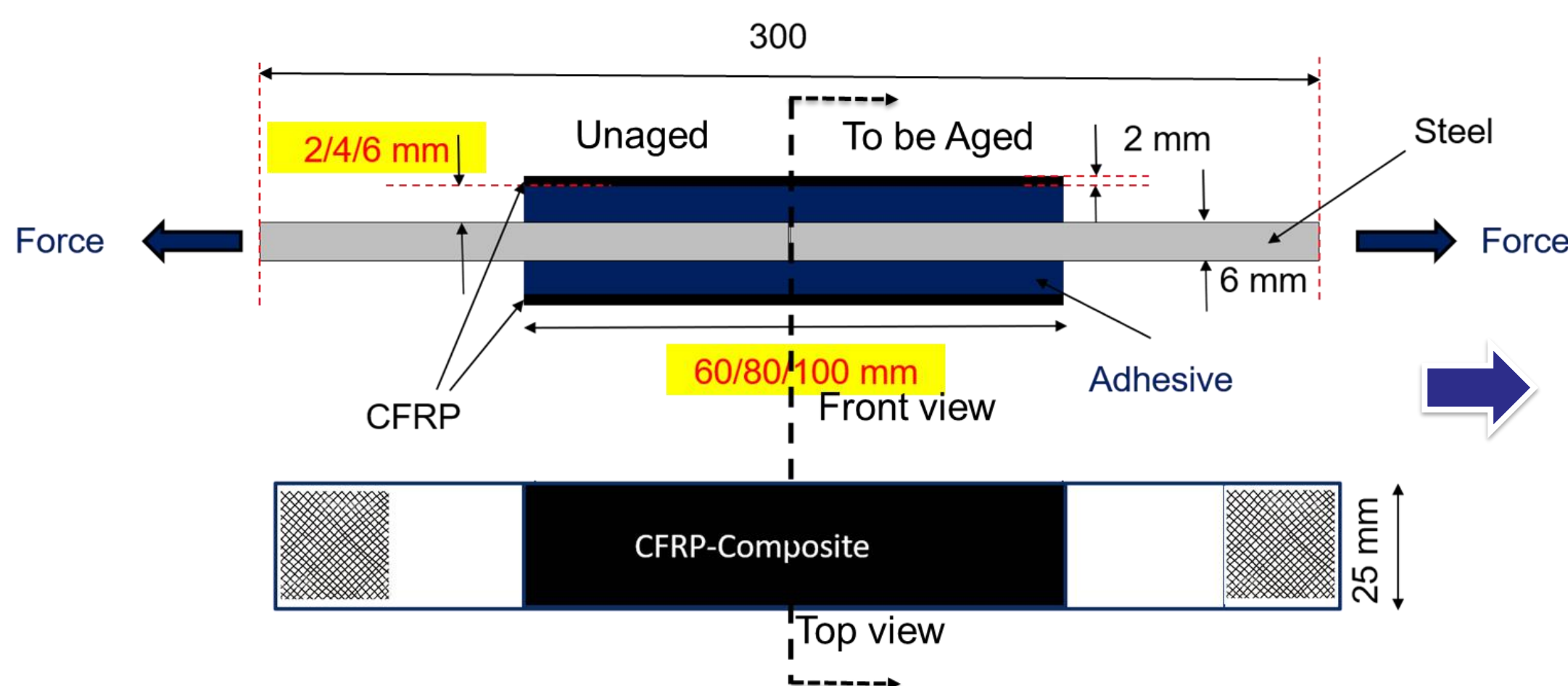
- To provide certification guidelines for new ship designs using adhesively bonded hybrid joints in primary structures.

Role of UGent in Qualify

- To develop an accelerated corrosion method for double strap adhesive joints which replicates 25 years of operational life in few days.
- To develop experimental tools to evaluate the long term structural performance of adhesively bonded hybrid joints under representative operational and environmental conditions.



