

World's first Certified Solas Reg. 17 FRP ship design

Project Status

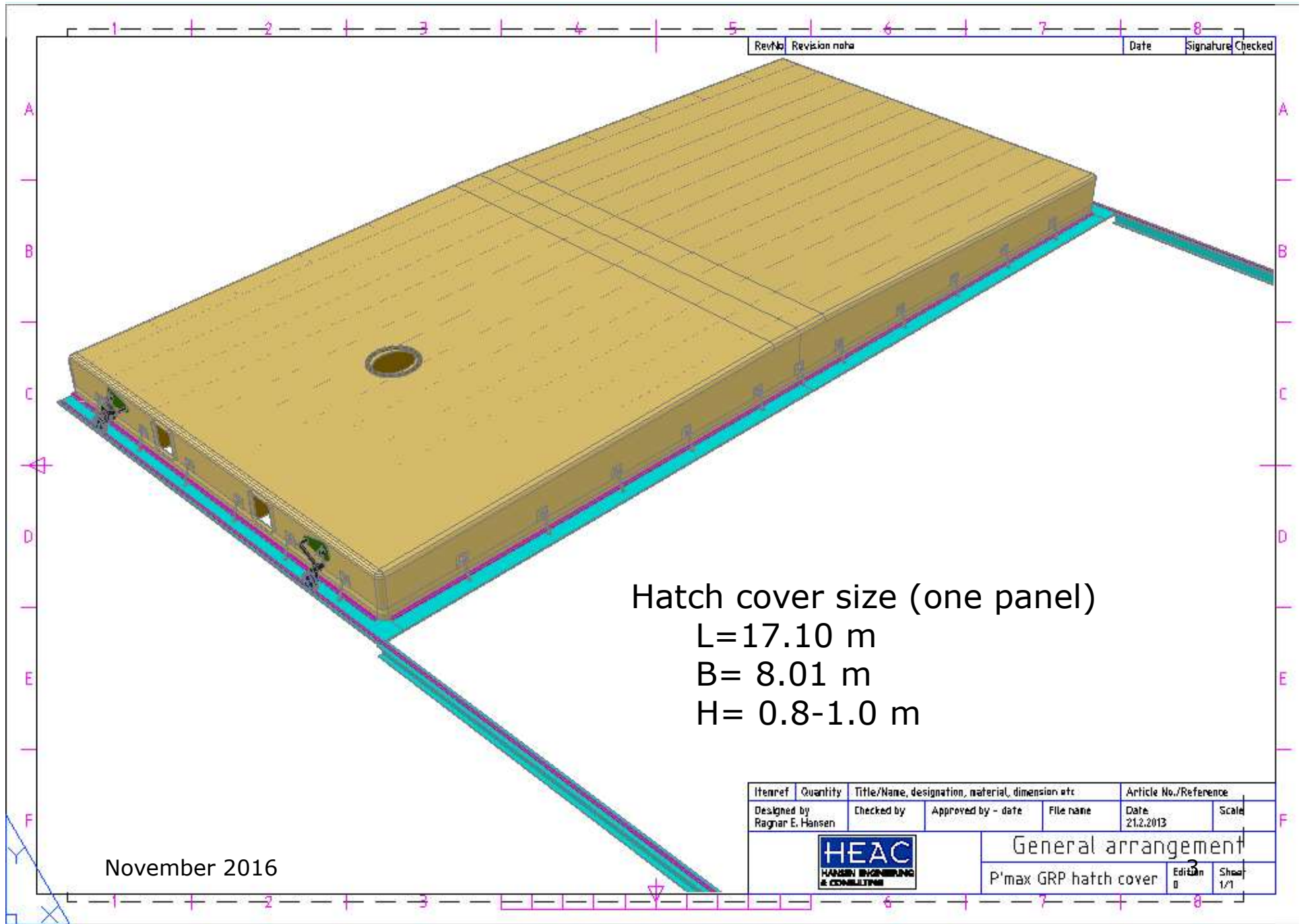
Ragnar E. Hansen

E-LASS Meeting
Finspång, November 9, 2016

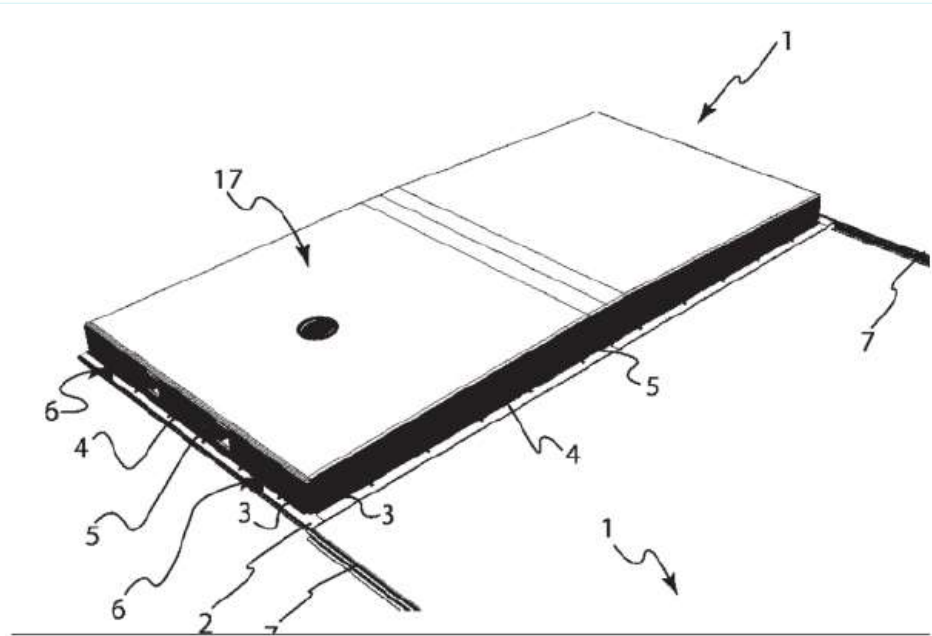


