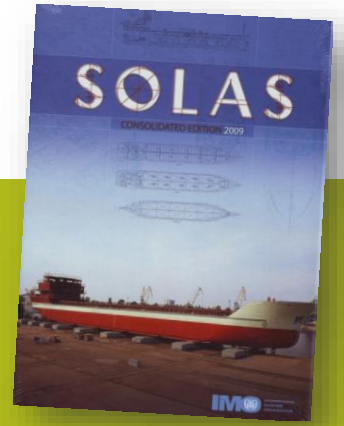
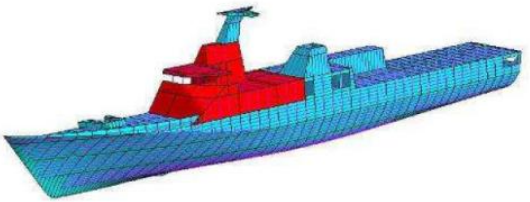




IMO

Lättviktskonstruktioner till Sjöss: State-of-the-art

IMO-status

Pågående EU-project RAMSSES/Fibreship

Franz Evegren
RISE Research Institutes of Sweden
Safety & Transport
Fire Safe Transport

LASS

SAFEDOR

DE-LIGHT TRANSPORT

LASS-C

BESST
Breakthrough in European Ship and Shipbuilding Technologies

CONVINCE

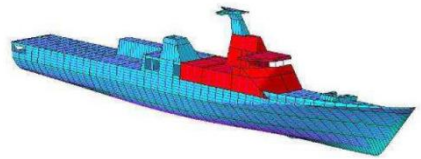
TankLightModule

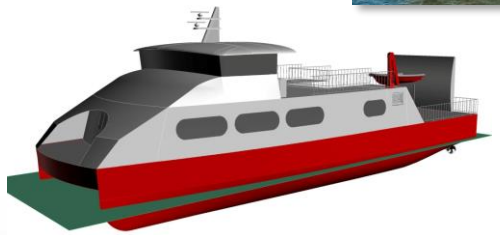
FIRE-RESIST

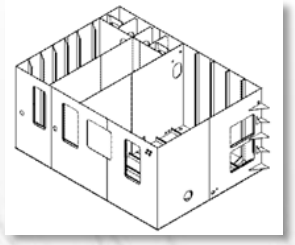
ØKO-Ø

KOMPAS

SP
your Science Partner







Commercial projects

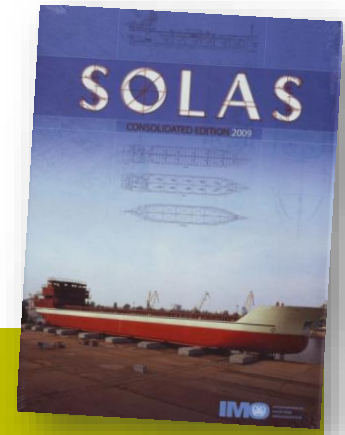
Military know-how to civil production

FRP composite sandwich
FRP = Fibre Reinforced Polymer

FRP
PVC / balsa

Fire safety assessment of FRP composite structures

MSC 87 (2010) UK proposed the item and required guidance when FRP replaces steel
"Development of guidelines for use of Fibre Reinforced Plastic (FRP) within ship structures"



SOLAS (Safety Of Life At Sea) chapter II-2

Reg. 9 prescribes main vertical and horizontal zones of A-class divisions
= steel or other equivalent material
= a non-combustible material which, by itself or down to insulation
pr
th

Reg. 11 prescribes the hull, superstructures, structural bulkheads, decks and deckhouses to be constructed of steel or other equivalent material.