Development of Testing Methodology for Small Scale Steel-CFRP Double Lap Adhesive Joints (DLAJ)

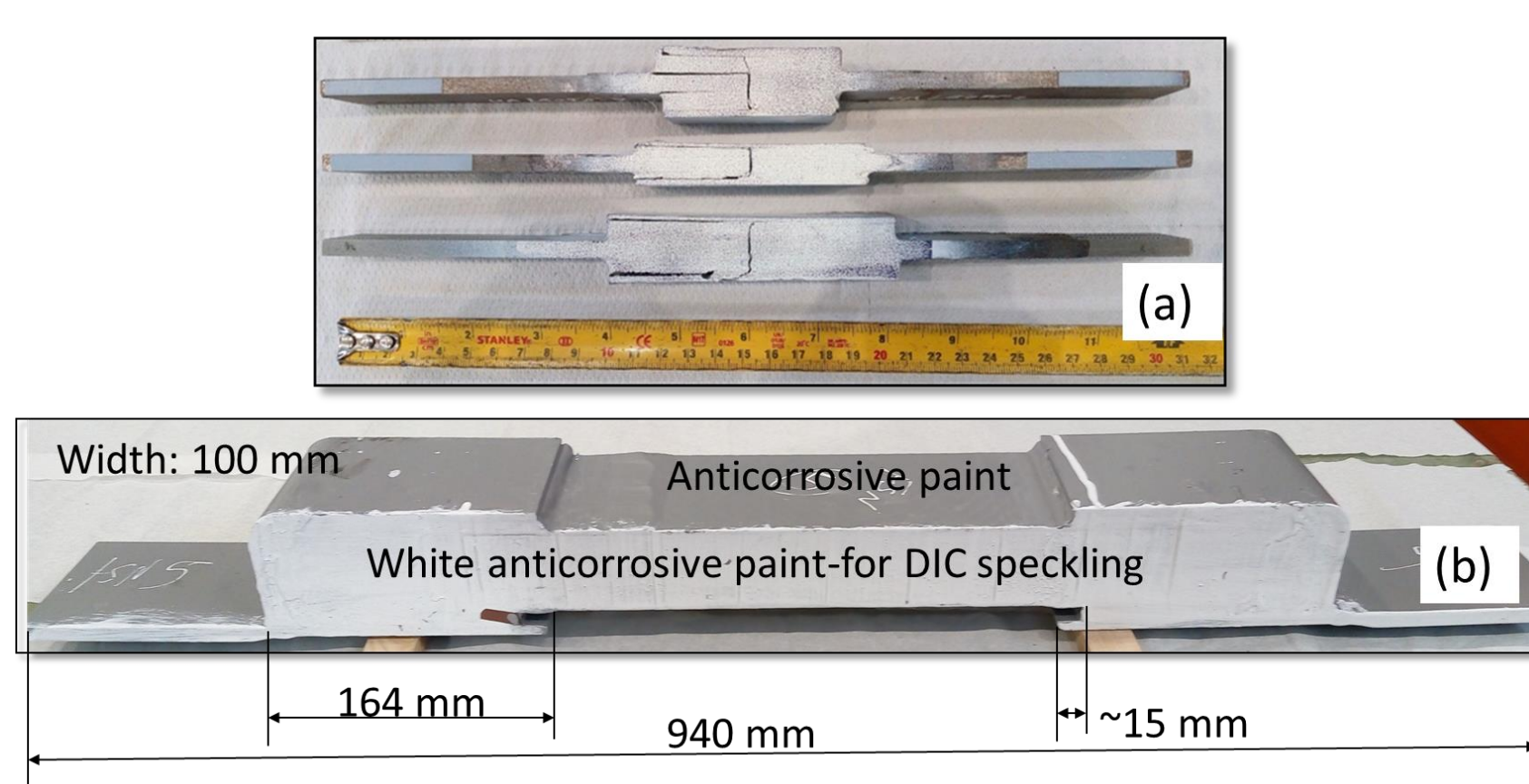