Contents of presentation

- ❑ Composite hatch cover development
- ❑ Composite tween deck development



Patent granted



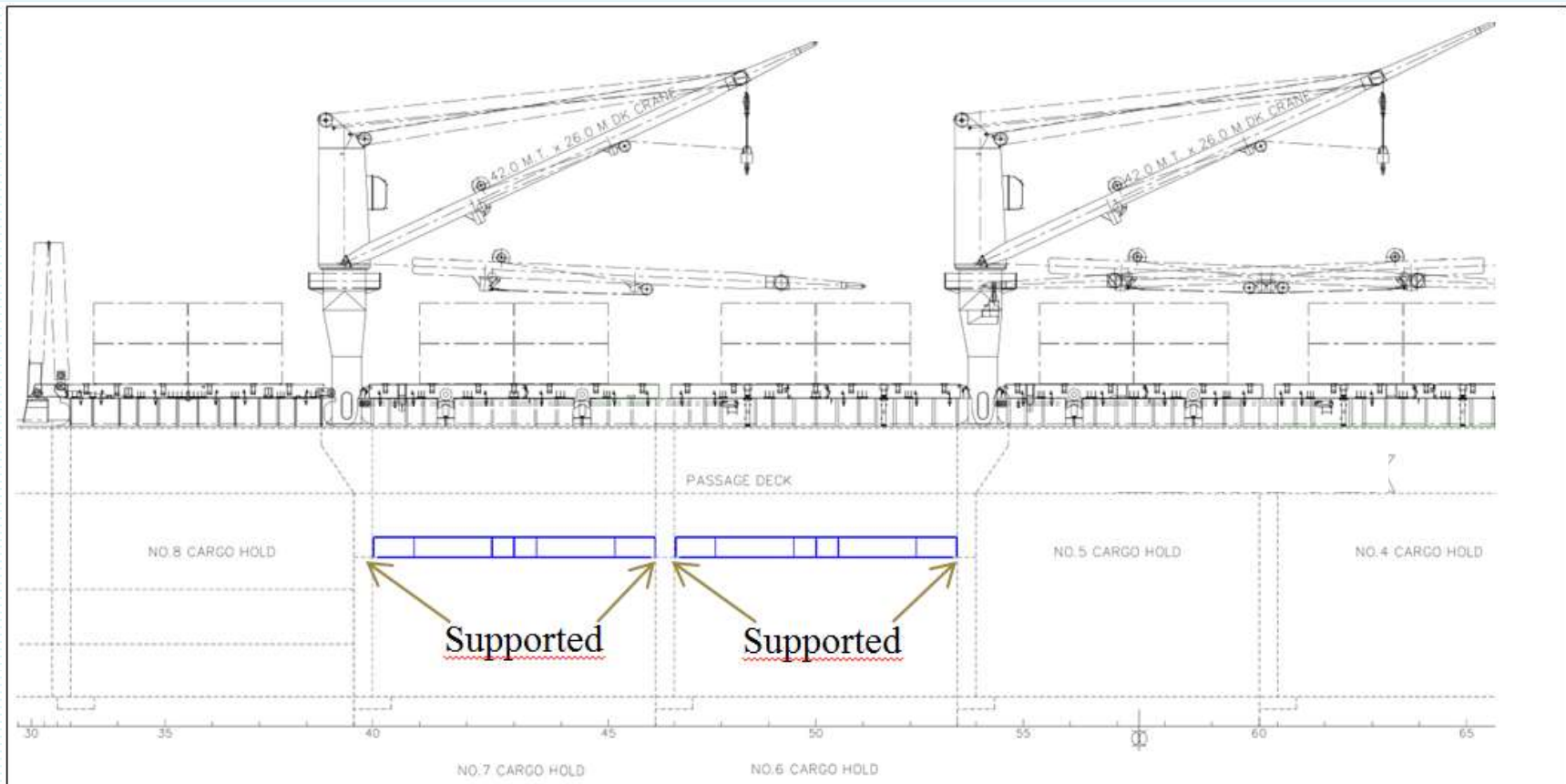
November 2016

NB market «dries up»



