

Assessment of Environmental Impact of Reducing Container Reposition through Algorithms Based Virtual Container Yard: A Case Study

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The container inventory imbalance results in container reposition which causes a substantial cost to carriers and creates a serious environmental issue. The virtual container yard is constructed on container exchange between carriers which is an extension to the present slot exchange of shipping lines. This needs fast and accurate decision making for every exchange activity. Algorithms have been used to aid decision-making for centuries and pre-date computers. Algorithms need data, and their effectiveness and value tend to increase as more data are used and as more datasets are brought together. In this scenario, there is no one correct solution, but there is a best possible solution, depending on what the user wants to achieve. Environmental impact created by containers is twofold. On the one hand, empty containers occupy ground space for storage for long stay thus creating environmental hazards. The distances these containers are transported without any cargo in them is the other environmental hazard. This recurrent operation generates a substantial carbon footprint. This research investigates

the benefits of operationalising a virtual container yard through algorithms. The researchers have employed qualitative methods collecting data and carried out extensive desk research. Interviews have been conducted using shipping professionals, information technology experts, port officials, employees of container yards and members of shipping associations. Although the maritime shipping is the world's most carbon-efficient form of transporting a modern ship emits 10 to 40 grams of CO₂ per metric ton of freight and per km of transportation which makes a substantial impact considering the excessive distance a container travels and amount of containers a ship carries. For example, hundred containers (20Foot) transported from Colombo to Shanghai is estimated generating 41.0147 MT of CO₂. The virtual container yard operationalised through algorithms is estimated to reduce the CO₂ by 15-20 percent which should be encouraged.

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