Schematic representation of DLAJ specimens

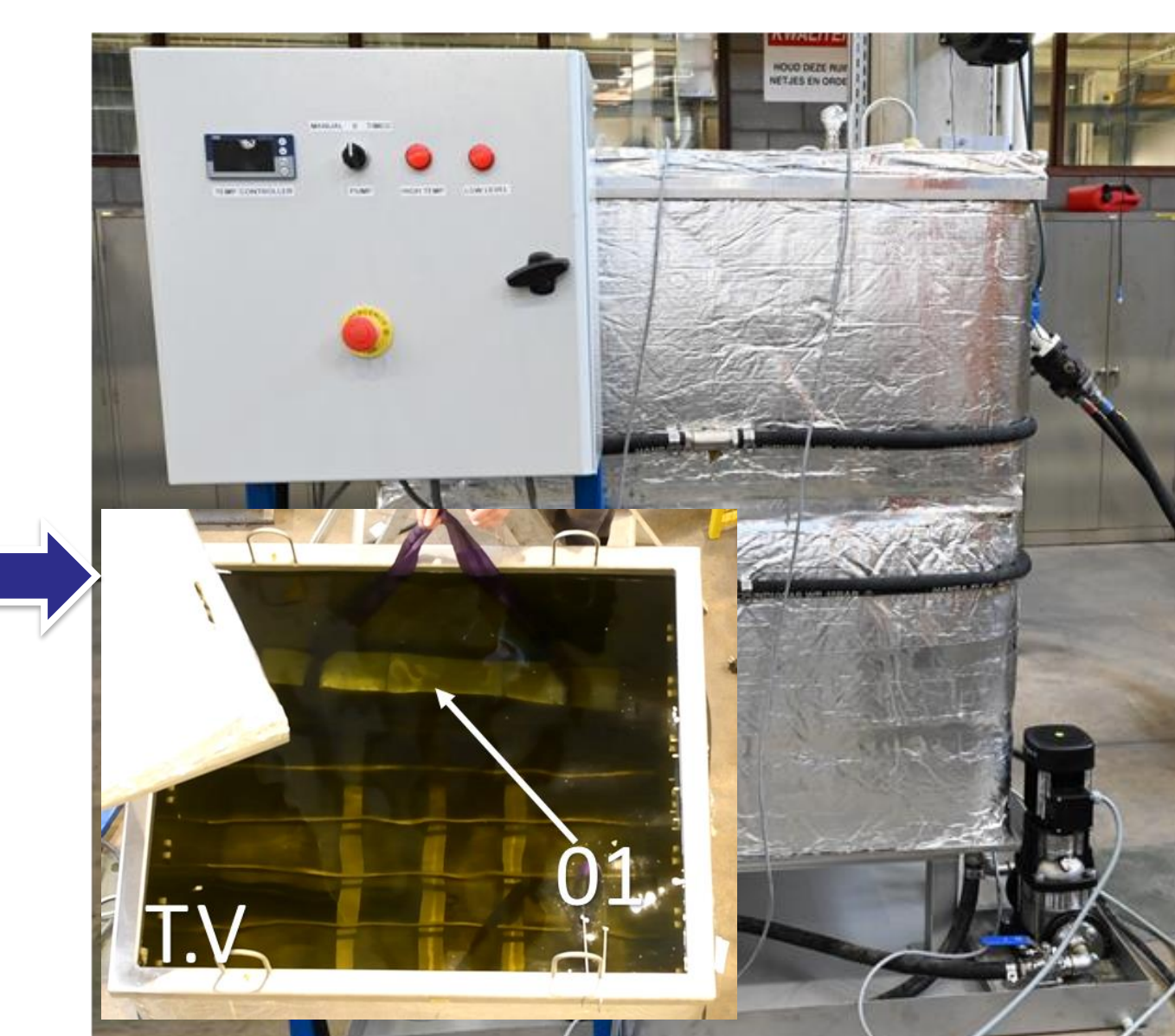
Laboratory test setup of electrochemical corrosion

