



West Pomeranian University of Technology, Szczecin

Faculty of Maritime Technology and Transport

Chair of Structure, Mechanics and Ship Fabrication



Innovative materials and light weight structures in shipbuilding - research at FMTT



E-Lass Meeting

Forum Alte Werft

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West Pomeranian University of Technology, Szczecin

- high school beginnings in 1946,
- 17 000 students,
- 1 100 lecturers and researchers,
- 10 faculties,
- 17 rights to confer doctoral degree in 17 disciplines,
- 9 full academic rights.

Faculty of Maritime Technology and Transport – FMTT

- 800 students,
- 50 lecturers and researchers,
- 5 departments (chairs),
 - Chair of Oceantechnology and Maritime Systems Design,
 - **Chair of Ship Structure, Mechanics and Fabrication,**
 - Chair of Safety Engineering and Energetics,
 - Chair of Logistics and Transport Economy,
 - Chair of Climatisation and Cooling Transport,
- 6 laboratories,
- entitled to confer DSc in discipline *Construction and Operation of Machinery*.

Innovative Barge Trains for Effective Transport on Shallow Waters [1, 5]

- European Commission Project No GRD1-2000-26812 under the 5th Framework Program, 2001-2004. 12 Partners from 4 countries.
- WPUT Co-ordinator – Prof. Tadeusz Jastrzębski.



FMTT involved in:



- conception of the shallow water barge and pusher,
- investigations of new materials to build the barge,
- building model of the barge and large-scale trials,
- environment protection.



INBAT vizualisation



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Network of Excellence in Marine Structures [2, 4]

- European Commission Project No FP6-PLT-506141 under the 6th Framework Program, 2004-2010 . 33 Partners from 17 countries.
- WPUT Co-ordinator – Prof. Tadeusz Jastrzębski.



FMTT involved in topics:

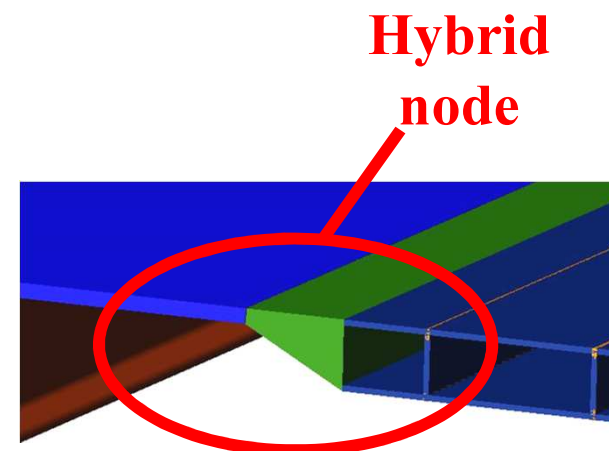
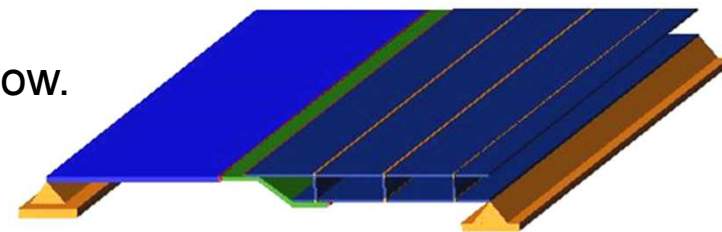
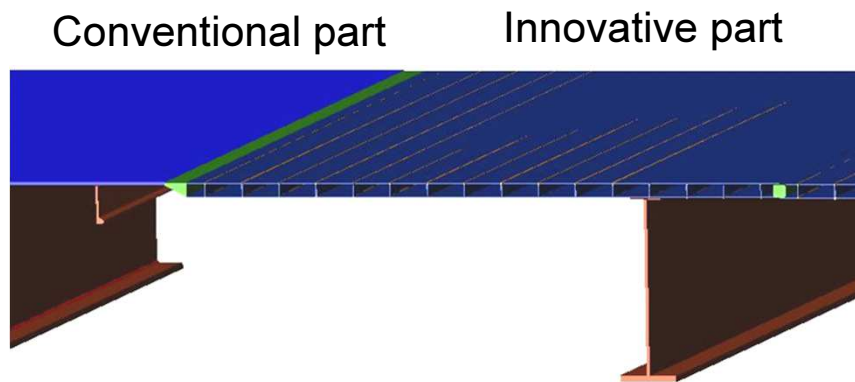


