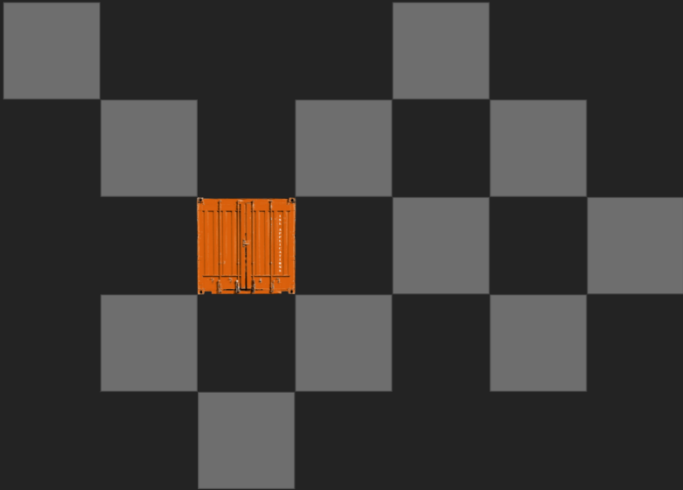


CHESSCON

Capacity





Optimization Tools for Container Terminals



high

Level of detail

low

CHESSCON
VIRTUAL TERMINAL

CHESSCON
SHIFT PREVIEW

CHESSCON
YARD VIEW

CHESSCON
SIMULATION

CHESSCON
CAPACITY

CHESSCON
TERMINAL VIEW

preplan.

planning

start-up

operation



Terminal capacity

- 1,500 m quay length
- 24/7 operation
- Average vessel length 330 m (incl. safety distance)
- Average throughput per vessel 2,300 TEU
- Average service time 24 h
- → Theoretical capacity
 $(1,500 / 330) * 365 * 2,300 \text{ TEU} \sim 3.8 \text{ MTEU pa} \text{ ???}$

Static view is insufficient

→ Simulation is recommended

Capacity Planning



What will be the result if an other vessel mix will arrive?

What's the impact of vessel's accuracy?