Tensile test results of aged and unaged specimens

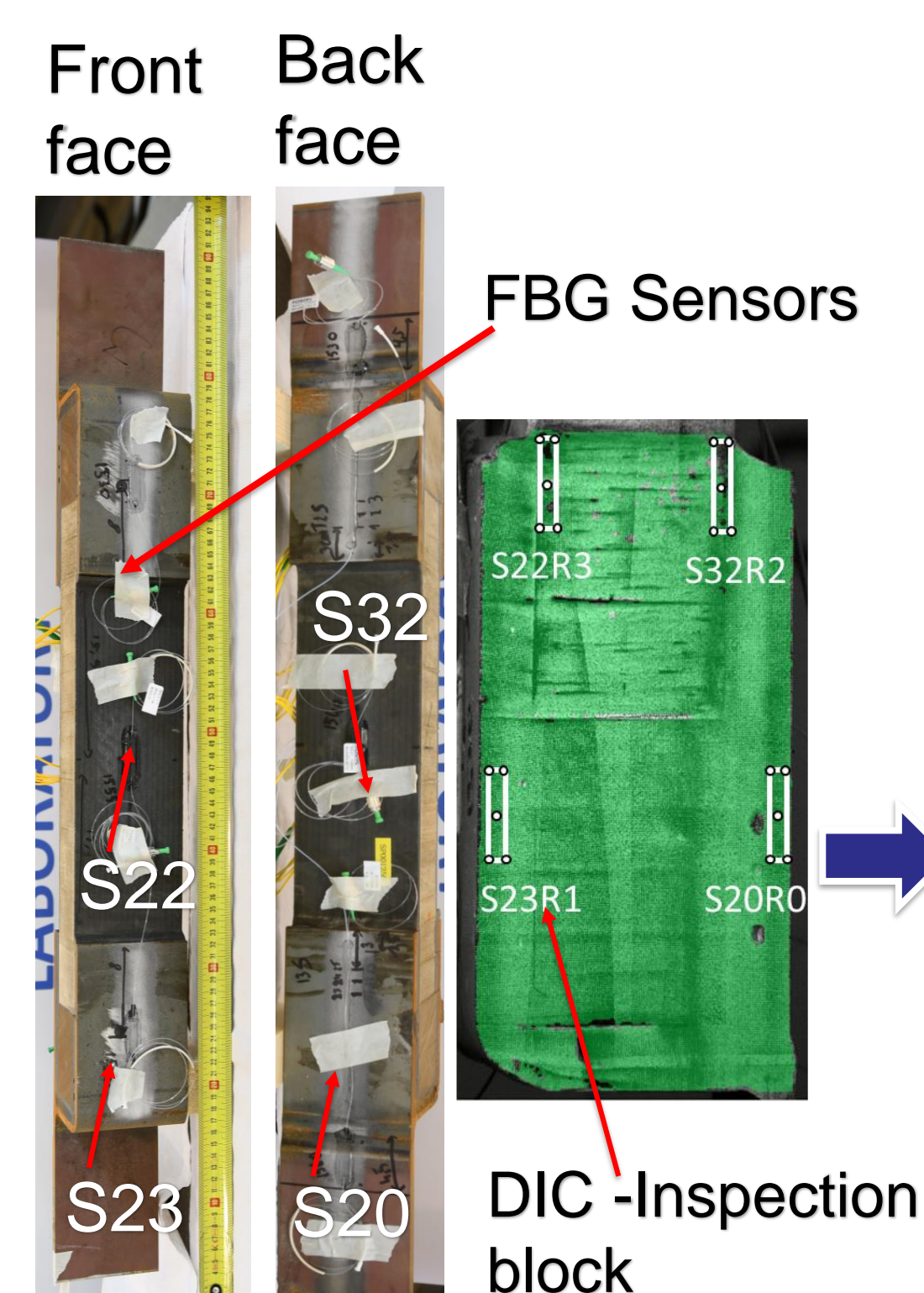
Long term mechanical performance of large scale adhesive joint



