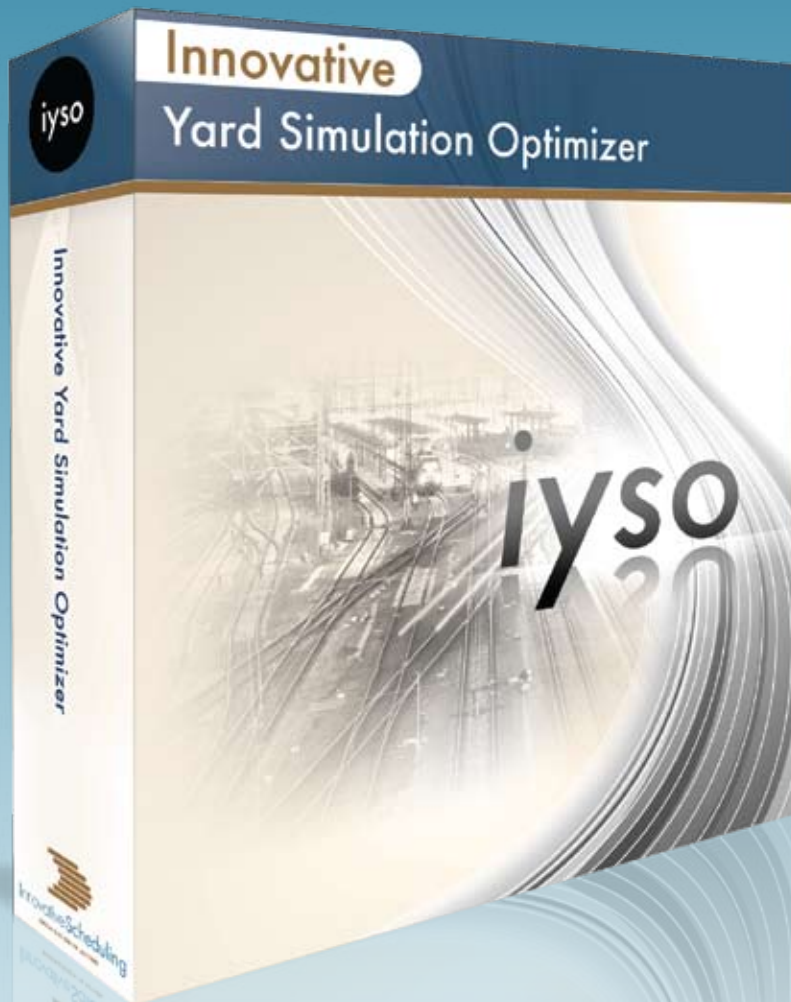


IMPROVE FLAT YARD LAYOUT AND CAPACITY



Innovative Yard Simulation Optimizer (IYSO) is a decision support system that can simulate flat yard operations (intermodal or otherwise) for any given yard layout, train plan, blocking plan, and train and blocking volumes.

- ➔ Evaluate blocking and car-handling capacities of a yard
- ➔ Assess the impact of schedule changes for trains on car dwell time
- ➔ Evaluate the impact of modifying the yard layout (adding and removing tracks) on classification operations
- ➔ Determine a yard's operational efficiency as a function of yard resources (i.e., crews, locomotives, and cranes)



Innovative Scheduling

OPTIMIZATION IN ACTION

INNOVATIVE YARD SIMULATION OPTIMIZER



Innovative Yard Simulation Optimizer is a discrete event simulation tool that performs detailed simulation of classification operations of railcars on a given yard layout, with given resources. IYSO also simulates the loading and unloading procedures of intermodal freight. It applies intelligent routing algorithms, heuristics, priority and rule-based methods to manage flat yard operations. IYSO records all the simulation events in a database and displays these events through state-of-the-art real-time animation of railcars, blocks, engines, and trains. Dynamic charts display the most relevant information during yard animation. IYSO also creates reports for track occupancy, track utilization, locomotive utilization, and crew utilization. This system is designed and built through a development partnership with CSX Transportation.

MAJOR CONTRIBUTIONS. IYSO captures critical yard processes without burdening the user with a myriad of details. It is an easy-to-use flat yard simulation model designed for use by railroad planners and decision makers. It can simulate one month of yard operations within two minutes; thus, the user can do multiple studies in a short time frame.

IYSO enables the user to scan an image of the yard layout into the system, edit the yard layout in a graphic user interface, and simulate yard operations on the input yard layout. The user can also display the animation of railcars, blocks, trains, and locomotives in the yard and create several output reports. IYSO is governed by decision rules that do not depend upon specific yard configuration. As yard configuration changes, routing of railcars and trains dynamically adjusts to the changes in the yard layout.

CASE STUDIES. The Innovative Scheduling team has performed several case studies of IYSO for CSX Transportation. We validated IYSO using data from an existing intermodal yard and showed that statistics produced by IYSO are very similar to those observed in the field. We also used IYSO to assist in the design of a new intermodal yard. We identified opportunities for improvement in the yard layout and quantified the benefits of these improvements at more than 15 percent in car handling capacity.

INNOVATIVE YARD SIMULATION OPTIMIZER:

- Java-based platform-independent system
- Enables user to easily specify scenarios through friendly interfaces
- Runs simulation within a few minutes to view movement of cars
- Provides detailed reports for extensive analysis of outcomes



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