via donau – Österreichische Wasserstraßen-Gesellschaft mbH

Impacts of extreme weather events on waterways

Budapest, 20th November 2013

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Contents

- Extreme weather effects on inland waterway transport
- Adaptation measures
  - Waterway management & Waterway planning
  - Information management
  - Management of logistics
  - Prediction methods
  - Fleet management – Ship technology
- Conclusions

The Rhine - Danube waterway as TEN-T axis

- Priority Project 18: "Rhine/Meuse-Main-Danube„
- Pan-European Transport Corridor VII

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Extreme weather effects on IWT

- **Uncertainties** are still high
- **Floods** are not projected to decrease for European waterways (except Finland, Russia and South Spain)
- **Low water:** No convincing evidence for increase in severity till 2050
- **Ice** occurrence is decreasing
- **Visibility** is improving
- **Wind activity**: almost no change
- **Rhine-Main-Danube corridor:**
  - No decrease in the **performance of inland waterway transport** due to climate change till 2050

Integrative adaptation

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Adaptation: Waterway Management

Waterway maintenance cycle

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Adaptation: Integrative waterway planning

Infrastructure adaptation pilot project Witzelsdorf

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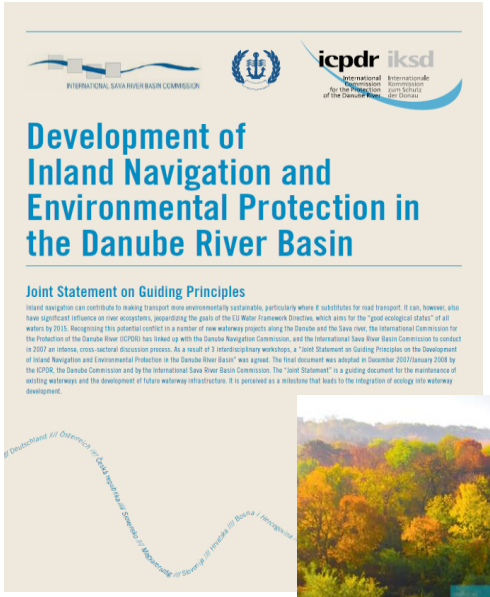
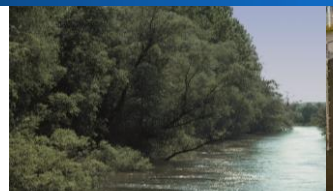
Adaptation: Integrative waterway planning



- Provision of fairway conditions in accordance with the internationally agreed fairway parameters
- Implementation of TEN-T priority projects in EU
- Integrative approach recommended (e.g. Joint Statement)



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Adaptation: Information Management

- ICT is used for safe and efficient navigation and reliable logistic service by providing information about:
  - Forecasts of water depth
  - Most efficient route of navigation (fairway in the fairway)
  - Accurate real-time information about fairway conditions
  - Time of arrival (waiting times at locks or bridges, flow velocities)
- to increase cargo load and drought, to optimize the travel schedule, save fuel and reduce Co2 emissions

Adaptation: Logistic management

- Higher number of operational hours to generate extra transport capacity
- Investment in additional storage capacity
- Extra cargo handling facilities in ports and terminals
- Cooperation with other modes of transport

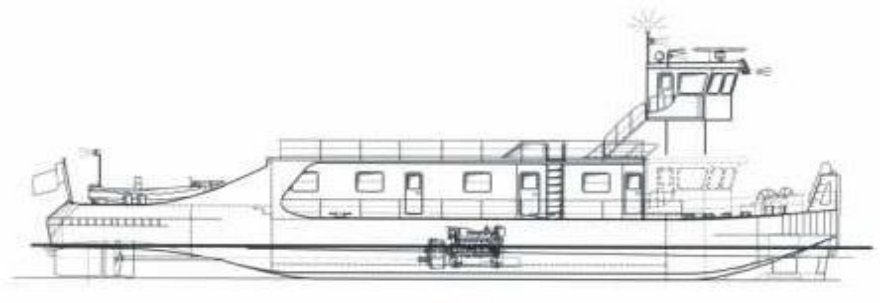
Adaptation: Prediction methods

Reducing uncertainty in the predictions of water levels

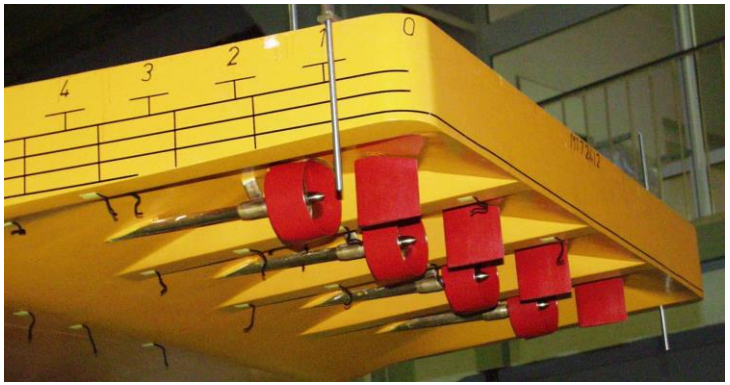
- Short tearm predictions (one week)
  - Used to establish the load factors
- Longer tearm predictions (seasonal horizon)
  - Helpful for decisions about storekeeping and production planning

Adaptation:
Fleet management

- technical changes of the vessels
  - take more load at the same drought
- changes in operation of the fleet
  - to operate safely even at lower drought
- changes in logistic solutions
  - to make more turnovers with the same time period



Source: Radojcic, D.: “Evironmentally friendly inland waterway ship design for the Danube River”, Belgrade-Vienna, 2009



Source: DST, ECCONET

Conclusion: Adaptation measures (1)

Category	Adaptation measure	Efficiency	short term	Stakeholder
Waterway management	Provision of navigation conditions according to international agreements	+++	2010 - 2020	Infrastructure management company
Information management	ICT for Smart Waterways	+++	2010 - 2020	Shipper, Carrier, Port, Government, Infrastructure management company
Category	**Adaptation measure**	**Efficiency**	**medium term**	**Stakeholder**
Management of logistics	higher number of operational hours, storage capacity, other transport modalities	+	2015 - 2020	Shipper, Carrier
Prediction methods	long tearm predictions of water levels	++	2015 - 2020	Meteorological Services and Hydrological Institutes

Conclusion: Adaptation measures (2)

Category	Adaptation measure	Efficiency	long term	Stakeholder
Waterway planning	integrative infrastructure adaptation (groynes)	++	2020 - 2040	EU, Government, Infrastructure management company
Fleet management	Vessel modification	+	2020 - 2040	Carrier, Shipper, Port, Government

Next steps:

MOWE-IT
MANAGEMENT OF WEATHER EVENTS IN THE TRANSPORT SYSTEM

- Draft Guidebook and development of road map for enhanced resilience of the inland waterways transportation
- Interviews with IWT sector to identify good practices, needs for further research and technical development

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