2018 PSR Spring Research Seminar

Pacific Southwest Region UTC

University Transportation Center

Wednesday, February 21, 2018
12:00 PM to 1:30 PM
USC – Ralph and Goldy Lewis Hall (RGL) 100

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Centralized Processing of Chassis: Modeling, Analysis and Optimization

The twin ports of Long Beach (POLB) and Los Angeles (POLA), consisting of fourteen individually gated terminals, combine to create the largest container port complex in the US. In 2015, the combined ports handled 15.4 million 20-foot equivalent units (TEUs), a 56% increase since 2000, expected to grow higher in the future. This large number of containers and the associated trips to/from the ports, result in traffic congestion, noise pollution, and greenhouse gas emissions in the vicinity of the ports. The current project studies the concept of "Centralized Processing of Chassis," and the possibility of using it to mitigate some of these problems. This concept revolves around an off-dock terminal (or several off-dock terminals), referred to as Chassis Processing Facilities (CPFs). A CPF is located close to the port, where trucks will go to exchange chassis, thereby reducing traffic at the marine terminals, resulting in reduced travel times and reduced congestion. The current project develops the required analytical framework for modeling and optimization of the CPF use. The developed analytical model is applied to a case study in the Los Angeles/Long Beach port area. The case study identifies sixteen locations in the vicinity of the ports that can be potentially used as CPFs, and examines several scenarios of container pickup/drop-off transactions. The study presents comparisons between the case when chassis exchanges occur at the CPFs versus the case when chassis exchanges occur at the marine terminals. It is shown that a reduction of up to 20% in total travel time can be achieved when using the CPFs, as compared to using only the marine terminals. The study also shows that using up to three of the potential sixteen CPFs provides significant improvements to total travel time, but using more than three CPFs will have insignificant additional benefits. Moreover, a discrete event simulation model is developed and used for detailed simulation scenarios, as well as for examining and evaluating the performance of heuristic methods.

Timothy VanderBeek

Timothy VanderBeek is the Hardware Team Manager and Deputy Chief Engineer for the Electrostatically Supported Gyro Navigator Replacement (ESGN-R) program at Boeing, providing technical oversight for system requirements and architecture development, hardware/software design, and integration and test activities. Initially an Electrical Engineering Intern for Boeing in 2003, he graduated from California State University Long Beach (CSULB) as the Outstanding Electrical Engineering Honors Graduate in 2004. After graduating, he returned to stay at Boeing with the exception of a two year leave of absence (2007-2009) to serve as a Peace Corps Volunteer in Niger, West Africa. He completed his Master of Science in applied mathematics at Claremont Graduate University (CGU) in 2014 and is pursuing a joint PhD in applied mathematics and industrial engineering from CGU and CSULB. His research is currently concentrated in the area of container terminal networks, focusing on optimization of landside transport.

Transportation research, education,

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