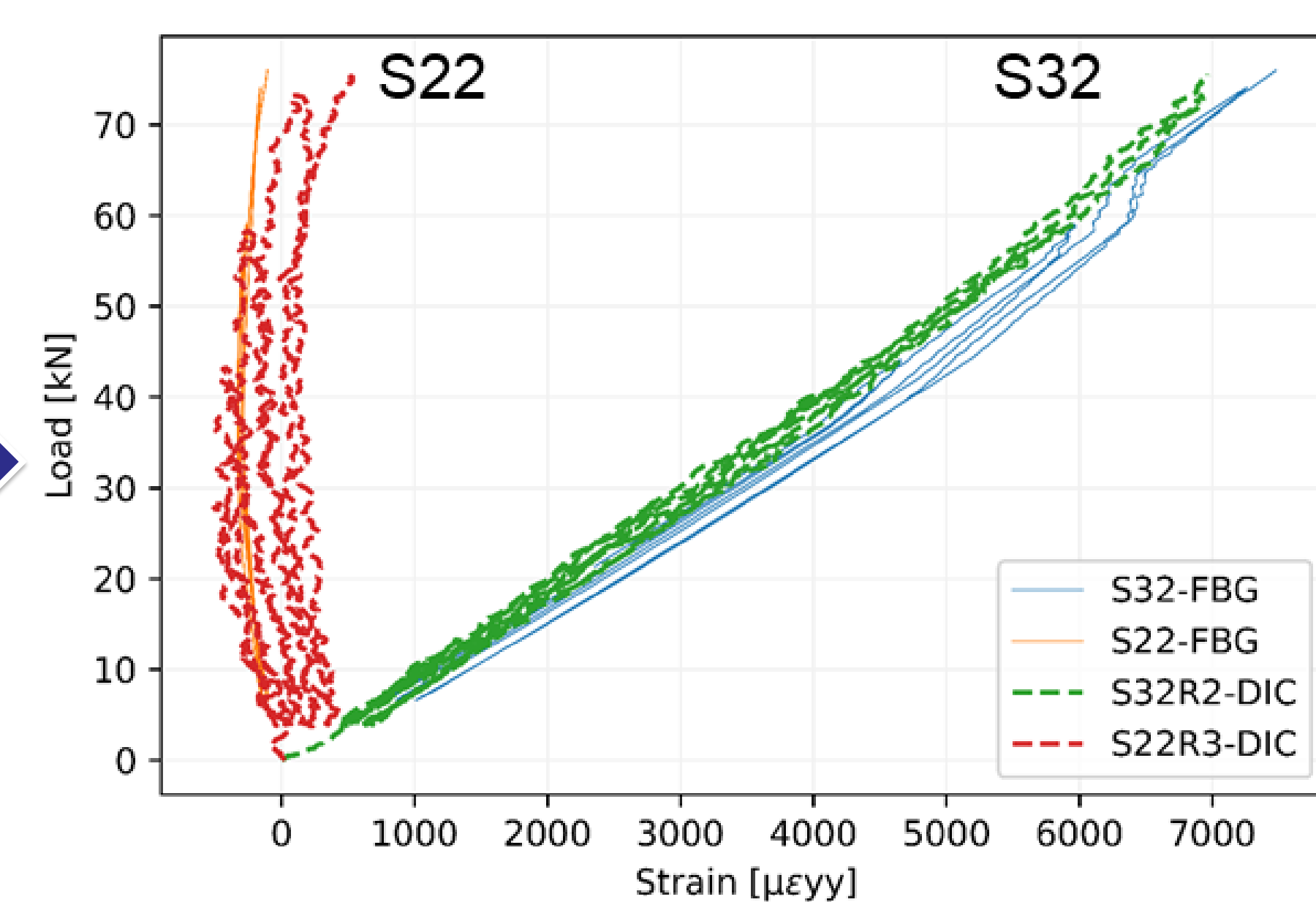
Specimen



(01) Samples submerged in salt water at 50°C for 10 weeks



Specimen instrumented with FBG sensors



Cyclic tensile test result

Conclusions:

- Decreasing adhesive thickness and increasing the overlap length of small scale joints leads to a higher shear strength in tensile test.
- The local strains measured by FBG sensors for a large scale specimen demonstrated a good correspondence with DIC results.

Future work:

- Tensile and fatigue testing of aged (i.e. by immersion) specimens.

Acknowledgment

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Contacts

Researcher: Pankaj.Jaiswal@UGent.be
Promotor(s): Wim.DeWaele@UGent.be