RAMSSES - Realisation and Demonstration of Advanced Material Solutions for Sustainable and Efficient Ships

E-LASS

September 16th, 2020 - Web meeting

Non-Combustible Lightweight Components

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Peter Mannberg (RISE)

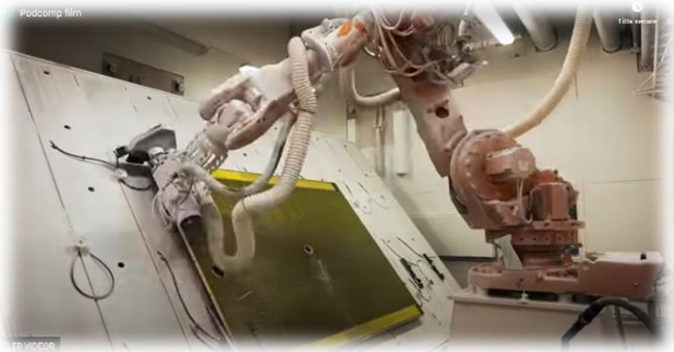
RAMSSES

Markus Lehne, BALance Technology Consulting GmbH

"Development of an integrated fire, thermal, acoustic AND lightweight panel system for a competitive price."

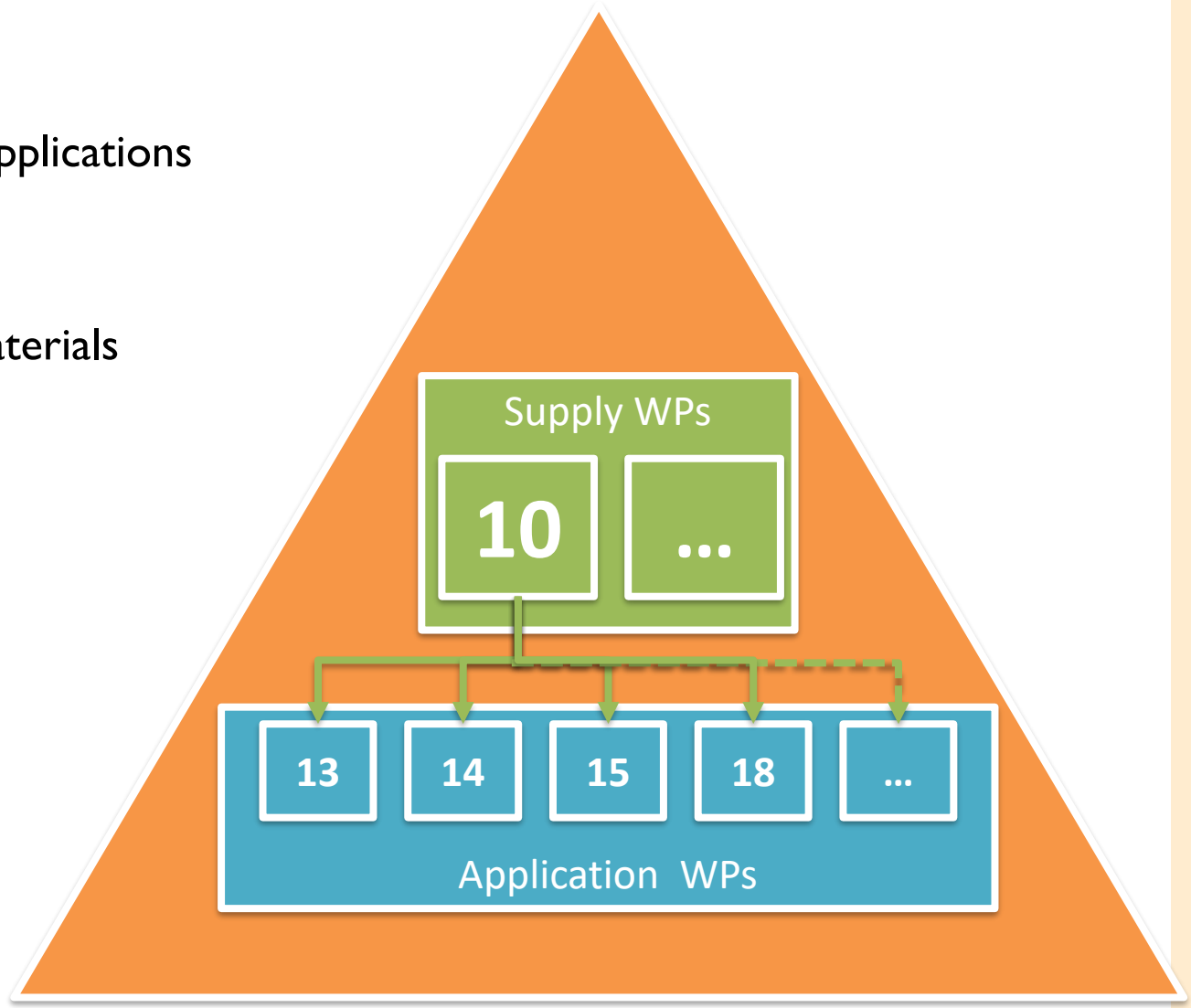
Glass prepreg technology → production scale (UK)

