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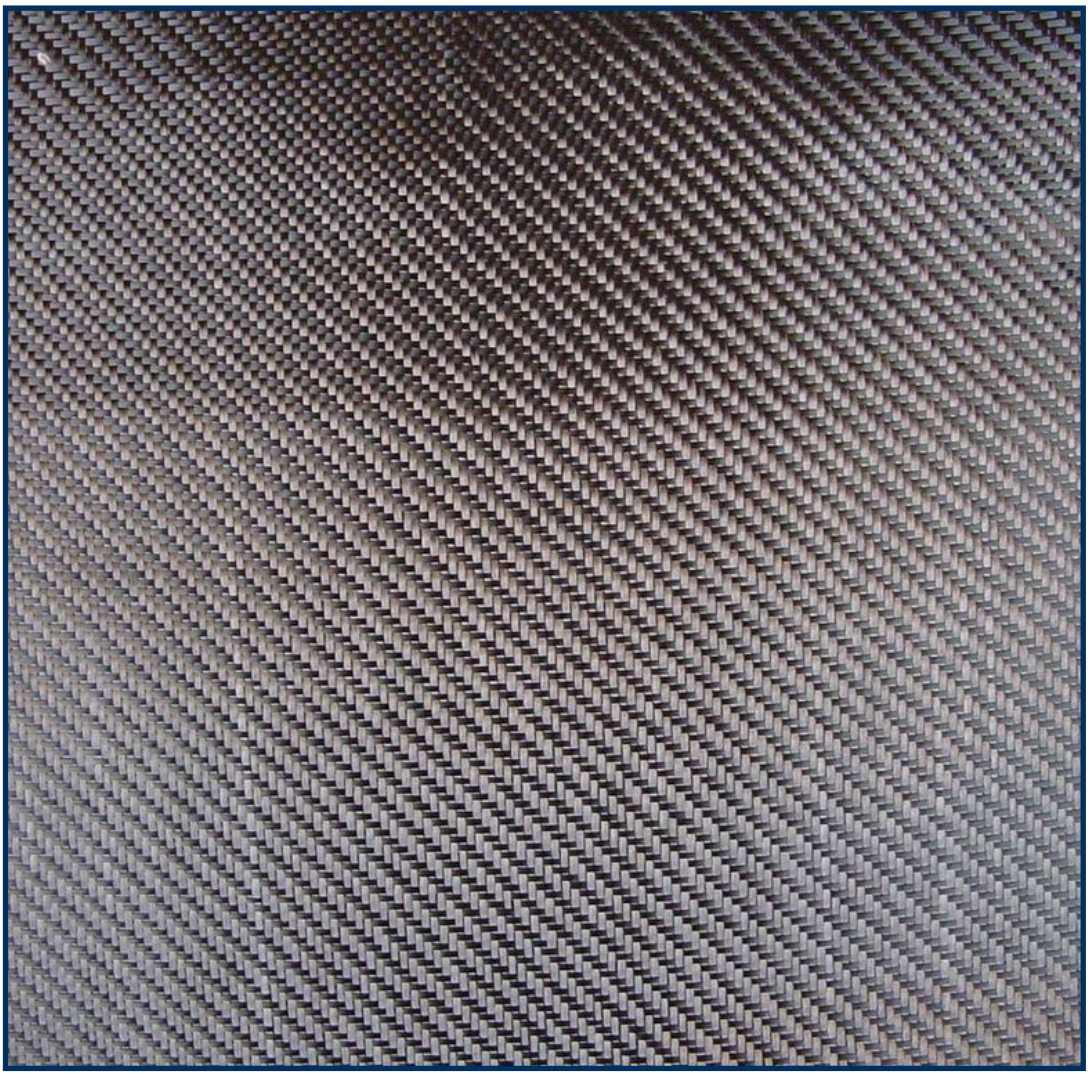

