



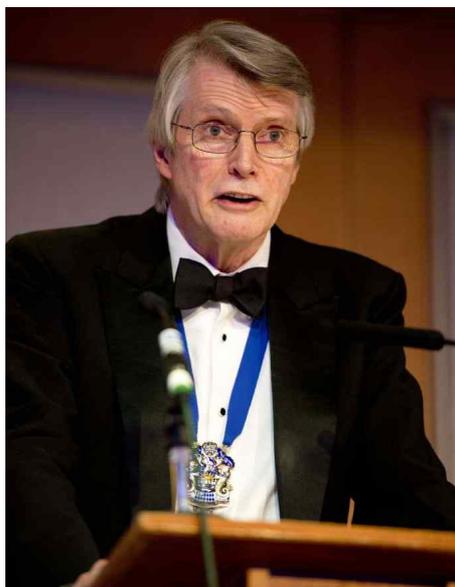
New Zealand Naval Architect

The New Zealand Division of the Royal Institution of Naval Architects

Issue 42 June 2014

President Ted Attends the Annual Dinner of RINA, London, 2014

The 2014 RINA Annual Dinner was held 30th April at the Lancaster London Hotel, opposite Hyde Park's Lancaster Gate in London's West End.



President of RINA, Mr. Peter French, FRINA, FREng, FRSA

One of the perks, Ted writes, of being Division President (and maybe the only one, because he can't think of another) is to receive a free ticket to the dinner, and all that one has to do is get there!

Fortunately he was visiting family in Virginia at the time, so was able to book a trans-Atlantic flight, together with a less expensive hotel in a NW London suburb. Even so, there was no change from a NZD 2,000 experience!

For transport he intended relying on the famous "tube" to get to the dinner. However, the tube was on partial strike on the day, and so he

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The well attended 2014 RINA Annual Dinner

managed to get only part way there, and ended up with a half hour's walk along Oxford Street to finish the journey, all dressed up in his black tie and dinner suit. Fortunately, he fell in with other "penguins" marching along the same route: safety in numbers!

On arrival he was greeted personally by the President, Mr Peter French, FRINA, FREng, FRSA, at the pre-dinner council reception (invitation only).

The dinner was attended by about 500 members and guests, with the Institution's Corporate Partner Companies, including the major

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Division News

The Annual General Meeting was held at the Marine Industry Association Building at Westhaven Marina on 2 April 2014. It was well attended, no doubt in part due to the raised expectations upon the presentation of two papers by former students.

The first paper was delivered by Hussam Gabriel who, together with Hayden Conmee, were recipients of the RINA prize winning project "Thermal Model of a Royal New Zealand Naval Vessel in the Arctic Environment".

The second presentation was a summary of a paper by James Flett, winner of the HPYD/RINA travel grant to attend the 19th International Conference on Composite Materials - co-author of

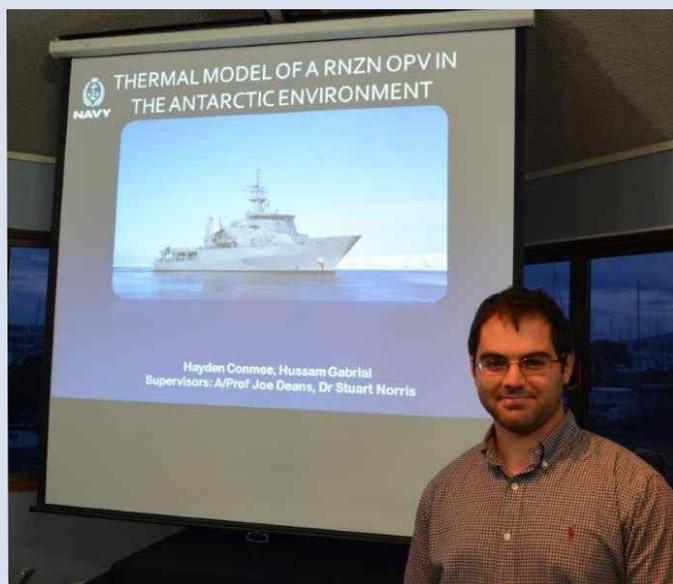
"Stress and Strain Fields in Sandwich T-Joints Subjected to Simulated Slamming Loads".

It should be noticed that the division actively supports education through prizes and HPYD conferences through graduate stipends. These activities are supplemented by the generosity of Babcock (NZ) Ltd for the company's continued support of the University of Auckland prize.

Presentation #1

A Thermal Model of a Royal New Zealand Navy Vessel in the Antarctic Environment by Hussam Gabriel

The Royal New Zealand Navy (RNZN) currently has offshore patrol vessels (OPV) in service that voyage a vast area ranging from the tropics to the southern ocean. The primary objective of this study was to provide the RNZN with a comprehensive thermal analysis of the vessel's engine room when on voyage in Antarctic seas during the summer months. This project involved a series of computational fluid dynamics (CFD) model iterations of increasing complexity in order to produce a final model that gives satisfactory results.



