Characterization of shipbuilding steels

Summary

Taltech Estonian Maritime Academy offers a 4-year PhD position in Naval Architecture.

Research field:	Mechanical engineering
Supervisor:	Mihkel Kõrgesaar
Availability:	This position is available.
Offered by:	Estonian Maritime Academy
Application deadline:	Applications are accepted between June 01, 2020 00:00 and July 03, 2020 23:59 (Europe/Zurich)

Description

Current efforts in the naval architecture are focused on reducing the overall weight to develop lighter, fuel-efficient and eco-friendly structural solution that reduce carbon emission. Along with the development of lightweight innovative structures, the safety margins are going down, while maritime traffic is increasing. Therefore, there is a need to develop new class of lightweight steel structures that are compliant with current design rules, but also show excellent performance under accidental limit states such as collision and ground-ing. We foresee that such structures are built from combination of normal and high strength steels while absorbing deformation energy through bending and crushing.
Therefore, we are looking for a doctoral student to work on characterization of steel materials used in ship-building.

Responsibilities and tasks
The characterization involves mechanical tests with different tensile coupons that give different stress state (ranging compression, shear, uniaxial tension and plane strain) prior to material failure and tests with structural components that are scaled representatives of ship structures. The coupon tests should be made with both base and welded materials. For high fidelity we will use ARAMIS to measure strains on the specimen surfaces. The second part of the thesis work involves numerical modeling of these tests, which involves also development of material models.

Qualifications
The call is open for candidates with a wide range of backgrounds inside and outside of Estonia. Most importantly, high level of interest and motivation towards, and deep understanding on, solid and computational mechanics is required.

The applicants should fulfill the following requirements:

- A suitable background may come from mechanical/material engineering, marine engineering, civil engineering, engineering physics, applied or computational mechanics, or related disciplines
- Prior experience on working with FE codes LS-DYNA or ABAQUS is a significant advantage and skills with programming tools Matlab, Python or Fortran is considered as a plus as these will be used during the work
- The candidate should prove his/her capabilities in writing the technical report and scientific papers in high quality journals
- Experience in collaborative research/publication with the existing Tal-Tech staff is also a plus
- The applicant for the position must have a Master’s degree and must fulfill the requirements for doctoral students at the Tallinn University of Technology

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