

Assessing Container on Barge Readiness within Maritime Transportation Systems

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Abstract

Container on Barge (COB) utilizes barges to transport shipping containers between seaports and inland ports via navigable inland waterways. Rapid development of COB in Asia and Europe has provided regional benefits, including lower shipping costs, reduced emissions, and land-side congestion mitigation. However, COB shipping has been slow to develop in other countries, partly due to inadequate multimodal supply chain coordination, poor infrastructure conditions, and limited governmental support. Sustaining a cost-effective, efficient, and environmentally-friendly transportation system within the United States requires reduced fuel consumption, lower freight transport costs, decreased transportation emissions, and congestion mitigation. Given its demonstrated benefits as part of the Asian and European transportation systems, COB has strong potential to be integrated into future transportation systems within the United States and other navigable inland waterway systems that have not yet capitalized on these benefits.

Motivated by this demonstrated potential, the team has developed a COB Readiness Assessment Scorecard to aid systems engineers and other maritime transportation stakeholders in assessing the feasibility of a maritime port to initiate COB development. The Scorecard, built upon the framework of value-focused thinking (VFT) developed in 1992 by Ralph Keeney, allows transportation system engineers and other decision-makers to: 1) broaden the decision contexts for measuring COB transportation readiness, 2) identify success factors that can assist a port terminal in launching COB successfully and generate the associated measurements for these factors, and 3) enhance decision-maker and stakeholder thinking towards developing COB transportation solutions to generate better COB development plans. Furthermore, the Value Hierarchy built into the Scorecard provides a framework to search for and identify engineering challenges ahead of the COB development planning phase. By integrating the VFT philosophy into the scorecard design, the essential attributes and hidden aspects of COB development success are identified. Once the COB Readiness Assessment Scorecard identifies advantages and weakness of COB readiness, system engineers can generate strategies to amplify advantages and improve weaker conditions for their ports to increase readiness for COB development.

This presentation will inform an overall understanding of COB development requirements, present the COB Readiness Assessment Scorecard as a practical readiness assessment tool for ports to improve the associated decision process, and assist transportation system engineers in understanding the benefits of COB within the global supply chain. To demonstrate the application of the Scorecard, a case analysis of the Port of Shanghai will be presented along with an overall assessment of nine global COB ports in total. This presentation informs an overall understanding of Container on Barge (COB) development requirements, presents the COB Readiness Assessment Scorecard to improve the associated COB development decision process, and assists transportation system engineers in understanding the benefits of COB within the global supply chain. To demonstrate the application of the Scorecard, a case analysis of the Port of Shanghai will be presented along with an overall assessment of nine global COB ports in total.

The presenter, Heather Nachtmann, is director of the Maritime Transportation Research and Education Center, a U.S. Department of Transportation University Transportation Center, and Professor of Industrial Engineering at the University of Arkansas. She holds the Earl J. and Lillian P. Dyess Endowed Chair in Engineering. Dr. Nachtmann has conducted research in inland waterway operations for more than twenty years and led over seventeen million dollars in research grants as principal investigator. She is a Fellow of the American Society for Engineering Management and the Institute of Industrial and Systems Engineers and a member of the Arkansas Department of Transportation Research Advisory Council and National Science Foundation Engineering Research Visioning Alliance Standing Council.

Keywords

Container on Barge, Maritime transportation, Readiness assessment, Scorecard, Value-focused thinking