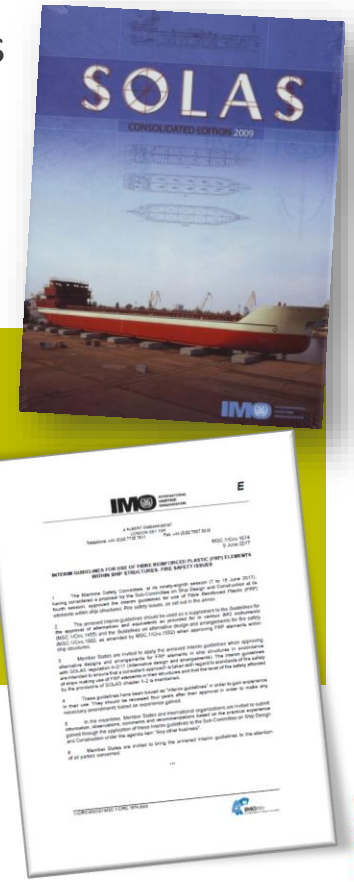
Regulation 17 Alternative design and arrangements

- Alternative solutions for fire safety are allowed if they can be shown to be at least as safe as a prescriptive design.
- Evaluated through risk assessment.

Fire safety assessment of FRP composite structures

MSC 87 (2010) UK proposed the item and required guidance when FRP replaces steel
"Development of guidelines for use of Fibre Reinforced Plastic (FRP) within ship structures"

MSC 98 (2017) Adoption of **MSC.1/Circ.1574** "Interim Guidelines for use of FRP elements within ship structures: Fire Safety Issues"



What has happened?

- Agreement that approval of FRP elements is possible through SOLAS II-2/17.
- The design SHALL MEET the fire safety objectives and functional requirements of SOLAS chapter II-2. (SOLAS II-2/5.1.3: The use of combustible materials shall be restricted.)
- Element: "a structure which may be removed without compromising the safety of the ship"
- Interim = Review after 4 years (amendments based on application experience)

"A unified interpretation on the possibility to approve FRP through SOLAS is needed."

"The interim guidelines should be used when approving FRP elements within ship structures."

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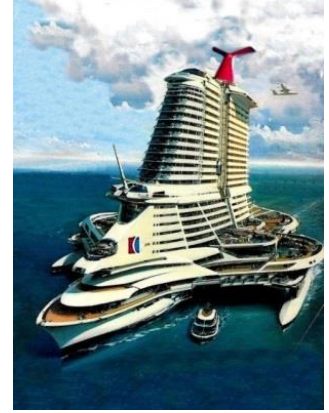
Content of the IMO FRP guidelines, MSC.1/Circ.1574



Chapter 1: General

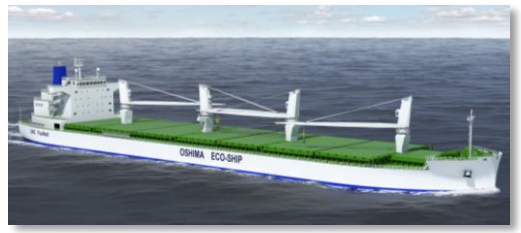
Chapter 2: Assessing fire safety of FRP composite structures

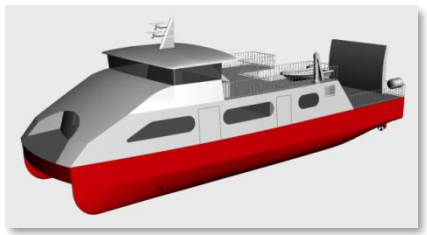
Chapter 3: Important factors to consider with regards to chapter II-2 regulations

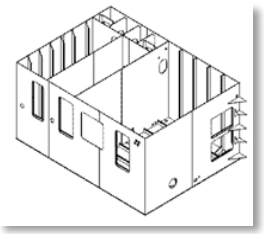
- Appendix A: Issues other than fire safety
- Appendix B: FRP Composite Materials and Compositions used in Shipbuilding
- Appendix C: Recommendations regarding the assessment
- Appendix D: Fire Testing of FRP Composite
- Appendix E: Example of Assessment Procedure

Review after four years, to make amendments based on experience from application

Approved examples are necessary to release the industry








RAMSSES


FIBRESHIP 3
INTEGRAL COMPOSITE SHIP

400 members from 30 nations

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Franz Evegren
franz.evegren@ri.se
+46 (0)10-516 50 88

Thank you for your attention!