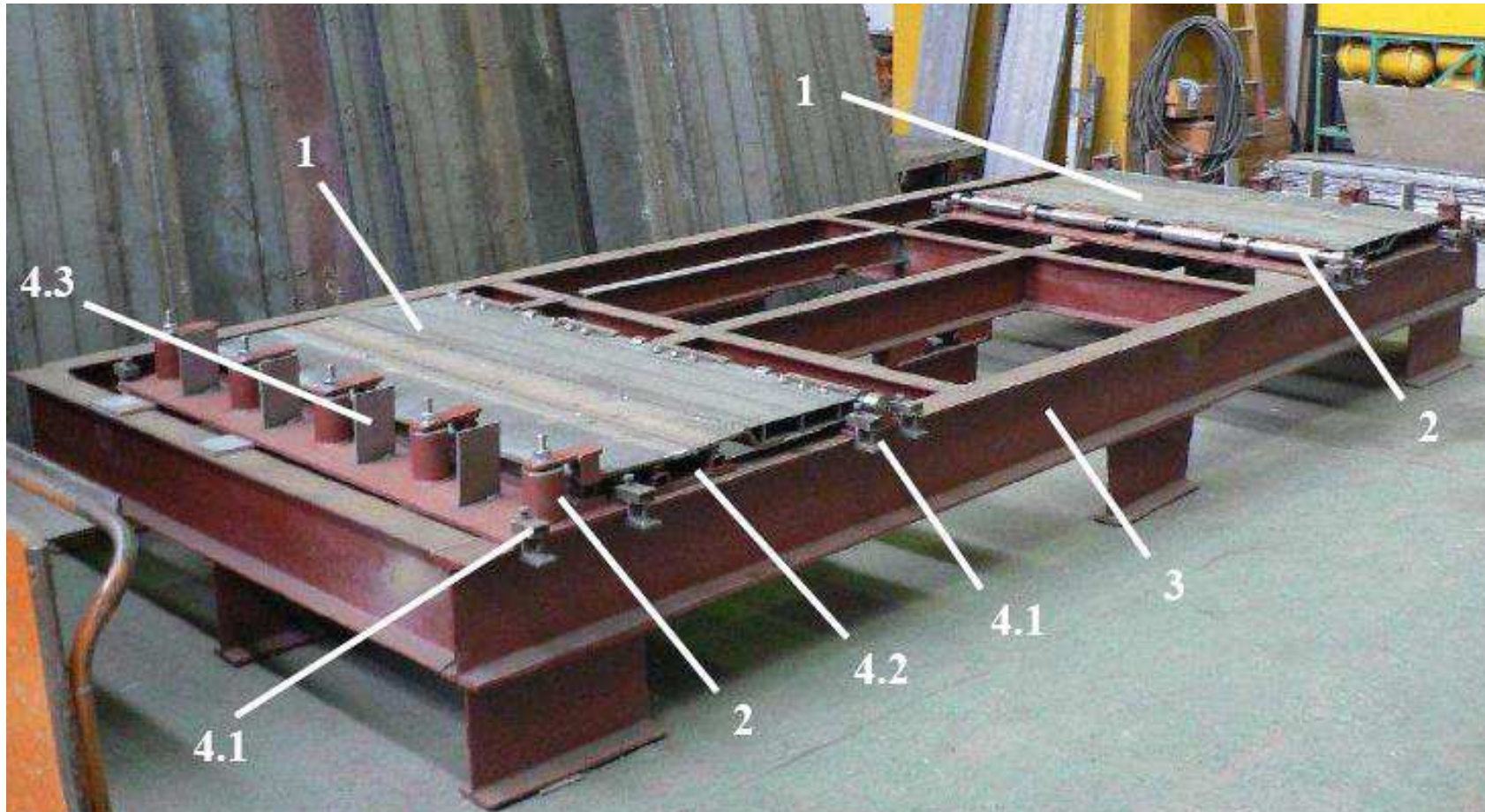
- design and fabrication of metallic structures,
- **innovative and light weight structures,**
- strength of structures applying FEM,
- concepts for a virtual process of ship construction,
- accuracy of optical measurement methods and the requirements regarding dimensional quality,
- measurement quality control of ship constructions in technical conditions of the Polish Shipyards,
- parametrical description of the structure of ship hull sections as a basis for the database building,
- welding deformations occurring within ship hull prefabrication process,
- application of innovative construction in a ship hull – influence on organization processes of shipyards production.

