

ABSTRACT

PT.ABC port is facing a serious challenge in efficiently managing truck arrivals without proper scheduling. As a result, there has been a significant increase in truck turnaround time, exceeding the planned duration by 49%. To address this issue, an innovative approach has been introduced, combining discrete-event simulation with an appointment-based truck arrival scheduling system. Discrete-event simulation is utilized to model the complex port system, taking into account critical parameters such as gate capacity, weighbridge operations, parking areas, and the dockyard. The primary change implemented is the transformation of the previously random truck scheduling into a coordinated and efficient arrival schedule. Additionally, truck arrival frequencies are carefully managed to prevent the formation of lengthy queues, which was a major concern in the past. The simulation results are highly encouraging. With the implementation of the new truck arrival scheduling system, the truck turnaround time has been significantly reduced to just 24% of the previous duration. This means that trucks can enter the port, load cargo, and depart much faster than before. The revised scheduling, with arrivals every 13 minutes and a limit of 4 trucks per arrival, has greatly optimized port operations. These changes not only bring benefits in terms of reduced truck turnaround time but also have a positive impact on overall port operational efficiency. The productivity of PT.ABC's port has significantly increased, which will support the growth and sustainability of port operations in the future. The approach that combines discrete-event simulation with an appointment-based arrival scheduling system has proven to be a highly effective solution for addressing this complex issue. By leveraging simulation technology and improved planning, the port can optimize its operations and better serve its customers. This has a positive impact on the entire supply chain and industries associated with the port.

Keywords: Truck Turnaround Time, Discrete-Event Simulation, Arrival Scheduling