Waterway infrastructure adaptation

Nina Siedl
International Conference on Adaptation of Transport Networks to Climate Change
Contents

• Weather related effects on infrastructure

• Infrastructure adaptation measures

• Particular examples related to infrastructure adaptation

• Conclusions
The Rhine/Meuse-Main-Danube waterway as TEN-T axis

- Priority Project 18: "Rhine/Meuse-Main-Danube,"
- Pan-European Transport Corridor VII
Weather related effects on inland navigation (1)

Drought – low water levels

- insufficient navigation conditions
- increase in accidents (grounding)
- increased fuel consumption related to tkm
- low flow velocities => little sedimentation
- recent examples for drought: 2003, 2011

![Graph showing development of grounding events on the Upper and Central Rhine within 2002 and 2009. Based on WSD Südwest.](image)
Weather related effects on inland navigation (2)

High water and floods

- Suspension of navigation
- Often short lasting phenomenon
- Changes in river morphology
- Sedimentation
- Aggradation
- Damage of towpaths
- Damage of banks and flood protection installations

Changes in the river cross-section geometry of the Danube at river kilometre 1887.1 in 2002, being partly caused by the flood in August.
Weather related effects on inland navigation (3)

Ice

- Suspension of navigation
- Prevented operation of locks
- Damage of navigation signs

Ice occurrence in locks on the Danube preventing their operation. Source: via donau.
Integrative waterway planning and management

Integrative approach required!
Integrative waterway planning

- Joint understanding on the future infrastructure development of the Danube waterway
- Definition of integrative planning principles, involving all relevant experts (ecology, economy, navigation, river engineering)
- Concrete instructions for action for the implementation of integrative planning principles with regard to waterway infrastructure projects
- Information on existing good practices
Example infrastructure adaptation pilot project Witzelsdorf (1)

- Construction of new groynes
- Removal of old groynes and river bank restoration
- Smaller scour at the groyne head
- By-pass route for young fish and for reducing sedimentation in the groyne field
- River bank restoration and removal of the existing groyne field
- New downstream-facing groynes lead to higher dynamics along the river bank

Innovative groyne shapes – advantages for ecology and navigation by interdisciplinary planning

- Removal of old groynes and river bank restoration
- Construction of new groynes
Example infrastructure adaptation pilot project Witzelsdorf (2)
Integrated waterway management – Fairway maintenance cycle

1. Surveying
2. Dredging
3. Information

- Regular Surveying with high-tech equipment and data processing
- Dredging in time and in line with nature (breeding times, no removal of gravel from the river)
- Up to date on-line information for users of the waterway
Fairway maintenance - Information

Improved fairway information. Source: via donau.
Conclusions

waterway infrastructure adaptation (1)

Climate Change effects on inland navigation
- only minor changes in water levels may be expected till 2050
- performance of inland waterway transport is not expected to be affected significantly

Integrative waterway planning and management
- 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)
Conclusions

Waterway infrastructure adaptation (2)

Strategies for short term adaptation
• integrative infrastructure maintenance
• economical usage of the current fleet as well as the proper design of the future fleet
• potential for improvement related to waterway management and usage of ICT

Strategies for medium/long term adaptation
• structural infrastructure measures (e.g. groynes)
Nina Siedl
Environmental Management Officer
via donau – Österreichische Wasserstraßen-Gesellschaft mbH

Donau-City-Strasse 1, 1220 Vienna, Austria
Phone +43 5 04321-1104
nina.siedl@via-donau.org
www.via-donau.org