International Conference

MARINE AND OFFSHORE COMPOSITES

3 - 4 FEBRUARY 2010
RINA HQ, LONDON, UK

MARINE AND OFFSHORE COMPOSITES

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day 1

09.30 - 10.00 **COFFEE AND REGISTRATION**

10.00 - 10.35 **APPLICATION OF COMPOSITES IN SHIPS AND OFFSHORE - A REVIEW AND OUTLOOK**
J Weitzenböck, D McGeorge, D Hill, B Hayman, A Echtermeyer, P Noury, K Brinchmann, G Hersvik, A Fredriksen, D Ohlsson, DNV

The aim of this paper is to show how the use of composites can provide unique solutions and significant commercial benefits to the marine and offshore industry. The main reasons for using composites are to save weight, to reduce maintenance (no corrosion), to achieve complex shapes and tailored properties and multifunctionality. This will be illustrated with a number of examples of successful use of composites on ships and offshore based on DNV's experience gained from applied research, consulting and technology qualification, verification and certification.

10.35 - 11.10 **USE OF CARBON FIBRE IN HIGH SPEED PASSENGER FERRIES**
M Håkansson, Kockums AB

Glass fibre has been used for boats for over 50 years and material properties, production technology and design principles are well known. But just switching the fibre to carbon will in many cases result in non-optimized design due to a different set of properties. An example of this is the carbon fibre's significantly higher Young's modulus but only moderately higher strength that will results in more strength problems rather than stiffness problems. Another example is that the quality control is more difficult in carbon laminates because they are not transparent, as glass fibre laminates.

11.10 - 11.40 **COFFEE**

11.40 - 12.15 **A TAXONOMY FOR RESIN INFUSION PROCESSES**
J Summerscales, University of Plymouth

The traditional processes for the manufacture of high-performance composite shell structures are (a) vacuum-bagging (VB)/VB with autoclave cure (VBA) or (b) resin transfer moulding (RTM) or (c) compression moulding. Over the past decade there have been a number of novel "infusion" processes introduced which span the gap between VB(A) and RTM.

12.15 - 12.50 **TOWARDS RECYCLABLE COMPOSITE CRAFT: FUSION BONDED THERMOPLASTIC COMPOSITE T-JOINTS**
M Otheguy, G Gibson, Newcastle University
B Cripps, BVT Surface Fleet Support

This research work addresses PP-glass composites joining, because the viability of thermoplastic composites for boat construction depends largely on the availability of a simple and effective joining method. A study on the design, processability and strength of fusion-bonded lap and T-joints has been carried out, inspired by a recently tested repair technology.

12.50 - 14.00 **LUNCH**

14.00 - 14.35 **SPS - BREAKING THE MOULD OF SHIP REPAIR AND CONSTRUCTION**
A Rayner, Intelligent Engineering

SPS Overlay is a Class approved repair that makes efficient use of the existing corroded/worn plating. An elastomer core chemically bonds the existing plate to a new top plate to create a composite structure that substantially enhances plate strength and impact resistance. This makes SPS Overlay ideally suited for hardwearing surfaces such as Bulk Carrier tank tops and RoRo decks. It has been used from reinstating corroded/eroded plating for asset life extension to strengthening helidecks and for side shell protection on FPSOs.

14.35 - 15.10 **APPLICATION OF COMPOSITE MATERIAL COMPONENTS ON F.P.S.O. VESSEL**
V. S. Mandloi and Dr. P. Kumar, Oil & Natural Gas Corporation Ltd.

This Paper covers the studies carried out on the feasibility of application of composite materials components and recommendations for use of composite material secondary structures like grating, handrail, stair, and piping system to handle different service liquids such as oil, gas, chemicals, effluent, sewer water, fire water etc. and chemical handling, chemical dozing etc. and components such as hatch cover, sub-sea equipment cover, mooring lines and production risers on FPSO.