We have changed focus to tween deck development

Typical application of tween deck



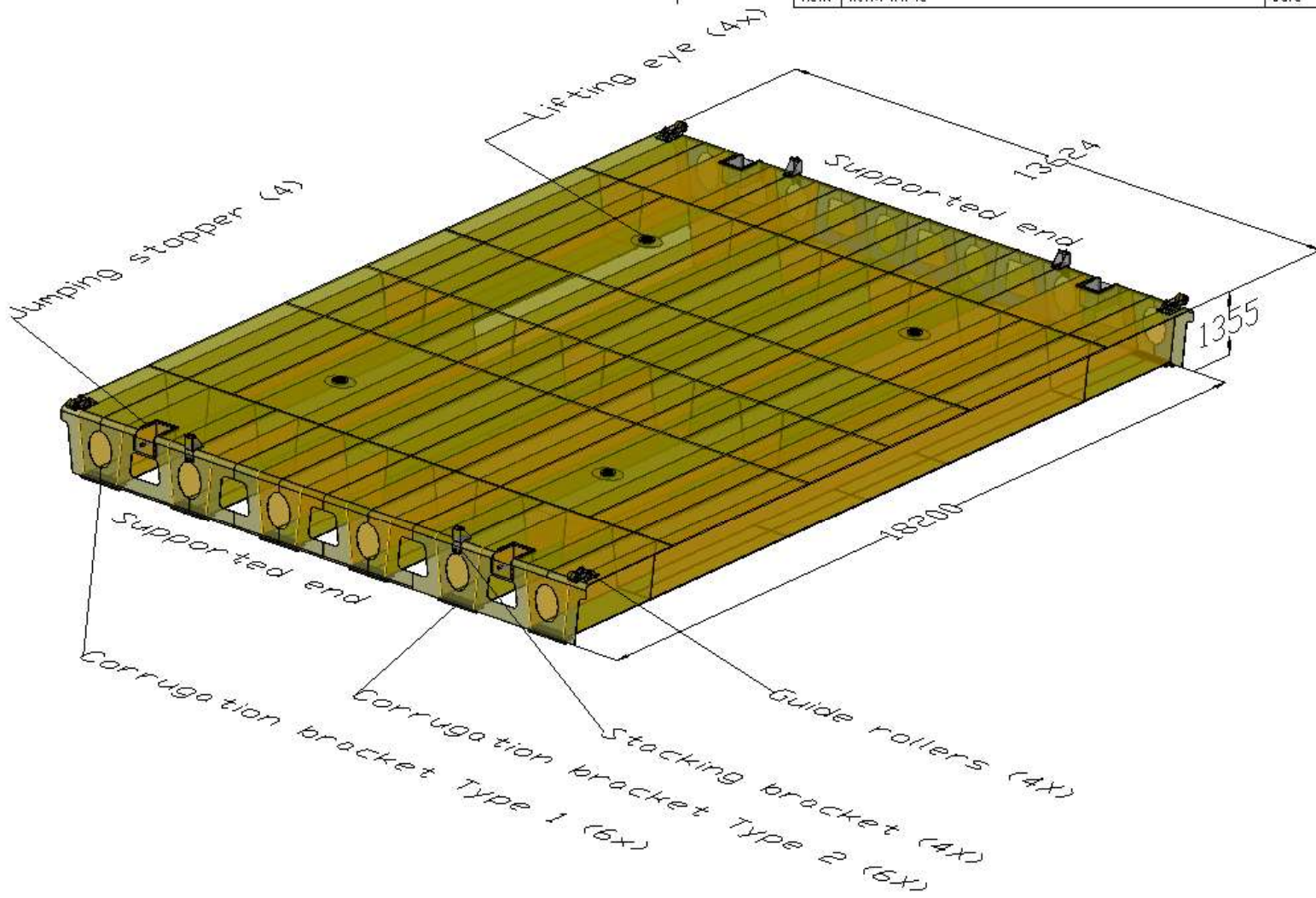
Design loads

- Permanent loads (selfweight)
 - ~33 tons
- Functional loads
 - $3.0 \text{ t/m}^2 = 744 \text{ tons/panel}$ (Cargo intake)
 - Vibration (Excitation from engine, propeller, waves)
 - Lifting of panel (Dynamic factor 1.3)
- Environmental loads (Ship acceleration, sea pressure, from Class Rules):
 - Longitudinal $A_x = 0.17 \text{ g}$
 - Transverse $A_y = 0.30 \text{ g}$
 - Vertical $A_z = 0.44 \text{ g}$
 - Green seas when panels are stored on deck