Sandwich panel production → (SE)



Story line

- The RAMSSES approach
  - Research on new lightweight products
  - Application of lightweight products in real applications
  - Assessment of solutions
- WP10 products
  - Fire resistant panels based on renewable materials
  - Panels from organic materials
  - Panels from non organic materials
- Uptake of results inside the project
  - PODCOMP – bathroom ceilings
  - FlowShip – Cardeck (14)
  - Baltic workboats – Sunroof (15)
  - Chantiers de'l Atlantic – Cabin floor (18)
  - MW - internal "A" wall (13)
- Prospects
  - High volume production



Team 10

PODCOMP: WP leader, product design & demo producer, evaluation

RISE SICOMP: pre-trials, material selection and tuning of production process, acoustic design and testing

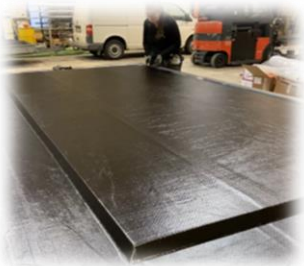
BALance: concept development, business scenario

Coventive Composites / Composites Evolution: developing and producing PFA prepregs

CETENA: acoustic design and testing



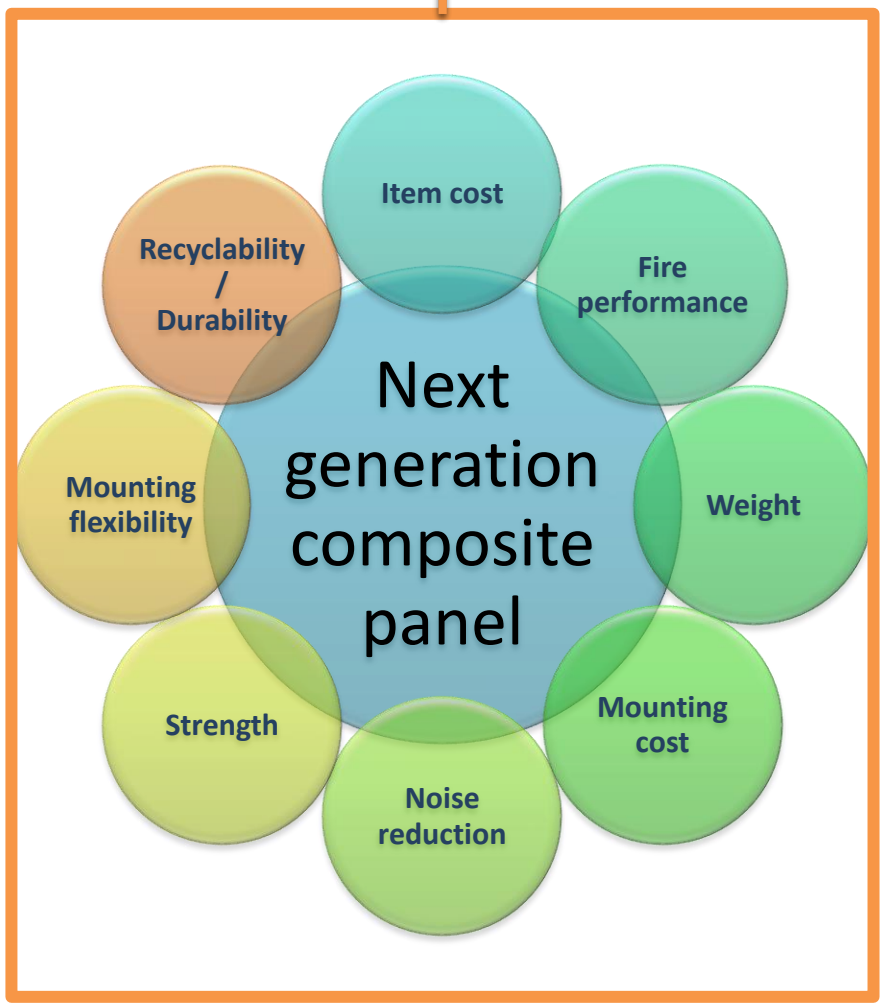


Question 1

- Which company of the **team 10** are new to you?
  - PODCOMP
  - RISE SICOMP
  - BALance