15.10 - 15.40 **COFFEE**

15.40 - 16.15 **DEVELOPMENT OF DESIGN EQUATIONS FOR STEEL SANDWICH PANEL CONSTRUCTION**
SJ Kennedy, MA Brooking, Intelligent Engineering
Y.Heo, MS Kim, DSME
H Ocakli, Lloyd's Register

This paper describes the development of new design equations for composite steel sandwich panels. Steel Sandwich Panels enable designers to create simpler structures with fewer components. By using composite panels in place of stiffened steel plates it is possible to eliminate secondary stiffeners and the associated cut-outs and brackets. Large composite panels cannot be assessed using the existing steel ship rules and so a new set of formulae is needed to support ship designers.

16.15 - 16.50 **IN-SERVICE COMPOSITE INTEGRITY MONITORING SYSTEM (I - CIMS)**
B Walker, P Faulkner, P Guy, J Tracey, Tangent Technologies Ltd
S Smith, C Gowrely, P. E. Composites Ltd

The paper will reflect the features of I-CIMS and how this technology is improving in-service reliability and safety. It will also draw upon the practical experiences derived from 'ECHO 1.' This is a demonstrator of a 9m fast inshore patrol craft where 4 in number Acoustic Emission sensors have been embedded into the composite hybrid material making up the bow section. The methodology used in ECHO 1 is directly transferable to larger vessels and structures made from composite or composite hybrid designs and is invaluable in complex, sandwich or hybrid 3D composite structures.

16.50 - **GENERAL DISCUSSION AND EVENING DRINKS RECEPTION**

day 2

09.30 - 10.00 **COFFEE AND REGISTRATION**

10.00 - 10.35 **IN-MOULD GEL COATING FOR RESIN TRANSFER MOULDING**
John Summerscales and Christopher Hoppins, University of Plymouth

Gel-coat, is normally applied onto the mould tool before the structural laminate is moulded against the coating. The majority of the volatile organic components (VOC) in the coating will react during the polymer curing process, but the application process is such that some VOC will be emitted into the workplace and the environment. Gel-coated laminates have been manufactured using several process variations.

10.35 - 11.10 **CONCURRENT ENGINEERING PRINCIPLES APPLIED TO MARINE COMPOSITE STRUCTURES FOR REDUCTION IN PRODUCTION COSTS THROUGH ROBUST DESIGN**
A Sobey, J Blake, R Shenoi, A Waddams, University of Southampton

Automated communication can then be implemented to determine the importance of different parts, determine the sensitivity to variation and optimise the part to ensure a robust design where cost is low while structural integrity remains. This paper therefore develops a concurrent engineering environment for implementation within the leisure boatbuilding industry with the aim of reducing production costs through robust design.

11.10 - 11.40 **COFFEE**

11.40 - 12.15 **A STUDY ON PHYSICAL-MECHANICAL PROPERTIES AND WATER UPTAKE OF FIBERGLASS AND CARBON FIBER POLYESTER COMPOSITES**
M. M. Jalili, Islamic Azad University, Iran

In this study, the performance of carbon fibers exactly replaced with fiberglass was investigated. In fact, the elastic modulus, density and water uptake of resultant composites were measured and discussed. In order to determine composites' modulus, a novel test method called Non Destructive Acoustic Test (NDAT) was carried out.

12.15 - 12.50 **MULTIPLE CRITERIA OPTIMIZATION APPLIED TO COMPOSITE BOAT DESIGN**
Jose Marcio Vasconcellos, COPPE/UFRJ, Brazil

This paper focus is the structural design using composite materials. The aim is indicates an improvement in weight and cost using optimization techniques. Optimization is a tool to indicate better designs and in this case better structural design when the concern is safety and cost.

12.50 - **GENERAL DISCUSSION**

This represents a preliminary programme and may be subject to change

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EVENING DRINKS RECEPTION
Following the end of day one (03/02/2010), delegates are invited to attend an evening drinks reception at the conference venue.

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