1 2 3 4 5 6 7 8

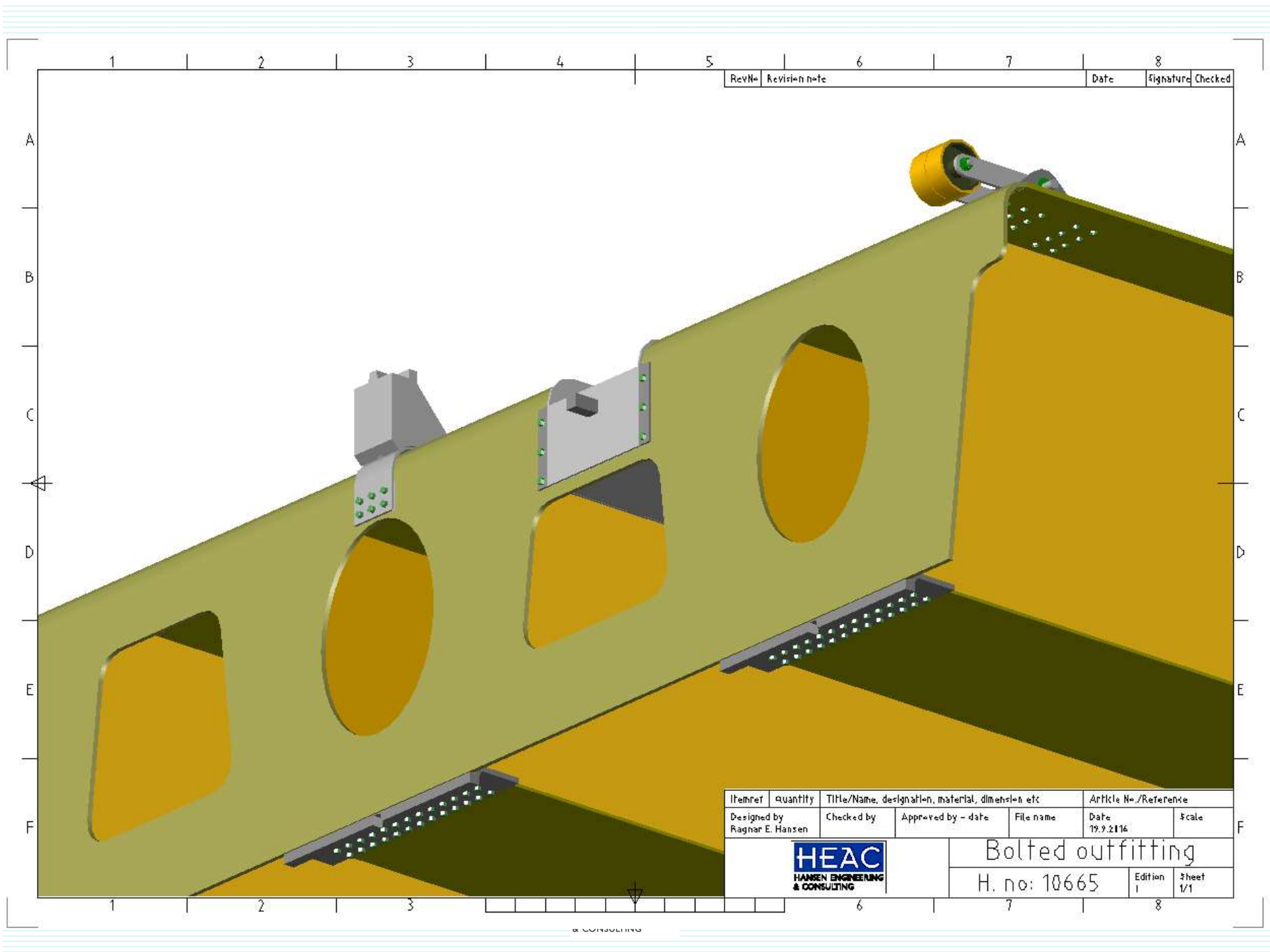
RevNo	Revision note	Date	Signature	Checked
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