Development of new planning tools coping with volatile weather conditions

EWEA Technology Workshop, Rotterdam 04.12.2013

Michael Görges

BLG LOGISTICS SOLUTIONS

WindEnergy Logistics
Agenda

- Overview BLG
- Offshore supply chain
- SIMTUL a simulative modeling and analysis approach
  - Cause of action
  - Concept of the simulation tool
  - Integration of weather uncertainties
- Further research activities
BLG LOGISTICS GROUP

Automobile
- Sea and inland terminals
- Storage and distribution
- Ro/Ro-Terminals
- Technical centers
- Intermodal transports
- Freight forwarding services

Contract
- Automotive logistics
- Industry and production logistics
- Port logistics
- WindEnergy Logistics

Container
- Sea and inland terminals
- Intermodal transports
- Logistics services
- Maintenance and repair
- Container-depots
Offshore Supply Chain
Material and information flows

Material flow:
- Production
- Intermed. storage
- Port operations
- Transport Inst. vessel
- Installation

Information flow:

Challenges material flow:
- Technical feasibility
- Organisation / resource planning
- ...

Challenges information flow:
- Exchange of information
- Planning and restrictions
- ...

Source: based on Industrie Management 27 (2011)
SIMTUL
Using discrete event simulation for improving the supply chain

Motivation
- Improving resources utilization
- Idle time of resources
- Improving plan accuracy
- Increasing throughput of the supply chain

Objectives
- Identification of influencing factors
- Operationalisation of influencing factors
- Modeling of offshore transport processes
- Generation of a simulation model
- Evaluation and validation of results

funded by:
SIMTUL
Course of action

Analysis of the logistic chain

Identification of parameters of the logistic chain

Development simulation model

Experiments and validation
Currently, SIMTUL addresses the near-shore logistics supply chain

Source: based on Industrie Management 27 (2011)
Approach in SIMTUL
Modeling in three layers

- Modular approach→ integration of further locations
- Weather and tidal data for specific locations
- Ports, Yards, Ressources (SPMT, Forklifter)
- Description of processes and their properties
- Mapping of restrictions to processes and resources
Modeling of Processes
Weather restrictions – influence on process performance

Process restrictions
- General criteria:
  - Windspeed
  - Visibility, tide

- Modular approach
- Varying restrictions for each process group
- Varying restrictions for each resource group

Plan
PG 1  PG 2  PG 3

Realised
PG 1  PG 2  PG 3

Restriction PG1, PG3
Modeling weather restriction
Using historical data and actual forecasts

Mode 1 – Analysis of planning scenarios
→ Under development / Validation

Mode 2 – Analysis of operative scenarios
→ Possible extension

*Simulation results*

- **Scenario analysis**
  - Performance measures: TPT, utilization, service level, costs
  - Analysis of alternative scenarios: e.g. variations of starting dates, reduction of delivery intervals
  → Substantiated results

*Database:*
- Hist. weather data
- Tidal predictions
- Multiple locations

Iteration of simulation runs per scenario

Simulation runs

Historical weather data year 1
Historical weather data year 2
Historical weather data year 3
Historical weather data year n

Actual forecast

Aggregation of results

Time horizon of analysis
**SIMTUL**

Scenario based approach – Analysis with SIMTUL

Scenarios and Influencing factors

Simulation

Evaluation
Summary and next steps of development
Research and Development

- SIMTUL provides a simulation based planning tool including restrictive factors (e.g., weather conditions)
- SIMTUL uses data from different sources
- Modular approach allows to extend the model:
  - Further Location (onshore and offshore)
  - Additional processes
  - Further restrictions
  - Usage of additional data sources

- Validation using existing data about transports
- Integrated Modeling approach for the offshore supply-chain
- Standards as an instrument for dissemination
Thank you for your kind attention!

Michael Görges
WindEnergy Logistics – Project Manager R&D
BLG Logistics Solutions GmbH & Co. KG
Präsident-Kennedy-Platz 1
28203 Bremen
Germany

Tel.: + 49 421 398 3458
Mail: mgoerges@blg.de
Web: www.blg.de