Determining the requirement for berths on the Rhine

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This presentation

- Need to determine the requirement
- Formula
- How it works...
- Q&A
Need to determine the requirement

- Every country and every river sector is different
- But the need for berths for the navigation industry is uniform
- Plenty of discussion... “not enough berths between A and B”
- No objective criteria... yet → first step by German & Dutch delegations
- BUT: → not an exact science
  → local conditions play an important role
  → (spatial) planning permits, Natura 2000 & WFD
Formula

- Formula
  \[ N = I_d \times A_r \times A_c \]

  \( N \) = number or berths required

  \( I_d \) = daily intensity of traffic → how many ships pass through in a day
  → ignore ships with 24/7 operation

  \( A_r \) = retention factor:
  \[ A_r = \frac{\text{Time required to pass trough sector}}{\text{Daily navigation time}} \]

  \( \text{Passthrough Time} = \frac{\text{sector length}}{\text{average speed}} \)

  16 or 18 h/day

  10 km/h

  \( A_c \) = correction factor for congestion & peak loads
  more congestion = more berths, so \( A_c > 1,0 \)
  but also: plan for 100% coverage? Or 95%? \( \Rightarrow A_c < 1,0 \)
How it works

• Count the number of ships per day at a fixed point

• Ask shipping industry about average navigation hours (16/18/24 hrs)

• Calculate pass-through time & retention factor

• Estimate congestion factor
SIMULATION

24 hrs
$I_d = 35/day$

$A_r = 0.8$
N = 24
9 barges → ..% 86m ..% 110m ..% 135m
2 tankers ADN 1 cone
1 tanker ADN 2 cones

10 barges → ..% 110m ..% 135m
2 tankers ADN 1 cone

CDNI + ▼▼▼

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Questions