LIGHTWEIGHT MATERIALS

FROM A SURVEYOR'S POINT OF VIEW

WELCOME



E-LASS

E-Lass Annual Conference 26 – 27 June 2018 Pornichet - France







Antwerp Maritme Acedemy

Deck Officer Jan de Nul

Polymer Maritime Development

2008 - 2012

2012 - 2017

LET'S MEET A small introduction



Conferences

Marine Surveyor DP Survey Group

2015-2018

2015 & 2017

2018 - present

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About DPS

DPS is an **international** organisation of experts engaged in claims and risk management services to both the marine and non-marine insurance industries.

All activities are coordinated from our **central hub** in Antwerp.



Goals

- Accurate and efficient investigations
- Crystal clear reports
- Technical competence
- Social skills
- Sense of urgency
- Focus on solutions.



LET'S MEET DPS

A word about DP Survey Group

Departments

- General Management
- Marine Department
- Non Marine Department
- International Desk
- International Fruit Desk
- Legal Department
- Accountancy-Administration
- DPS Africa



Clients

- International Insurance market
- P&I Clubs
- H&M Underwriters
- Carriers and Traders





Cargo related surveys

- Pre-shipment surveys
- Loading and discharging surveys
- Stowage, lashing and securing surveys
- Cargo damage surveys and quality control







MEET OUR MARINE DEPARTMENT?

Our Services

⊘ Nautical surveys

- On- and off-hire surveys
- Condition surveys
- Bunker surveys
- Pre-loading condition surveys
- Hatch cover surveys including ultrasonic testing
- Damage surveys
- Ship repair surveys







Probability X Consequences

- Pre-shipment surveys •
- Loading and discharging surveys •
- Condition surveys •
- Loss prevention •

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Probability X Consequences

RISK= Probability X Consequences

- Pre-shipment surveys
- Loading and discharging surveys
- Condition surveys
- Loss prevention

• ...

- Damage surveys mitigation of loss
- Ship repair surveys
- ...







USE OF LIGHTWEIGHT MATERIALS

"How can we control the risks involved with the implementation oflightweight materials in the maritime industry?"

"How can we reduce the risks involved with the implementation oflightweight materials in the maritime industry?"

Current applications of composites:

- Hull
- Accommodation
- Hatches, doors
- Pipes
- Tweendecks
- Propeller blades
- Walking grids
- Railings and ladders
- Bearings





Figure 11: Distribution of casualty events with a ship

Damage to ship or equipment

EQUIPMENT DAMAGE

2011

Source: EMSA - annual overview of marine casualties and incidents 2017

1st Example: Equipment Damage A point of view





ABOUT THE MATERIAL

- Material used (fibre? Resin?)
- Fibre oriëntation (isotropic, uni-directional,...)
- Fibre length
- Additives and fillers (UV resistance, fire retardants,...)
- Production process (vacuum infusion, pultrusion,...)

=> there is no such thing as a "standard" composite

1st Example: Equipment Damage

A point of view



FRP doors ACCEDOO





IN CASE OF DAMAGE

There is no such thing as a "standard" composite

ł,

Completely different behavior compared to steel

(No yield zone before fracture)

In case of equipment damage:

- Challenging to inspect
- Product specific repair techniques
- Need for service engineer

1st Example: Equipment Damage

A point of view



FRP working platform



IN CASE OF DAMAGE

Challenging to inspect

- Residual strength determination
- Material knowledge (wide range, IP)
- Non-visible internal damage
- Verification of equal strength after repair
- Product specific repair techniques
 - Local vacuum infusion, hand lay-up
 - Strict environmental conditions
- Need for service engineer
 - Ship's crew is not trained or equipped
 - Shipyards or repairers do not have the required knowledge or skills

1st Example: Equipment Damage



FRP Fast Ferry (Brødrene AA)



IN CASE OF DAMAGE

Challenging to inspect

- Residual strength determination
- Material knowledge
- Non-visible internal damage
- Verification of equal strength after repair
- Product specific repair techniques
 - Local vacuum infusion, hand lay-up
 - Strict environmental conditions
- Need for service engineer
 - Ship's crew is not always trained or equipped
 - Shipyards or repairers do not have the required knowledge or skills



Complex case! Worldwide coverage?

1st Example: Equipment Damage







POINT OF VIEW

\Rightarrow Smart composite applications in the maritime sector:

Consider "Damage and repair" as a design criteria

- Is it likely that my product will encounter damage? (weather deck vs. accommodation?)
- Can my product be disassembled easily?
- Can I design a modular/ sectional application?

1st Example: Equipment Damage

A point of view



FRP car decks on mv "Siem Cicero"







Figure 11: Distribution of casualty events with a ship

Damage to ship or equipment

RISK OF FIRE

2011

Source: EMSA - annual overview of marine casualties and incidents 2017

2ND EXAMPLE: RISK OF FIRE A point of view





CURRENT APPROACH

Current safety rules and regulations for construction and fire fighting:

SOLAS Chapter II-1 and II-2

FSS Code

- Subdivision in compartments to withstand fire for certain time (A60 A30) •
- Materials to be used (**non-combustible**)
- Fire detection
- Fire fighting

Non-combustible material is a material which neither burns nor gives offflammable vapours in sufficient 33 quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with the Fire Test Procedures Code.

2ND EXAMPLE: RISK OF FIRE





CURRENT APPROACH

SOLAS Ch II-2 Regulation 17: Alternative designs (+MSC/Circ1002)

Methodology to prove equal safety for a certain design

(Approval for a certain design, not for a material!!)

2ND EXAMPLE: RISK OF FIRE





POINT OF VIEW

Composites do have a complete different fire behavior compared to steel

- Combustible vs. non-combustable
- Insulating vs. conducting

Currently, type approval (reg. 17) is achieved by proving equal safety based on rules for steel constructions!

2ND EXAMPLE: RISK OF FIRE





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How to control the risk of fire when implementing composites:

=> Evaluate all aspects including:

- fire containment
- fire fighting techniques
- Fixed fire fighting systems
- detection

Big step in controlling the risk:

MSC.1/Circ.1574 – Guidelines for use for use of FRP elements

within ship structures

2ND EXAMPLE: RISK OF FIRE



THANK YOU



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Thank you for your attention Get in Touch With Us

Send us a message or visit us whenever you like

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