  - Coventive Composites / Composites Evolution
  - CETENA

Two product development lines



1

Concept 3
Smart track to approval
- Organic core
- High loads
- Part 5 (flame spread) ✓
- SBE (EN 13823) ✓

2

Concept 5
Wheel-mark-product
- Non organic core
- Non load bearing
- Part 1 (non combustibility) ✓
- Part 3 (A60) ✓

Markus Lehne, BALance Technology Consulting GmbH

Question 2

- What are for you the **two most important panel features** from the list
  and
  which ones are the **two least important** ones?

1. Fire performance
2. Weight
3. Mounting cost
4. Noise reduction
5. Strength
6. Mounting flexibility
7. Recyclability/Durability

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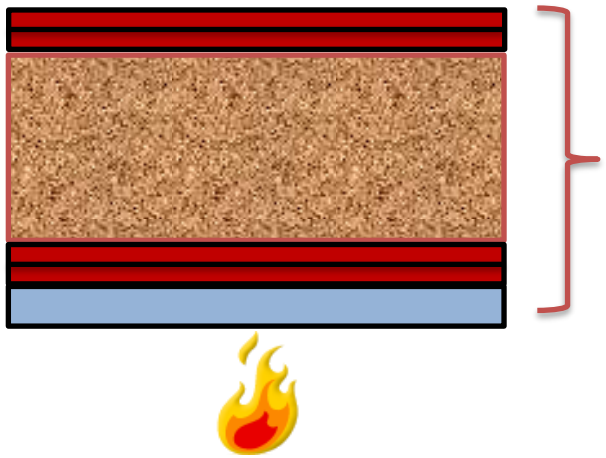
WP10 results (concept 3)



Glass/PFA Prepreg Facing

Impregnated Balsa Core

Glass/PFA Prepreg Facing

LEO Facing

Single Burning Test

Fulfilling the classification criteria on all points with excellent fire results

Parameter	*Concept 3*	*Classification criteria**
FIGRA (W/s)	*32*	*≤ 120*
THR (MJ)	*2.6*	*≤ 7.5*
LFS	*OK*	*< edge of specimen*
SMOGRA (m^2/s^2)	*4*	*≤ 30*
TSP (m^2)	*49*	*≤ 50*
Flaming droplets	*No*	*No*

