

**Project Information Form**

Project Title:	Congestion Reduction Through Efficient Empty Container Movement
University:	University of Southern California
Principal Investigator:	Maged Dessouky
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Funding Source(s) and Amounts Provided (by each agency or organization):	Caltrans - \$98,866.73
Total Project Cost:	\$98,866.73
Agency ID or Contract Number:	Caltrans 65A0527 Task Order 031 USC-CT-TO-031
Start and End Dates:	August 24, 2016 – August 14, 2017
Brief Description of Research Project:	<p>In 2015, the Ports of Los Angeles and Long Beach moved 15.3 million twenty-foot Equivalent Units (TEU). There is a significant body of work on moving loaded containers efficiently, however there has been little research on the movement of empty containers. Out of the 15.3 million TEUs, about 30% or 4.3 million TEUs were empty containers.</p> <p>Empty container movement is increasing greatly because of the enormous inconvenience for companies to coordinate with each other to exchange empty containers. This problem is known as the Empty Container Problem. This study proposes a mathematical model that solves the empty container problem using double and single container trucks. The model discretizes time and ensures demand is met. By solving the empty container problem, congestion can be reduced since fewer truck trips would be needed to satisfy demand. Furthermore, since double container trucks can deliver two containers per truck trip, the quantity of trucks needed to satisfy the demand is decreased even more, further reducing congestion.</p> <p>The model was tested using data from the Ports of Los Angeles and Long Beach. The results are promising and show that the number of miles and trucks can be significantly reduced by increasing the number of street exchanges, and further reduced by using double container trucks. This report shows that using a single container policy instead of the current policy would reduce truck miles by about 12%, and would reduce significant truck trips to and from the port. The double container policy reduces truck miles by about 55% compared to the current policy, which is a noteworthy reduction. This could potentially reduce congestion</p>



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	substantially, lessening the impact of container freight movement on the environment.
Describe Implementation of Research Outcomes (or why not implemented):  Place any photos here	
Impacts/Benefits of Implementation (actual, not anticipated):	
Web Links <ul style="list-style-type: none"><li>• Reports</li><li>• Project website</li></ul>	<a href="https://ncst.ucdavis.edu/project/congestion-reduction-through-efficient-empty-container-movement/">https://ncst.ucdavis.edu/project/congestion-reduction-through-efficient-empty-container-movement/</a>