

A DECISION SUPPORT SYSTEM TO MITIGATE THE IMPACT OF BERTH ERRORS

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Examples of Berth Errors at the Container Terminal Burchardkai

The term berth error can be used to define the difference between the berth schedule determined 'a priori' with the information known beforehand and the schedule that has to be planned dynamically during the planning horizon. No error means the schedule is being performed as planned; an error disturbs one or more processes at a container terminal which may or may not influence other logistic partners, and provokes the replanning of related operations. In the worst case one berth error may lead to subsequent berth errors at other container terminals which are included in the route of the late coming ship. The occurrence of berth errors is often dependent on the punctuality of ships, but also on the availability of berths fit for necessary performances.

Terminal Processes

	Seaside	Yard	Landside
Strategic	Choice of Location and Equipment Selection	Yard and Traffic Course Layout	Gate and Rail Area Layout
Operational	Berth Allocation	Yard Management	Hinterland Operations
	Quay Crane Assignment	Horizontal Transport Operations	
	Quay Crane Scheduling	Yard Crane Scheduling	
	Workforce Planning		

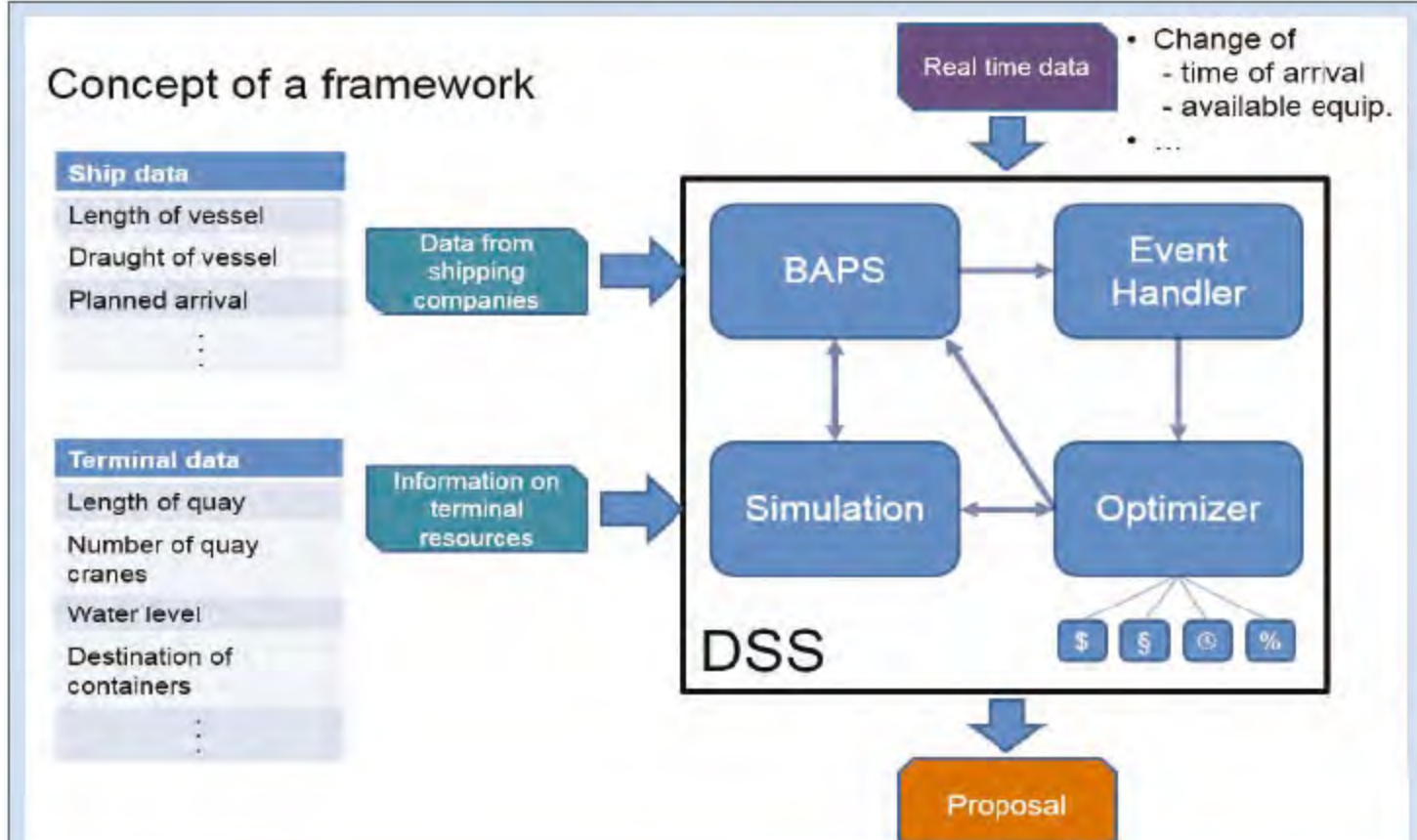
Based on Maierl, Frank (2009): Seaside Operations Planning in Container Terminals, Heidelberg, Physica, p. 8.

Decision Support System (DSS) with an integrated Information System

Berth Error Schedules

Impact on Processes

Example:
 - Vessel Charlotte is late at ECT
 -> Berth Error occurs
 - Berth allocation replanning
 - Rescheduling of all interrelated terminal processes
 - Hinterland logistic partners need information
 - Vessel Charlotte leaves late
 - Next Berth Error at CTA Hamburg



Example of Chosen Solution based on KPI Extra Costs

Key Performance Indicators (KPIs):

- extra costs
- fulfilment of contractual deadlines
- total time to process the combination of actions
- reduction of the impact in percent

Real-time event	Actions	Extra Costs	Contractual Deadlines	Total Time	Impact Reduction
Vessel arrives late and interferes with another vessel	Load both vessel at planned berth and load other vessel after delayed vessel is loaded	150	4/6	3	0
	Load delayed vessel after other vessel was loaded at planned berth	120	5/6	4	10
	Load delayed vessel at different berth and load other vessel as planned	100	5/6	6	10
	Load other vessel to different berth and load delayed vessel at planned berth	200	4/6	8	13

Resulting Schedule