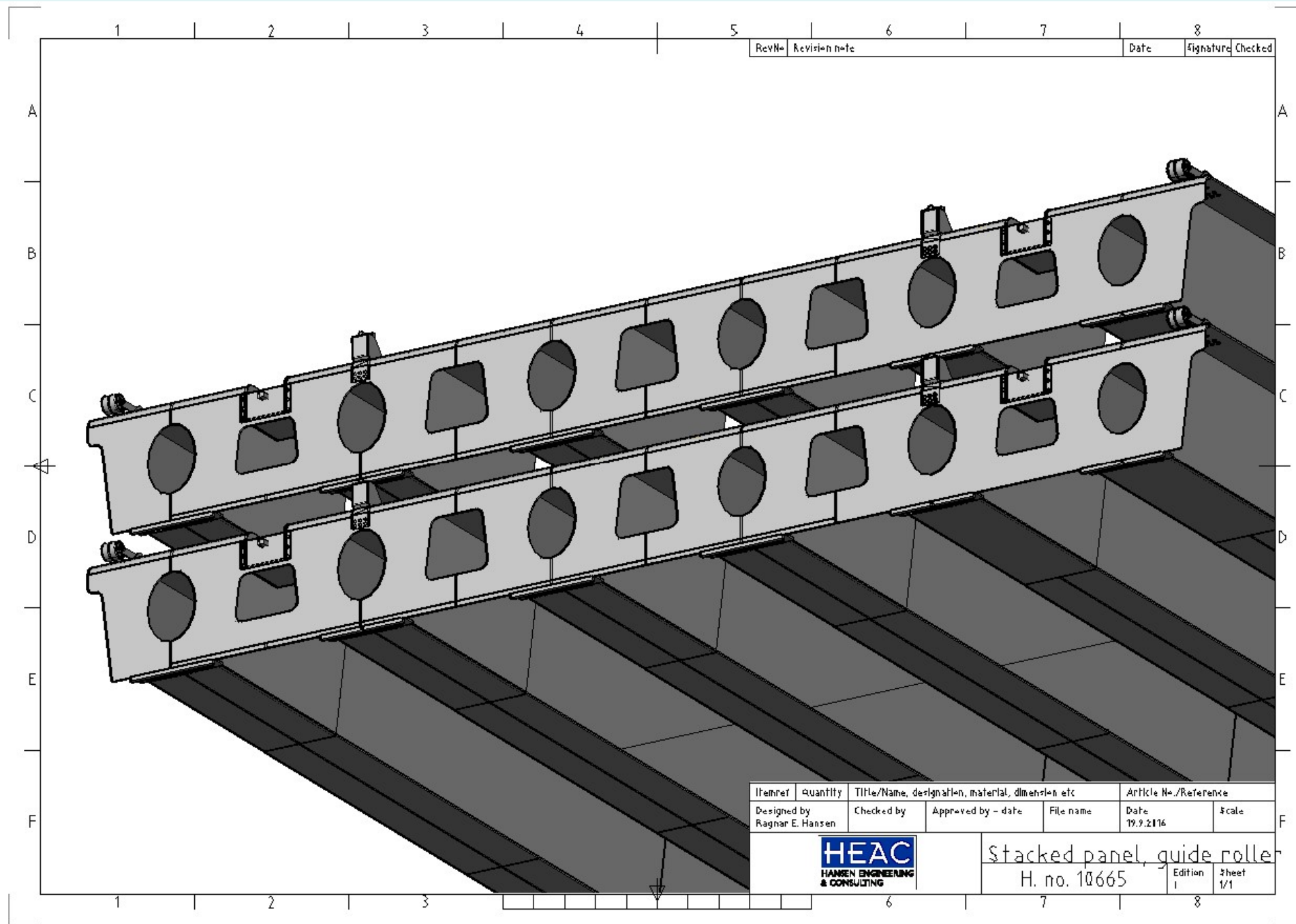
A
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C
D
E
F



