ATCMTD

Advanced Transportation and Congestion Management Technologies Deployment

THE PORT OF VIRGINIA TRUCK RESERVATION SYSTEM PROJECT EXECUTIVE SUMMARY

The ATCMTD Program awarded the Port of Virginia (POV) a grant in fiscal year 2017.

Project Goals

From 2020 to 2021, the POV implemented phase 2 of its Truck Reservation System (TRS-2) and created an automated workflow data model.

The Fixing America's Surface Transportation (FAST) Act (Pub. L. No. 114-94) (2015) set goals for the ATCMTD Program. POV's goals included the following:

Improved Safety	Improved System Performance	Reduced Emissions	Reduced Costs	Improved Real-Time Information	Administrative Benefits	Improved Mobility

Truck Reservation System Improvements

Before work on this project began (i.e., during phase 1), POV enforced **mandatory truck reservations** during peak times, which allowed for the planning of cargo arrival and movement and resulted in improved logistical planning and trucker wait times.

In TRS-2, the POV redesigned the truck reservation system to improve user experience and facilitate real-time edits to accurately reflect motor carriers' usage. The POV also published the underlying **data model** for TRS-2, which other ports can scale and use. Additionally, the TRS-2 system allows truckers and logistics chain stakeholders to subscribe to a cloud-based system that provides real-time terminal information.

TRS-2 now uses **artificial intelligence (AI)** to optimize the port's container stacking. The POV also created a **mobile application** to improve user access to the port system.

**Figure 1. Map. United States with Port of Virginia location.**

POV

Source: Pixabay®.

Improved Safety, Emissions From Reduced Turn Times

Improvements to the reservation system make the port safer by reducing the need for drivers to exit their trucks to coordinate. While waiting to back into a lane, brief coordination with other motor carriers is acceptable under POV Health and Safety Rules - Motor Carriers for up to 2 minutes before reentering their cabs. In 2018 and 2019, rule compliance, which is measured quarterly, was in the "unsatisfactory" range, with 1 score as low as 62 percent. After implementing TRS-2, compliance scores for the 4 quarters evaluated in 2020 and 2021 rose above the 95-percent threshold to the "satisfactory" range. Maintaining lower turn times also decreases time idling, resulting in fewer emissions.

Figure 2. Chart. Compliance scores.
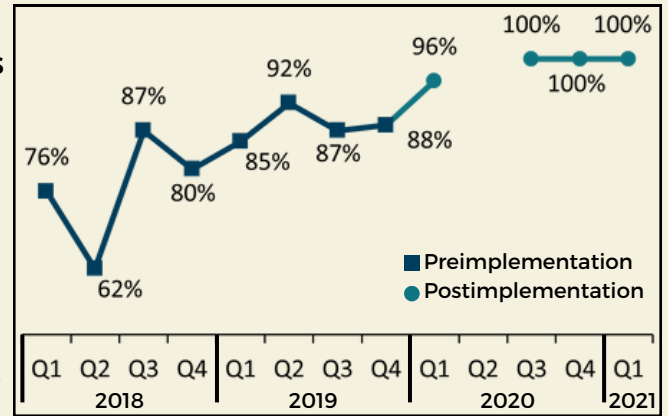
Source: The Port of Virginia.

Efficiency Gains: Improved Housekeeping

Before implementing TRS-2, containers were often moved multiple times based on the order in which truckers arrived at the gate and at the stacks, contributing to longer queues and wait times.

With AI housekeeping, the POV positions containers during offpeak hours based on the upcoming reservations, resulting in fewer container moves, especially during port hours. Based on the results from the proof of concept, POV could potentially eliminate 218 unnecessary moves per day. Extrapolated over the course of a year, leveraging an AI-based housekeeping approach could eliminate 55,154 wasteful container moves per year. This approach would potentially enable POV to operate at levels 25 percent above the design capacity for an extended period while maintaining improved turn times.

Improved System Performance

Despite supply chain issues in 2021 and 2022, thousands of containers were rerouted from other U.S. east coast ports to POV. While other ports saw turn times of 3 to 4 hours, POV's turn times were between 50 and 60 minutes. The POV decreased operational hours by 40.9 percent (from 22 hours to 13 hours each day) while handling a 76.4-percent increase of in-gate container volume (comparing 2019 to 2021). These outcomes can be attributed to mandatory reservations and AI housekeeping.

To read POV's final report, please go to: https://ops.fhwa.dot.gov/fastact/atcmtd/2017/awards/PoVA%20-%20ATCMTD%20Final%20Report.pdf.