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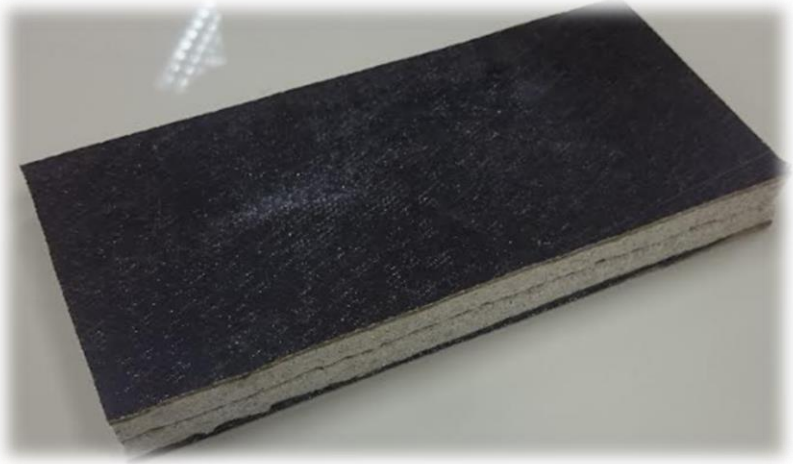
WP10 – results (concept 5)

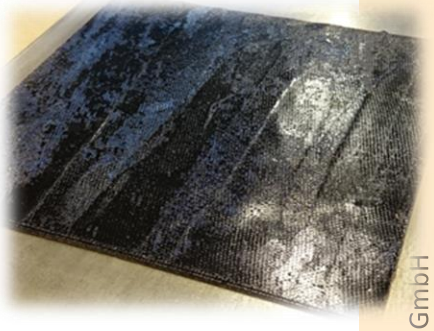
Silicate core wall with Glass/PFA prepreg facings

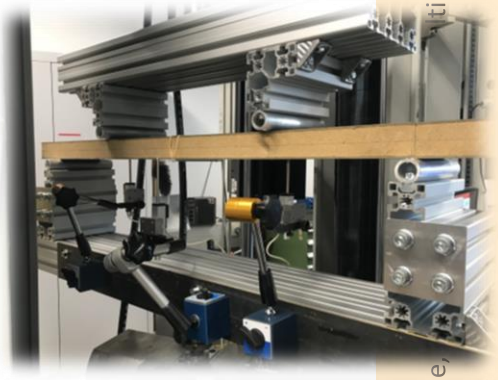
- ✓ Extremely light (290 – 370 kg/m^3)
- ✓ Variable density core for good acoustic performance
- ✓ Absolutely non-combustible (A1 certification), durable and resilient

- ✓ PFA resin derived from bio-resources (Hemicellulose)
- ✓ Environmentally friendly material – good working environment
- ✓ Excellent fire performance – Low VOC emissions



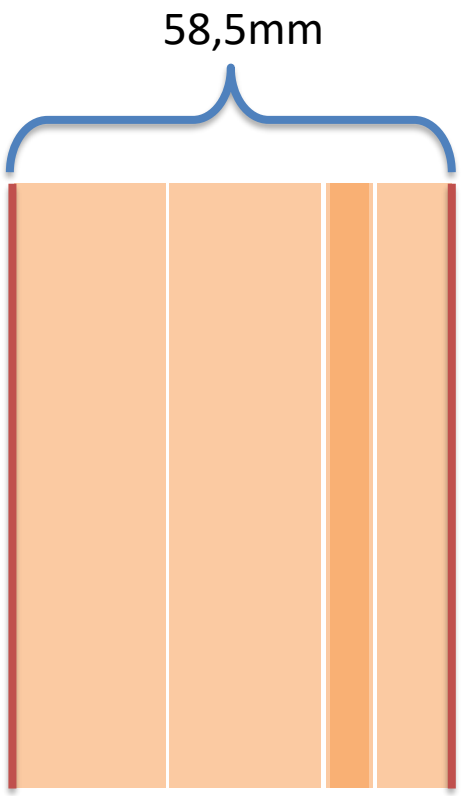
- *Silicate core 4.5, 10, 20 and 40 mm thick, 13 – 27 kg/m^2*
- *PFA/Glass facing 1.5 – 3 mm thick,*
- *Cost effective and Flexible*