Item ref	quantity	Title/Name, designation, material, dimension etc			Article No./Reference		
Designed by Ragnar E. Hansen	Checked by	Approved by - date	File name	Date 19.9.2016	Scale	Panel GA w/guide roller H. no. 10665	
				Edition 1	Sheet 1/1		

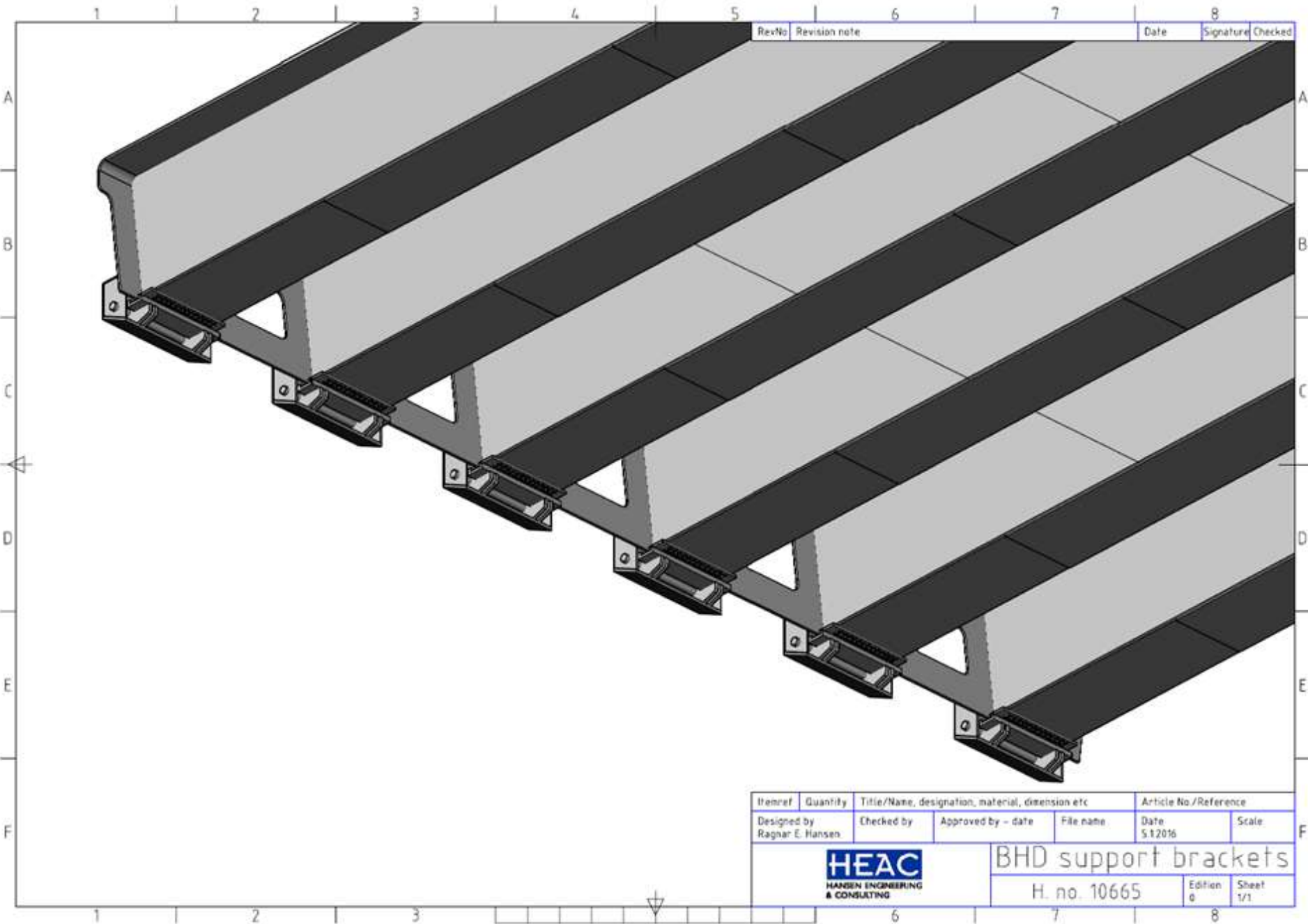
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Item no	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference		
Designed by Ragnar E. Hansen	Checked by	Approved by - date	File name	Date 19.9.2016	Scale		
HEAC HANSEN ENGINEERING & CONSULTING				Stacked panel, guide roller			
				H. no. 10665			Edition 1
							Sheet 1/1



