Education for the Future: Learning IE Skills through Interactive Port Security Simulation Models

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Background

The maritime system is a vital part of the economy and our way of life. Disruptions to this system can be very costly. Hurricane Ike caused 14 refineries in Texas to be shutdown which caused a major disruption in energy supplies nationwide. The 2002 west coast (Los Angeles/Long Beach) port shutdown due to labor disputes caused the U. S. economy to lose approximately 6.3 to 19.4 billion dollars. Many students are unaware of the role of the maritime transportation system as well as the role of the Department of Homeland Security in protecting the nation's ports and waterways from natural and manmade threats that can disrupt operations. This project seeks to increase maritime domain awareness among Industrial & Systems Engineering students through the use of an interactive simulation model of the maritime system.

Purpose

The main objectives of this research project are to 1) develop a case study based on the operations data obtained from the Port of Wilmington, NC; and 2) evaluate the effectiveness of the case study along with an interactive simulation model as a tool for increasing awareness about port operations and port security. The case study seeks to reinforce skills related to simulation model development, data analysis, and analysis of queuing systems.

Design/Method

First, instructional guides were created explaining how to interpret and execute the simulation model. Then, a case study was developed using operations data on vessel arrivals, departures, and cargo type. The study also requires students to use Excel as a primary analysis tool. The design of the case study was modeled from similar quantitative case studies published in *INFORMS Transactions on Education*.

Results

The case study was applied in one undergraduate statistics course. Additional courses in queuing theory and operations research offered in subsequent semesters will also make use of the case study. Preliminary results show the simulation model can be effective in increasing maritime domain awareness; In particular when questions are developed that require students to modify the model and interpret the model results.

Conclusions

Case studies are a major tool used to teach data analysis and queuing models. They provide students a real life example of a problem that utilizes the skills learned in the classroom environment which are needed in order to solve various problems.