

## **INNOVATIVE BARGE TRAINS FOR EFFECTIVE TRANSPORT ON SHALLOW WATERS**

### **Development for a new cost-effective Push-Barge-Train System for shallow waters is now ready for production**

The **INBAT** R&D project, supported by the 5th FRP, has fully achieved their objectives to develop a low draught inland water transport system to operate in water depths sufficient for a draught of as low as 0,60 m with development of new light weight construction materials and innovative structural design, engineering and production methods. Barge payloads were essentially increased while production and maintenance costs for the barge train were reduced. Effective shallow draught propulsion systems were developed for this purpose and hull forms optimized for best overall operating efficiency.

The basic barge train system consist of one low draught push boat with a length of 20,50 m, which normally operates one lane of three platform barges with a length of 32,50 m each. If waterways and conditions permit also two barge lanes can be handled by the same push boat.

In addition to this standard train configuration also special light weight U-shaped barges were designed suitable for transportation of bulk cargoes, project loads as well as containers with a length of 48,75 m each and for a maximum draught of 1,70 m.



This new development can also be used most efficiently for container distribution within the surrounding of larger container terminals or as support shuttle for bigger ships to bring limited numbers of containers to shore in extremely shallow waters, thus working as a "Container Taxi".

For the push boat the design strategy of a light weight body with modular deck outfitting had been practiced.

- Total power of about 480 kW
- Thrust for barge operation in shallow waterways with push boat draught limited to only 0,60 m
- Good maneuverability of the barge train
- Triple propeller with two side propellers of relatively small diameter and one larger center propeller of hoistable azimuth type
- Low investment costs and good reliability



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Compared to the conventional barge trains used so far on waterways such as the Odra river, the benefits of using an INBAT barge train are as follows:

- Reduction of fuel costs due to higher propulsive efficiency
- Total reduction of time requirement per trip, allowing more trips per year.
- Increase of payload capacity due to lesser light weight of barges.
- Better utilisation of particular river operation profiles for optimised efficiency.
- Capability to transport on barges heavy bulk cargo (iron ore) at maximum permissible draught.
- Capability to carry also container and special large volume project cargoes with same barges.
- Increase of operation time by utilisation of also low water level periods in the river.
- Additional waterway stretches with low water depth that can be utilized for navigation.
- Reduced time for maintenance and repair due to modular outfitting and better accessibility.
- The increase of navigation at average operating draught will be 25,4 %.
- **The power consumption required to obtain a transport work of 1000 tkm will be reduced from 27 kWh to now 20 kWh with an INBAT barge train.**



Thanks is given to all INBAT partners who participated in this R&D project.

There were the research institutes: Versuchsanstalt für Binnenschiffbau (acted also as the project co-ordinator), Technical University of Szczecin, Wrocław University of Technology, Ship Design and Research Centre Gdansk, and the design and engineering offices: NAVICENTRUM and SCHIFFKO GmbH, the shipbuilders: Neckar-Bootsbau GmbH, manufacturers of materials and equipment: SADEF N.V., Eckold GmbH & Co. KG, and Volvo Penta AB, and inland water ship operators: Deutsche Binnenreederei AG and ODRATRANS S.A.

For more information on a new cost-effective Push-Barge-Train System for shallow waters kindly contact [Albrecht.delius@technolog-services.biz](mailto:Albrecht.delius@technolog-services.biz)