Innovative materials and structures in shipbuilding [3]

- Research project „Hybrid node in ship structure” within the doctorate thesis elaborated by T. Urbański, 2008-2009.
- Sandwich panels of I-core type from Meyer Werft + conventional construction.
- FMTT Head – Prof. Boshidar Metschkow.

Hybrid structure



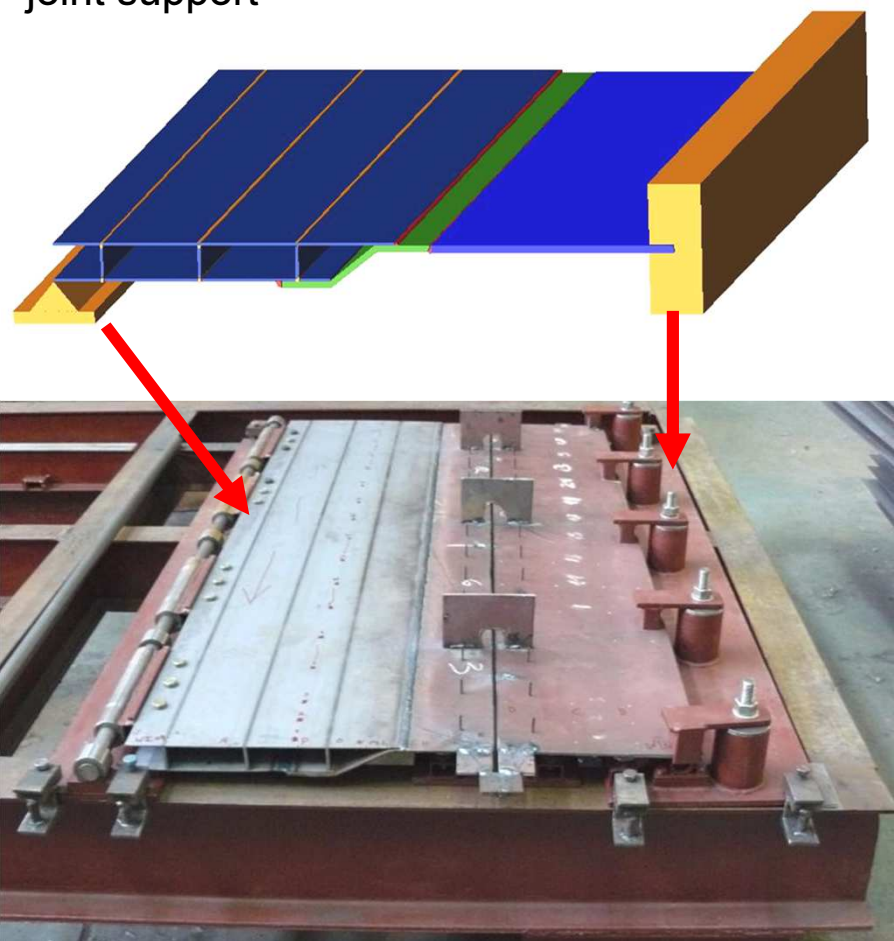


- 1 – object of research,
- 2 – fixed elements (simulate of boundary conditions),
- 3 – stand foundation (shipyard assembly),
- 4 – additional elements:
 - 4.1 – attaching elements,
 - 4.2 – support element,
 - 4.3 – the auxiliary elements the establishing position of sample.