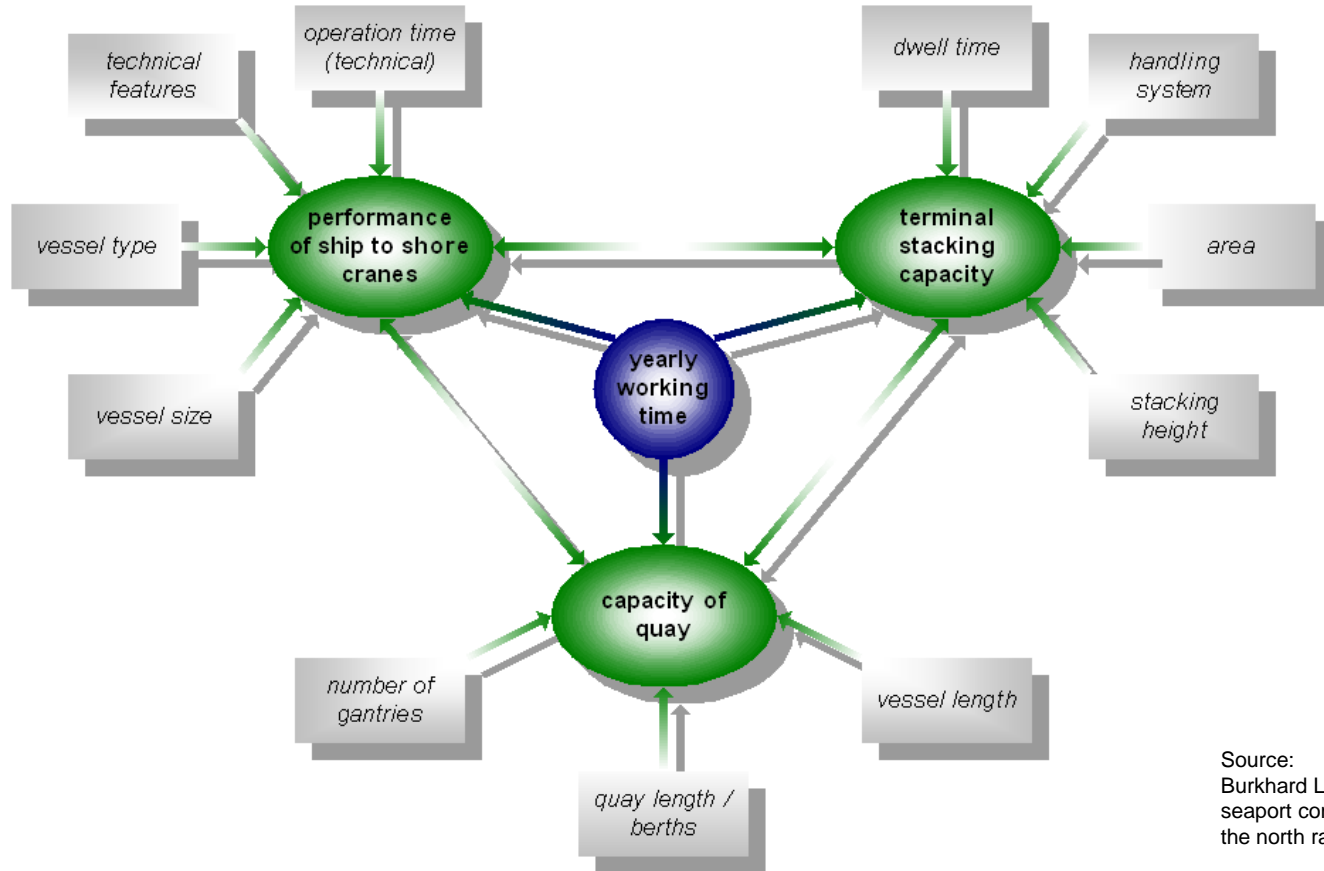
Terminal capacity : 2,85 MTEU pa

What will be the result if QC's productivity decreases from 30 to 27 mv/h?

.....



Important parameters for container terminal capacity



Source:
Burkhard Lemper: Efficiency of the seaport container throughput market of the north range



Capacity planning for container terminals

- **Targets**

- Where is the bottleneck of the terminal? Quay or stacking area?
- With how much throughput does a terminal cope with the existing capacity?

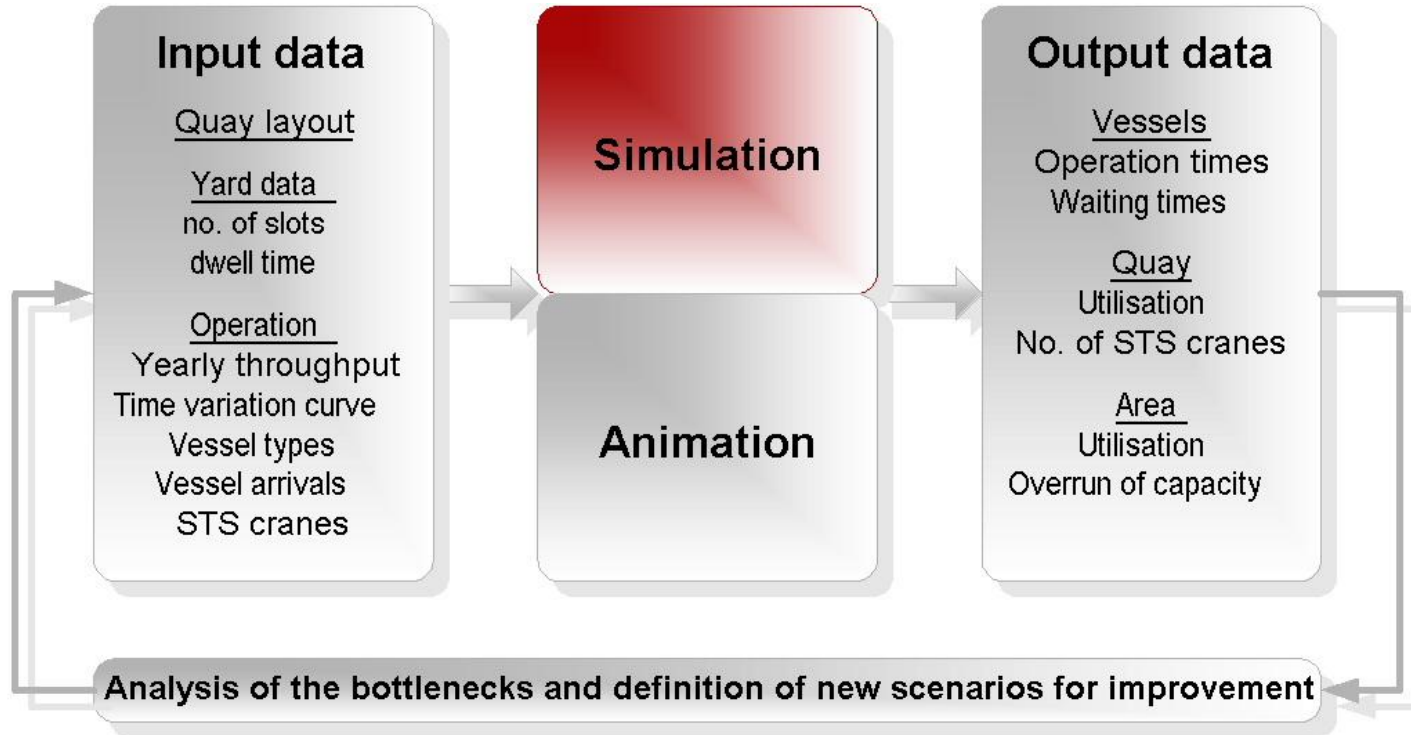
- **Quay evaluation**

- Is there sufficient quay length to operate a given container volume?
- What is the utilization of the quay?
- What is the number of quay cranes required to handle the container volume?

- **Area evaluation**

- Is there a sufficient number of stacking slots?
- What is the utilization of the stacking area?

