Whitepaper

Improving Inbound Logistics Operations

A Simulation-Based Evaluation Of Warehouse Check-In Strategies For Improving Inbound Logistics Operations

Inbound logistics is a vital step in warehouse receiving processes and has a direct impact on supply chain cost and performance. As a result of an inefficient check-in operation, the incoming trucks may experience inordinate wait times between arrival and check-in, which in turn leads to unnecessary cost to the company in the form of detention fees (a penalty for holding the truck and driver beyond the agreed upon time) and delayed delivery of subsequent consignments. Moreover, prolonged idling of queuing trucks is not environmentally sustainable as it increases the concentration of carbon dioxide (CO2), a primary contributor to climate change, in the atmosphere.

This research is motivated by a case study of one of the largest consumer goods companies in the US, which pays over a million dollars in detention fees every year. The trucks entering the facility under study encounter an average waiting time of approximately an hour. The primary objective of this paper is to minimize the detention fees paid to the carrier by enhancing the check-in process of the inbound trucks, and the secondary goal is to reduce the CO2 emissions. Different check-in policies (staging area, dynamic dispatching rules, and automated technology) are proposed and compared to the current operations using discrete-event simulation models.

The results suggest the adoption of a staging area with dynamic dispatching rule in the short-term as it requires minimal capital investment and achieves substantially lower detention fee and CO2 emission. A more expensive yet superior alternative is the use of automated technology for check-in processing as it eliminates detention fee and reduces the CO2 emissions from the trucks by 80%. The modeling approach and proposed dispatching rules are generic and can be adopted by any facility characterized by long waiting time for check-in and high detention fees.

Reference
https://www.sciencedirect.com/science/article/abs/pii/S1569190X19300280?via%3Dihub