I arrangement

Non-shifting articulated joint support

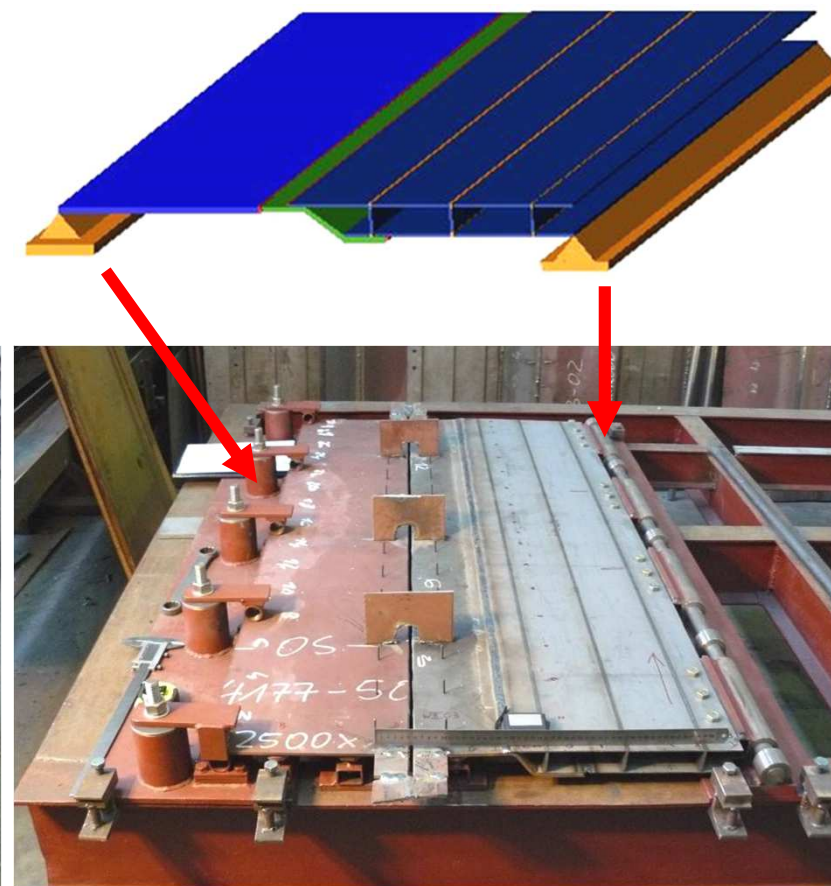
Rigid securing

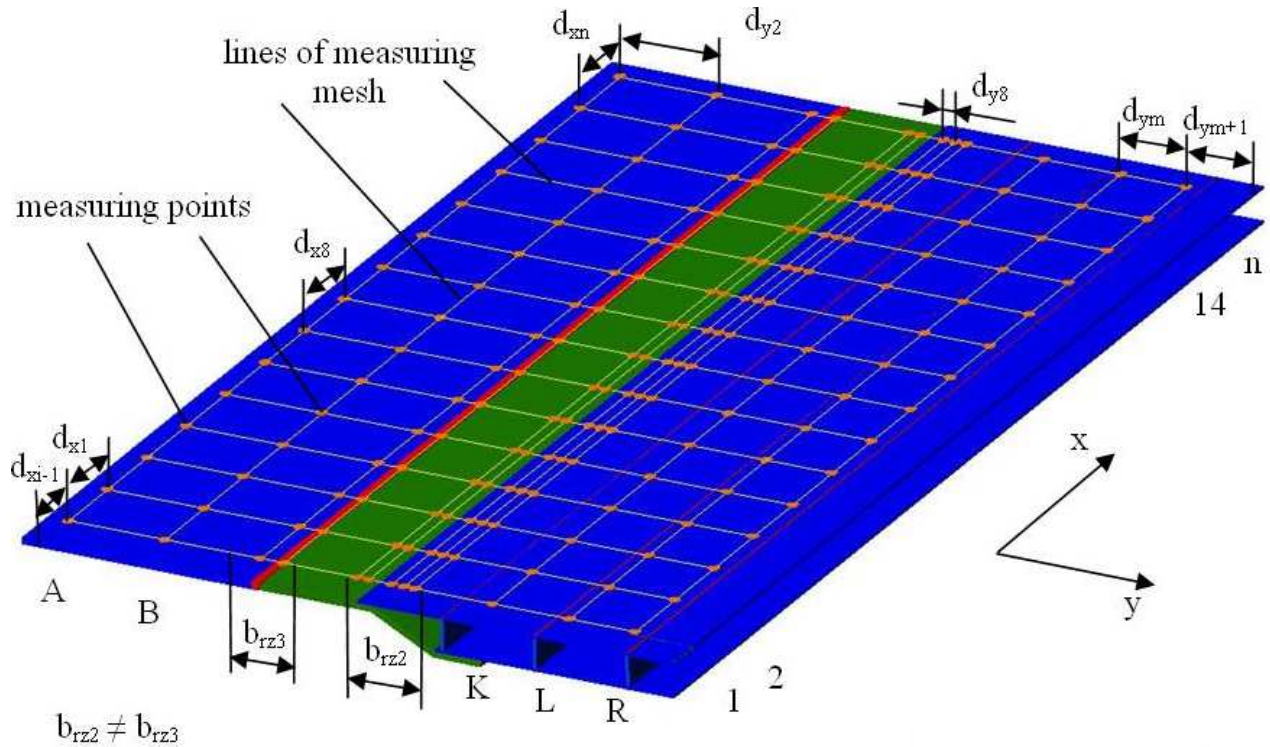


II arrangement

Shifting articulated joint support

Non-shifting articulated joint support



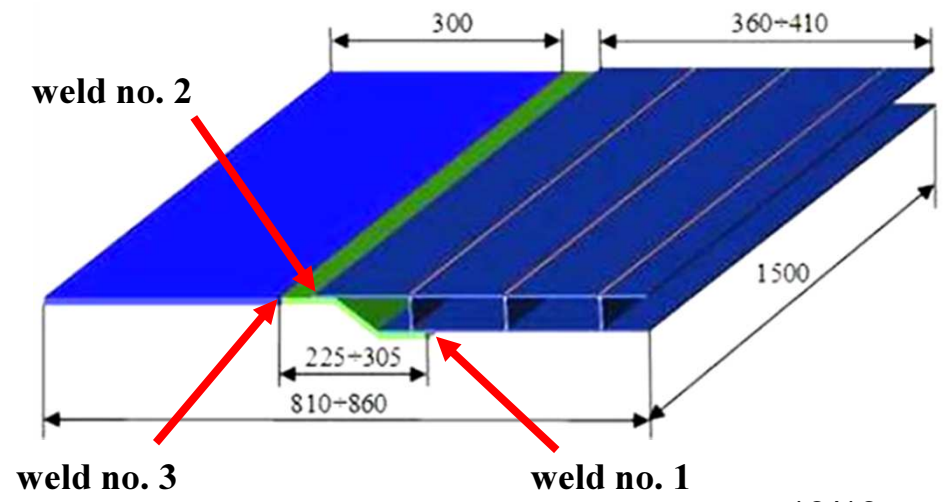


Number of measuring points on the one sample:
 preliminary stage – 357
 main stage - 272

$b_{rz2} \neq b_{rz3}$

b_{rz2}, b_{rz3} – width of zones of plastic deformations

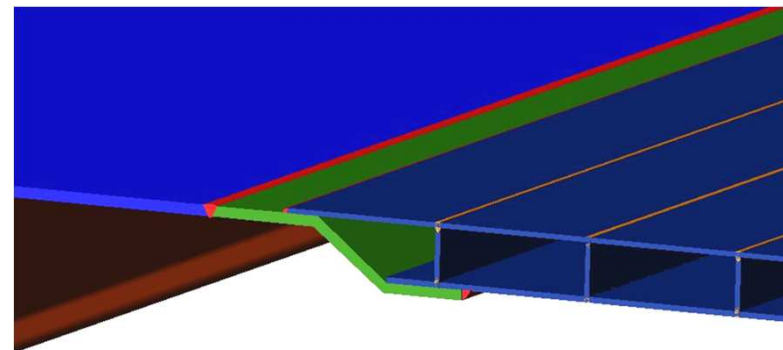
Dimensions of samples →





Possibility of application ?

Task for the future ...



Bibliography

1. Jastrzębski T., Sekulski Z., Taczała M., Graczyk T., Iwańkiewicz R., Rutkowski R., Urbanski T.: European Commission Project No GRD1-2000-26812 under the 5th Framework Program entitled: „Innovative Barge Trains for Effective Transport on Inland Shallow Waters” - INBAT, 2001-2004.
2. Jastrzębski T., Sekulski Z., Taczała M., Graczyk T., Iwańkiewicz R., Rutkowski R., Urbanski T.: European Commission Project No FP6-PLT-506141 under the 6th Framework Program entitled: „Network of Excellence in Marine Structures” - MARSTRUCT, 2004-2010.
3. Urbański T., Metschkow B., Graczyk T.: Hybrid node in ship structure - experimental research at WPUT, 11th Workshop Co-operation between Nordic Maritime Universities and DNV. KTH, Stockholm, Sweden. 28-29 Jan. 2010.
4. <http://www.mar.ist.utl.pt/marstruct/>
5. <http://www.vbd.uni-duisburg.de/inbat/index.htm>

Thank you for your attention