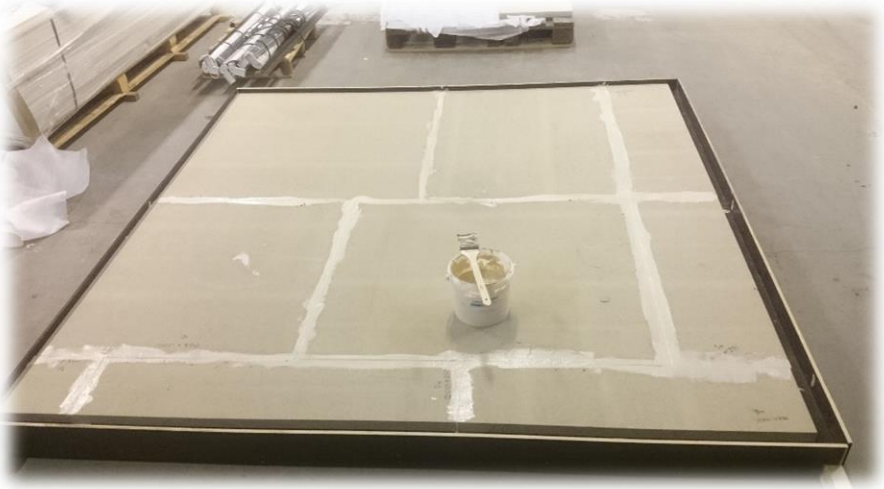


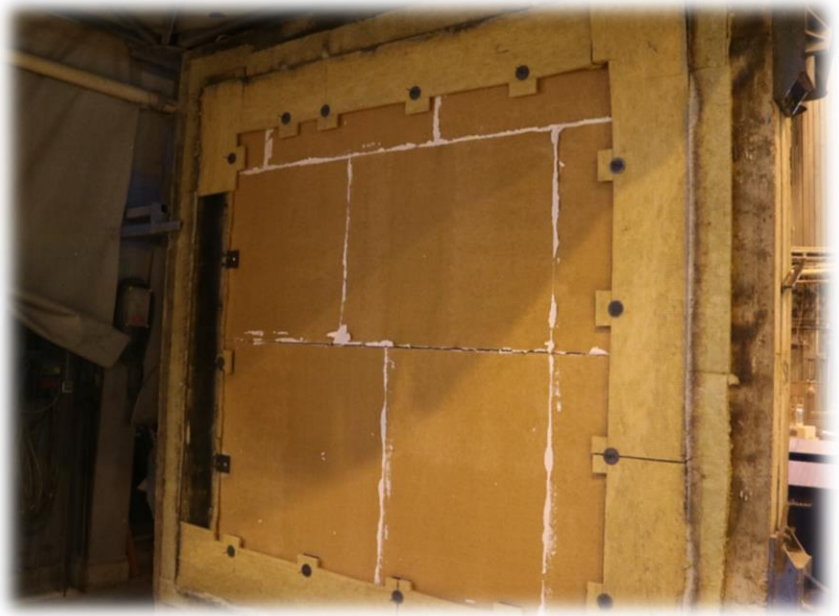
Concept 5 panel tested for A60

- Non combustible core 54,5 mm
- Up to 2mm PFA facing
- Delta T after 60 min: 72°C



Fulfilling the classification criteria on all points with excellent fire results





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WP10 results applied

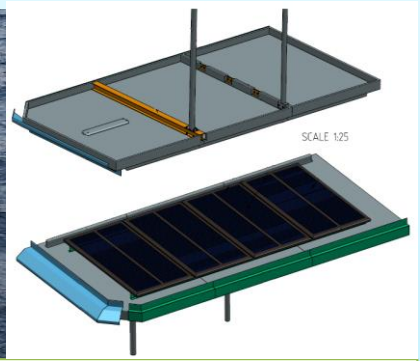
concept 3

Cardeck for FLOW SHIP DESIGN (14)

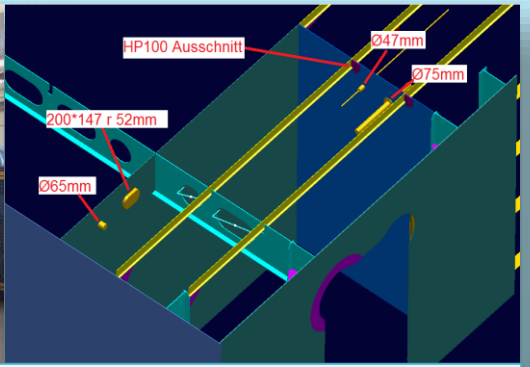
PFA prepreg for Cabin floor at Chantiers de l'Atlantique (18)