Main Modules of Capacity





Simulation

- simulation time: 1 year

- preliminary time: 2 weeks
(for pre-occupancy of quay and stacks)

- Simulation
 - single runs for configuration check
 - several runs for evaluation

- saving of simulation results
 - average data over all simulation runs
 - if necessary data of each single run

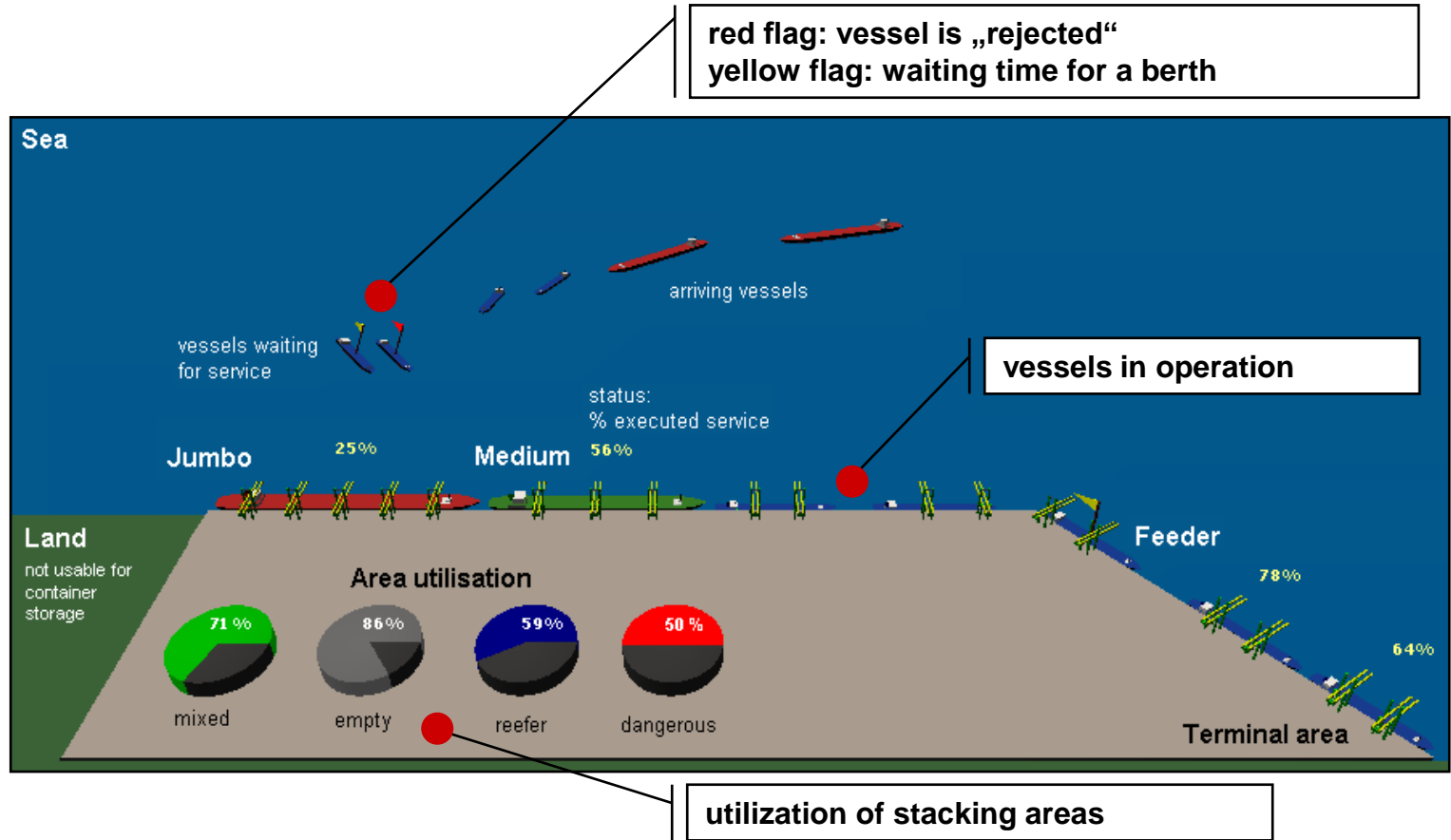


Animation

- 3D animation of the quay
- animation of the area utilization
- online animation during simulation
- supplementary animation for fault analysis
 - The last simulation run is recorded as a “film” which can be turned back and forward.
- adaptation of the animation speed according to the requirements
- zoom and sight onto the terminal from various perspectives



Animation





Simulation result evaluation

- quay evaluation
 - quay utilization – maximum and average
 - crane requirement – maximum and average

- vessel evaluation
 - berthing times - maximum and average for any vessel type
 - waiting times - maximum and average for any vessel type
 - „rejected “ vessels – waiting time over maximum
 - crane performance - minimum, maximum and average

- stacking area evaluation
 - evaluation of the area utilization regarding to capacity overrun as well as maximum utilisation overrun



APPLICATIONS

THANK YOU FOR YOUR ATTENTION

ISL APPLICATIONS GMBH

Barkhausenstrasse 2
27568 Bremerhaven
Germany

P +49 471-30 98 38-38
www.isl-applications.com