Iterative CFD modelling processes were used to simulate the thermal behaviours of the engine room of the HMNZS Otago. The complexity of the models progressed from simplified 2D models of the engine room, then to half hull 3D models, and finally to a full hull 3D model including accurate supply fan flow and geometry asymmetries.

This report details the processes undertaken to produce a series of predictions relating to the thermal behaviour of the system when operating in different conditions. The RNZN was provided with valuable information regarding the vessel's current temperature measurement situation.

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Division News

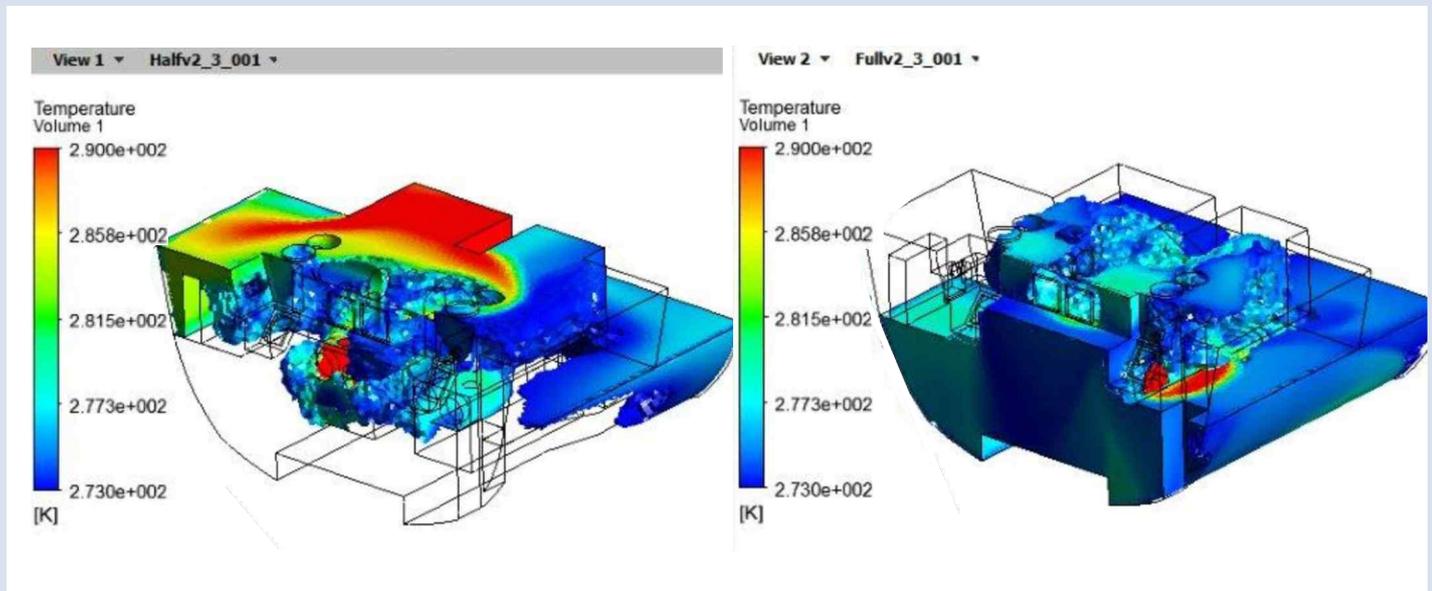
Thermal Model of Navy Vessel . . . continued

This analysis also produced numerical correlations that describe the expected temperatures for different operational scenarios. Engine room temperatures can be predicted when the fan speed and ambient air temperature are known.

Distinctive 'cold zones' within the engine room were identified, therefore allowing recommendations focussed on reducing the rates of heat loss from the engine room to be made to the RNZN. This investigation was designed to provide a complete analysis of the HMNZS Otago engine room and finally concluding with practical solutions to potential thermal issues that could debilitate the vessel in extreme conditions.



President Ted Ewbank congratulating Hussam Gabriel



Division News

Presentation #2

Below is a summary of presentation by James Flett, M. Battley and T. Allen on Stress and Strain Fields in Sandwich T-joints Subjected to Simulated Slamming Loads