WP10

concept 5



Sunroof for Baltic Work Boats (15)



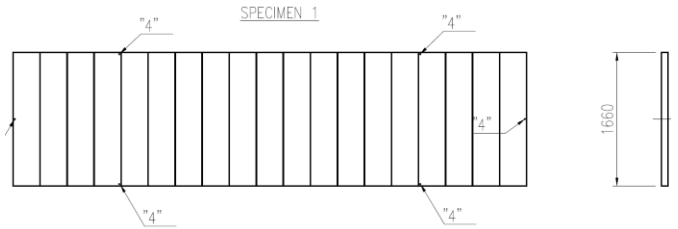
Onshore /On-board demo for Meyer Werft (13)

A case with history

Full scale fire at test at RISE – specimens and test arrangement

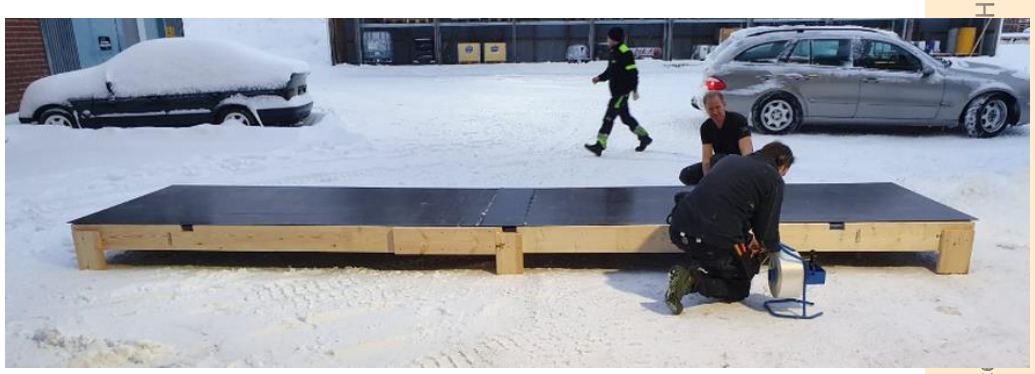
Commercial project
-Sandwich panel-

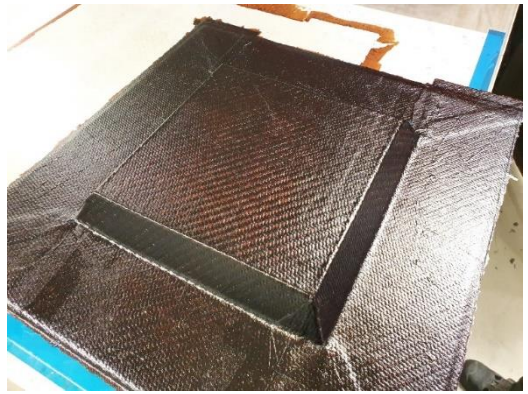
WP14 specimens (2x)
- Pultruded FRP profile-



