Enhancing Port Efficiency in Singapore

Singapore is striving to capitalise on its strength as an excellent Asian port to promote itself as an International Maritime Centre. The Maritime and Port Authority (MPA) of Singapore has been working with SCE to further enhance competence of the local industry. Over the past several years, a team of researchers in SCE has teamed up with MPA to work on projects ranging from master-planning of new terminals, evaluating innovative operational equipment and handling policies, estimating terminal capacity, enhancing productivity of existing terminals to optimisation of inter-terminal trucking procedures.

Project Highlights

The research team is currently conducting a study with MPA and Surbana International Consultants Pte Ltd to develop a master plan of a future Singapore terminal. It involves the large-scale simulation of container terminal operations ranging from vessel operations at quayside, storage and retrieval operations at yard side and import/export handling at the gates.

Results from this study will help to refine the port layout. The research team has also been evaluating different quayside and yard side handling equipment, and operational policies for a future high-performance port capable of efficiently handling mega vessels.

In addition to planning and preparing for the future, existing container terminal operations were also examined. Researchers collaborated with local operator, Jurong Port, to conduct a capacity estimation study for terminal and gate operations. Ways to optimise the trucking of containers between the different terminals were also studied.

The research team’s Adaptable Container Terminal Simulator (ACTS) was used to simulate the operations of a regional NOL-operated terminal – Vietnam International Container Terminal (VICT). ACTS was used to assess the handling capacity of the terminal, detect bottlenecks in operations, and determine the


Detailed and realistic modelling of yard storage operations.
number of resources required to cater to the increasing volume of port activity over the next few years.

Impact on Industry

The aforementioned projects have assisted in the design and planning of future terminals. Several new technologies and schemes have been analysed to assess feasibility and utility. Existing container terminal operations have been accurately modelled and simulated to evaluate handling capacity, and to help identify potential bottlenecks and options for removing them.

Trucking efficiency was also improved using algorithms proposed for matching jobs to resources.

The maritime sector, one of Singapore’s mainstays, has contributed in excess of 8% to the nation’s GDP. Over the past few decades, Singapore has built up a considerable competitive advantage and it is critical to continue to improve every aspect of the container flow in our terminals.

Team Members

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