RevNo	Revision note	Date	Signature	Checked
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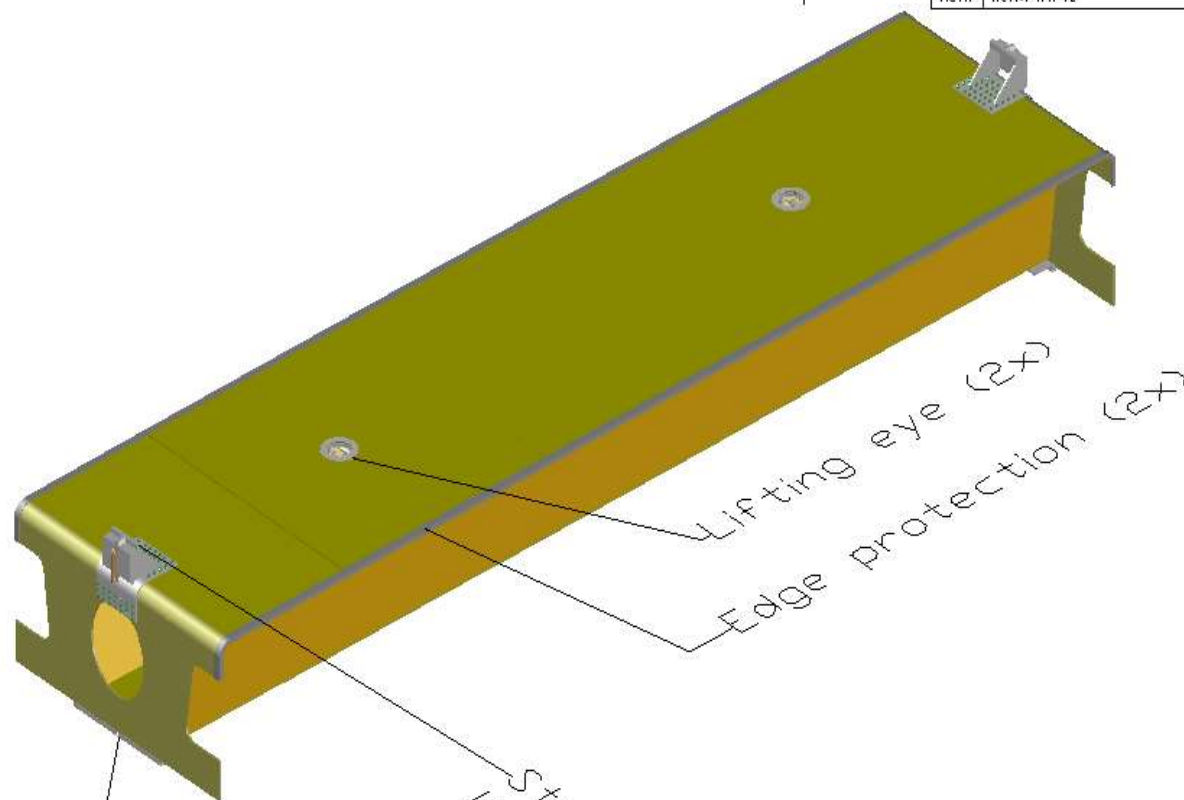
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Designed by Ragnar E. Hansen	Checked by	Approved by - date	File name	Date 5.1.2016	Scale	
HEAC HANSSEN ENGINEERING & CONSULTING				BHD support brackets		
				H. no. 10665	Edition 0	Sheet 1/1

The Prototype project

- JiP Project between
 - Oshima Shipbuilding Co. Ltd
 - I-Know Machinery
 - DNV-GL
 - CompOcean

The objectives of the Prototype Project

- ❑ The prototype shall confirm the main aspects of construction of the final panels
- ❑ The testing shall confirm the material properties and the theoretical strength calculations
- ❑ Impact strength and repair methods shall be demonstrated
- ❑ The photo/video documentation and brochure material of the physical model of the tween deck shall create interest and confidence to potential customers




Corrugation bracket (2x)