38 FRP profiles, length 1.66 m

WP10 specimen (1x)
-Sandwich→RAMSSES laminate+balsa core



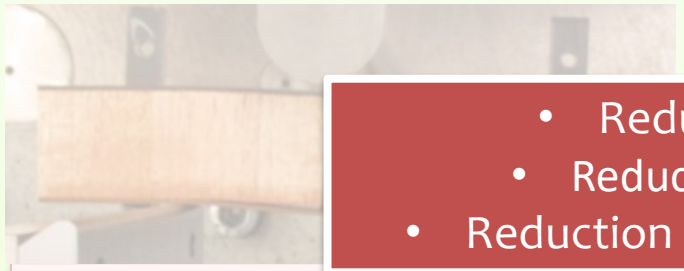


WP10 results applied

concept 3

- Weight reduction
- Increased payload or
- Fuel consumption reduction

Cardeck for FLOW SHIP DESIGN

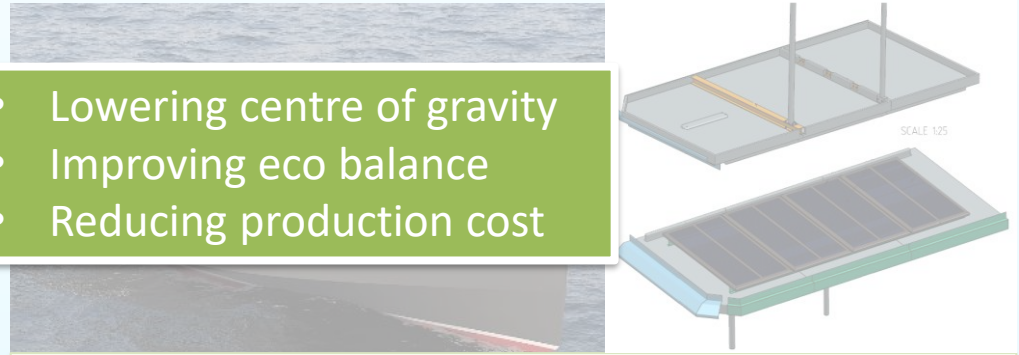


- Reduction of lead time
- Reduction of deck height
- Reduction of production cost

PFA prepreg for Cabin floor at Chantiers de l'Atlantique

BAL.LCPA

concept 5



- Lowering centre of gravity
- Improving eco balance
- Reducing production cost

Sunroof for Baltic Work Boats (15)

- Easing refurbishment
- Adding flexibility for outfitting
- Adding flexibility to compartmentation

Onshore /On-board demo for Meyer Werft

Question 3

- Assume you are sitting in the team10 advisory board, would you push us to put more development effort in

  1. Concept 3 (renewable materials, very light, very strong, good fire properties, risk assessment required)

     OR

  2. Concept 5 (renewable materials, light, non combustible, non load bearing, following prescriptive rules procedures)

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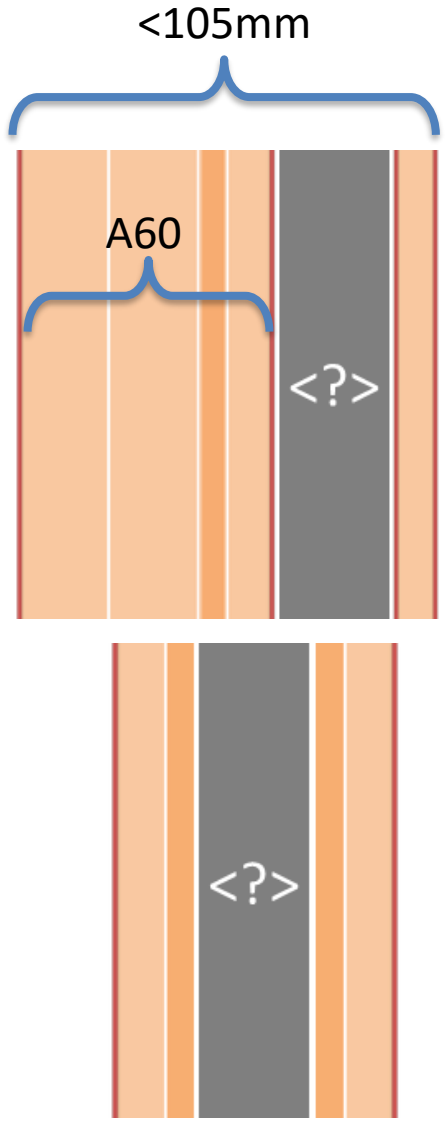
Next activities by team 10

- First simulation results have been discussed….

- Integration of rockwool layer
- Symmetric lay-up vs. asymmetric lay-up
- Target thickness < benchmark (5mm steel +100mm rockwool)
- Simulation of sound propagation for new panel designs
- Production of sound optimized panels
- Testing
  - Sound
  - Fire

- Showcase at SMM



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Thanks for listening

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