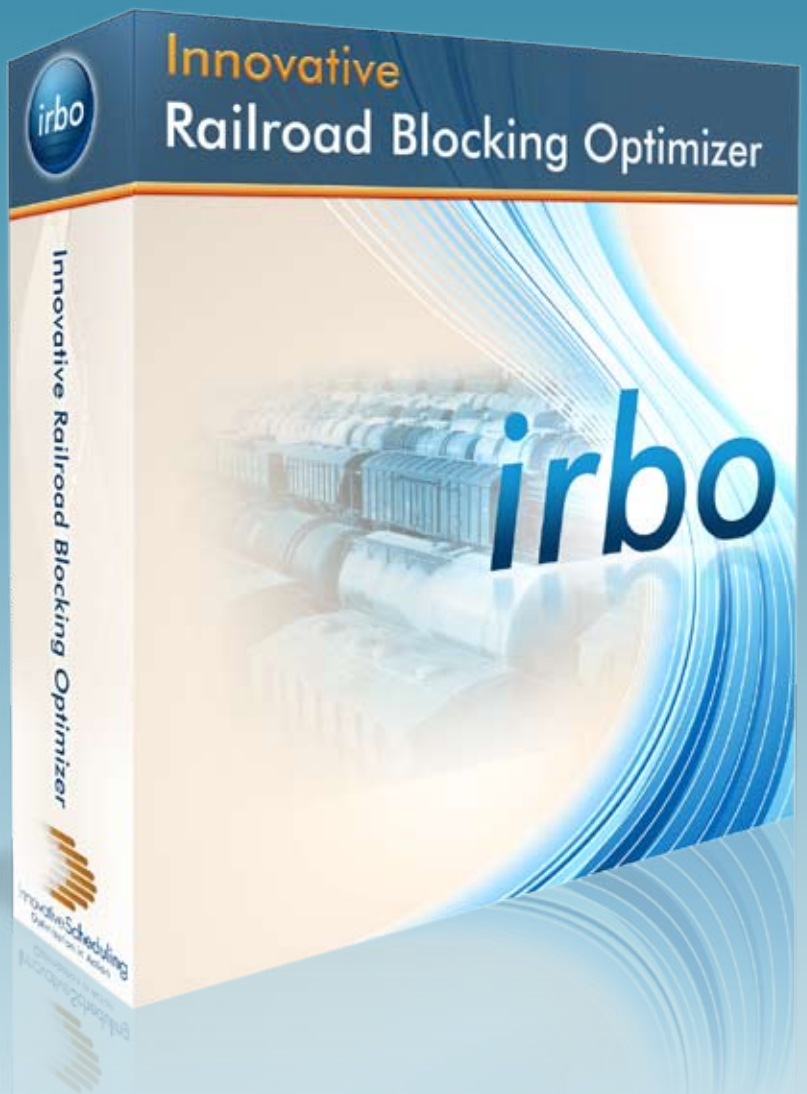
irbo **INNOVATIVE RAILROAD BLOCKING OPTIMIZER**

MINIMIZE COSTS FOR RAILCAR MILEAGE & HANDLINGS



Innovative Railroad Blocking Optimizer (IRBO) is an interactive, web-based decision support system to design blocking plans for freight railroads.

- Aid service-design planners in developing/modifying a railroad's blocking plan
- Develop a clean-sheet (zero-based) blocking plan
- Suggest minor, incremental changes to an existing blocking plan
- Study the benefits of closing a yard and/or expanding the capacity of a yard
- Evaluate the impact of traffic growth and/or shifting traffic patterns on the operating plan

InnovativeScheduling
OPTIMIZATION IN ACTION

INNOVATIVE RAILROAD BLOCKING OPTIMIZER

INNOVATIVE RAILROAD BLOCKING OPTIMIZER DETERMINES THE FOLLOWING:

- Origins and destinations of all blocks
- Routing shipments over the blocks made
- Routing blocks made on trains

The blocking plan, an important part of a railroad's operating plan design, determines routing of shipments over the network. It specifies how a large number of shipments between numerous origin-destination pairs are consolidated into a small number of blocks to reduce the handling of cars as they travel from origins to destinations.

Blocking plans generated by IRBO honor the capacities of nodes, including the maximum number of classifications that can be made at each node and the maximum number of cars that can be switched at each node. In addition, the model's proposed blocks can be restricted by a given train schedule. The objective function for the blocking problem minimizes the weighted sum of costs due to railcar miles and railcar handlings. Research for this product was partially funded by the National Science Foundation's SBIR Program, and received the prestigious 2006 INFORMS's Daniel H. Wagner Prize given for Excellence in Operations Research Practice.

MAJOR CONTRIBUTIONS. Railroad blocking is a large-scale multi-commodity network design and routing problem containing millions of design variables and billions of flow variables. At Innovative Scheduling, we have developed a novel very large-scale neighborhood (VLSN) search algorithm to solve the railroad blocking problem to near-optimality within one to two hours. In addition to being very efficient, it is also a very robust approach and can easily incorporate a variety of practical constraints. The VLSN search technique can be easily adapted for postal and package delivery, shipping, trucking, and airlines.

CASE STUDIES. IRBO has been tested on data provided by several railroads. When run in the clean-sheet mode, it consistently demonstrated improvements of 5–10 percent in railcar handlings and 1-2 percent in railcar miles. When run in the incremental mode, it showed that even small changes in the blocking plan can significantly reduce transportation costs. IRBO has been used by CSX Transportation, Norfolk Southern, and BNSF Railway to generate their operating plans. IRBO has also been licensed by Norfolk Southern Corporation and BNSF Railway, where it is routinely used to improve current blocking plans and to perform strategic and planning studies.

Contact us to learn more about this or other Innovative Scheduling products:

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