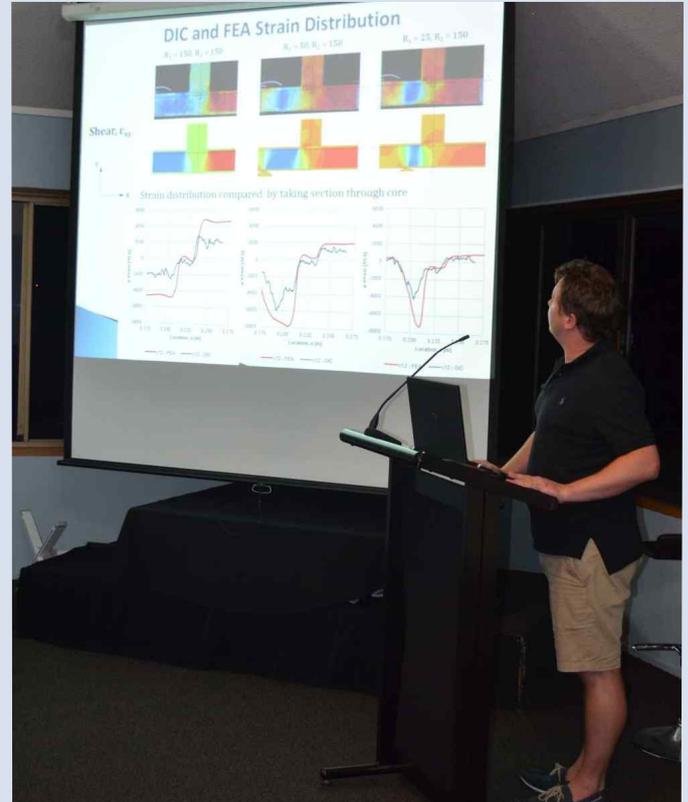
Composite sandwich structures are commonly used in the construction of high performance marine vessels. The high speed and variable operating environment for these vessels leads to large magnitude impacts with the water surface. These impacts, referred to as slamming, result in localised pressure pulses that travel across the hull panels. Water slam testing of composite sandwich panels has shown significant transverse shear forces occur at the panel edges, which can lead to core shear failure. The maximum transverse shear forces occur at junctions between the hull and structural members such as bulkheads, stringers and girders. Configurations where the supporting member is perpendicular to the hull panel are commonly described as “T-joints”.

The aim of this work was to investigate the stress and strain fields in the core of glass-fibre/epoxy skin, polymeric foam core sandwich panels at T-joint junctions. A series of transverse loading tests were conducted on a T-joint beam specimen, with the core strain field being measured through digital image correlation (DIC). A finite element model was validated using the results from experimental testing. The strain distribution in five alternative joint configurations was then investigated using the finite element model.

The strain contours measured by the digital image correlation system correspond well with those predicted by the finite element model, demonstrating that DIC is a useful tool for the assessment of strains and deformations in a complex loading scenario, as well as for validation of numerical models. Differences in the magnitudes of the measured and predicted strains may be due to uncertainty in actual material properties.

The simulation results demonstrated that for design of such joint details it is essential to consider the full stress field, not just the transverse shear components. In particular, the local compressive stresses can be of similar magnitude to the transverse shear stresses.

Tailored T-joint details can substantially reduce the



James Flett giving the Presentation

magnitude of the principal stresses. All three joint variations with over-laminates produced similar maximum stresses, with the least rigid joint consisting of a foam pad with over-laminates being the best performing configuration. However this may be significantly more complicated to manufacture for only a slight improvement in performance, so a simpler design may be more cost effective.

Further work in this area should include investigating the optimal over-laminate thickness and the radius of the resin fillet. More detailed analysis of the cost effectiveness of using an alternative joint, such as a triangular foam fillet should be undertaken. Experimental work should be conducted for a variety of other joint configurations for further validation of the numerical models, and to quantify the failure loads for alternative designs. It would also be useful to evaluate the performance of alternative T-joints in actual water slamming events.

President's Report

My report for this issue is well covered in the opening article regarding the Headquarter's function, together with the student presentations which followed the AGM. I look forward to resuming the traditional "President's Report" in the next issue.

Ted



Annual RINA Dinner. . . continued from page 1

classification societies, being well represented.

The general theme running through most of the speeches was the safety of seafarers, which, of course, is a "given" with naval architects. Speeches and toasts were presented in an entertaining and humorous vein where this was appropriate

One of the keynote speakers was guest of honour, the Reverend Andrew Wright, head of the Sailors' Society, who was the only one who offered a solution to the transport problem for Ted's return to his hotel later that night. He offered the use of his bicycle, which he had ridden to the dinner. A London cab, however, proved to be the better option!

Ted found the company convivial, which made for a memorable evening, and a worthwhile experience, perhaps whetting his appetite for 2015!



Pic above right: President, Ted Ewbank at the RINA HQ Annual Dinner April 2014 with Professor Iain Macleod, President of the Institution of Engineers and Shipbuilders in Scotland.

Editor's Note

Due to unforeseen circumstances this issue has been unavoidably delayed.

I apologise for any disappointment caused.

The next issue is being prepared so if anyone has any contributions - now is the time to email them to me.

Mike

Council Update

Council members up for re-election and all subsequently re-elected at the AGM 02 April 14:

Susan Lake (2002)
 Graeme Finch (2002)
 Jason Smith (2008)

Council members mid-term and continuing in office:

Tony Stanton (2009)
 Ian Macleod (2009)
 Mike Kay (2009)
 Ted Ewbank (2011)
 Brendan Fagan (2013)
 Nina Heatley (2013)
 Richard Flay (2013)
 Anderson Chaplow (2013)

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