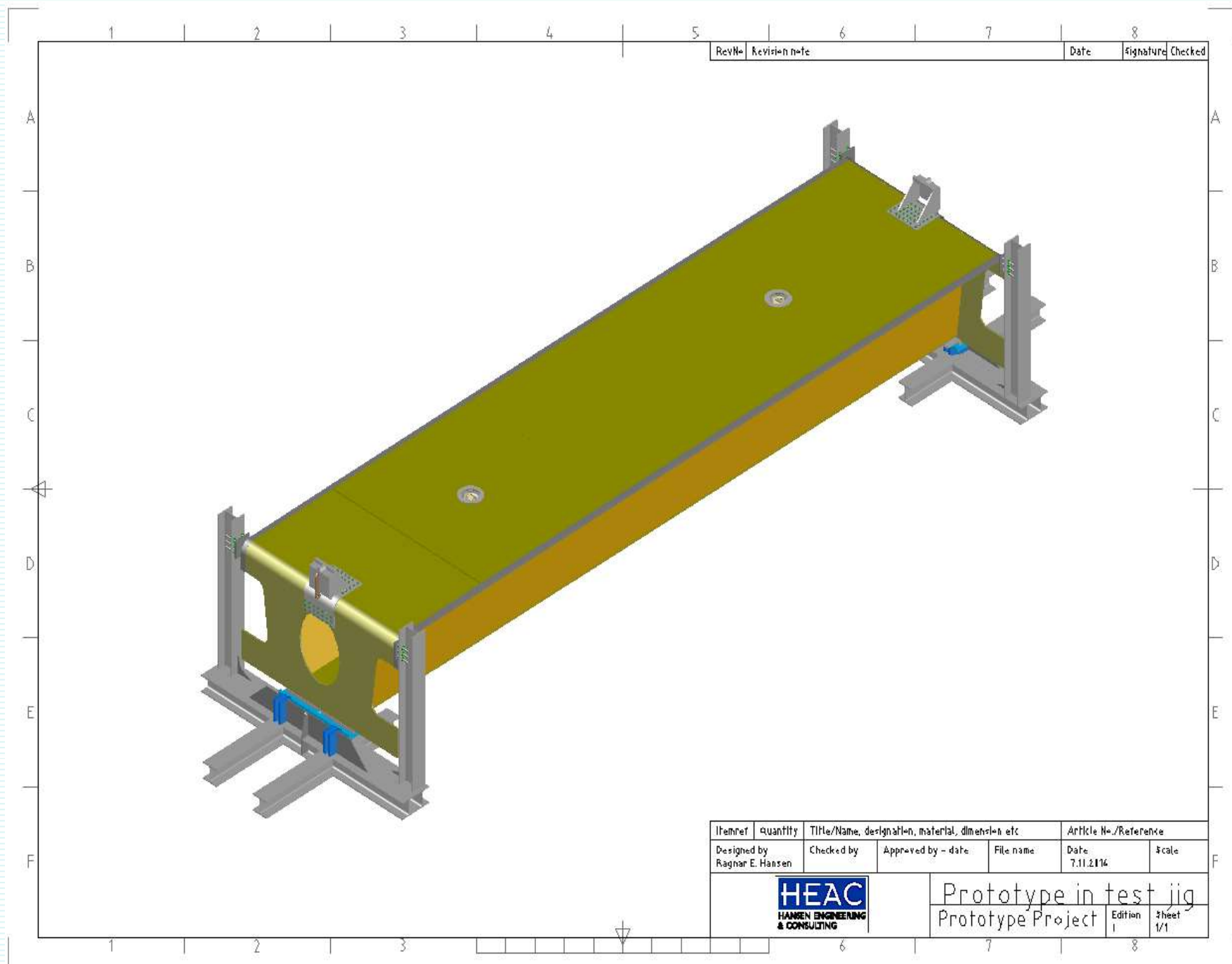
Stacking and lashing bracket (2x)

Edge protection (2x)

Lifting eye (2x)

Length o.a.: 9.100 m
Breadth o.a.: 2.320 m
Height o.a.: 1.355 m

Itemref	quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
Designed by Ragnar E. Hansen	Checked by	Approved by - date	File name	Date 4.11.2016	Scale	
			Prototype GA			
			Prototype JIP			
			Edition 1	Sheet 1/1		



Rev	Revision note	Date	Signature	Checked
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Item no	Quantity	Title/Name, designation, material, dimension etc			Article No./Reference	
Designed by Ragnar E. Hansen	Checked by	Approved by - date	File name	Date 7.11.2014	Scale	
HEAC HANSEN ENGINEERING & CONSULTING				Prototype in test jig Prototype Project		
				Edition 1	Sheet 1/1	

Scope of testing

- ☐ Composite material properties
- ☐ Static strength (Composite and steel components)
- ☐ Impact strength
- ☐ Vibration

Thanks for your attention

This development work has been carried out for

Oshima Shipbuilding Co. Ltd.

Marine Engineering and Innovation Department

