



## MARITIME SIMULATION APPLIED FOR REDESIGNING A TERMINAL HUB

### INDUSTRY

Industry & Logistics

### APPLICATION AREA

Maritime freight handling

### COUNTRY

Norway

### CHALLENGE

Redesign major scandinavian terminal-hub with a fundamental condition that says the terminal-hub must have the ability to handle all kind of carriers.

### RESULTS

- Futureproof and operational reliable system
- Quality and speed of planning improved
- Cost reduction
- Redesign approval from all stakeholders through the appealing 3D-visualization used in presentation

## Baltic Marine Consult used Enterprise Dynamics® simulation software to redesign a major Scandinavian terminal hub

### FUNCTIONALITY EVALUATION OF INTERMODAL FREIGHT HANDLING SYSTEMS

Intermodal freight handling between road and rail is one of the main modes of transport. The intersection between high-frequency but low-capacity operating truck-based cargo transport and the low-frequency but high-capacity acting rail freight services give rise to storage in transit. Dwell time of cargo units is the key influencing capacitive factor besides limitations of design, technical equipment, and transport connections.

Due to rising customer variety and soaring relations of loading equipment operation become more and more inhomogeneous. Analytical techniques are overextended to describe the characteristics, even if the data base of material flow is profound and the essential influencing factors are well known. Using the large random variables of Enterprise Dynamics® appeared promising to reproduce that volatile system performance within a simulation model.



**BALTIC MARINE CONSULT**

Baltic Marine Consult GmbH (BMC) is a member of an international project team that was assigned to redesign a major Scandinavian terminal-hub in spring 2008. The fundamental condition of the contract was the ability to handle all kind of carriers, like 20 – and 40 feet containers, several swap types, and trailers, even if mixture and/or volume will undergo predicted changes of market requirements. The hub is the central control unit in order to safeguard the changeover between rail and road.

The planning process was divided into several subprojects:

- Design of rails and layout of handling areas;
- Layout based performance measurement for varying technical equipment;
- Determination of terminal module;
- Capacity and utilization;
- Cost-benefit analysis of the preferred design.

The simulation expertise of INCONTROL and the comprehensive branch specific knowledge of BMC were merged to work out the model specifications for this challenging task. Some of the main issues are:

1. Modular design of model and building blocks in order to back up the design process, but also indemnify reusability;
2. Appliance of train schedules, delays, loading structures and capacity utilization;
3. Modelling of all handling operations using detailed stochastic distributions;
4. Reproducibility and accessibility of all model parameters and activities to the client;

5. Flexible application of different operation strategies to optimize terminal performance and energy consumption;
6. Flexible integration of several cargo scale scenarios to verify the predicted carrier mixtures and hub schedules;
7. Capable model structure to enable long-term experimentation of one year or longer;
8. Appealing 3D visualization.

**SOLUTION**

The project has been realized by simultaneous modelling and process development with consecutively increasing level of maturity for booth partitions. The resultant synergetic effects influenced not only the quality and speed of the planning. In fact even more potential approaches have been ad hoc tested within the flexible structure of Enterprise Dynamics®. often before they caused additional planning costs.

**RESULTS & BENEFITS**

In the final stages of the project the client received a flexible and operational reliable system that meets the requirements of today as well as the future performance increase.