

Top 5 steel manufacturer Optimizing steel production to better meet customer demand

Overview

A leading producer of crude steel was producing 27.5 million tons in 1997. In 1996, the company's sales revenues reached 9.6 trillion won (U.S. \$11.4 billion) and net profits after taxes reached 591 billion won (U.S. \$698 million). Its crude steel production reached 24.3 million tons in 1996, 886 thousand tons more than the previous year. Sales volume in 1996 also jumped by 701 thousand tons to 23.6 million tons.

■ **Business need:**

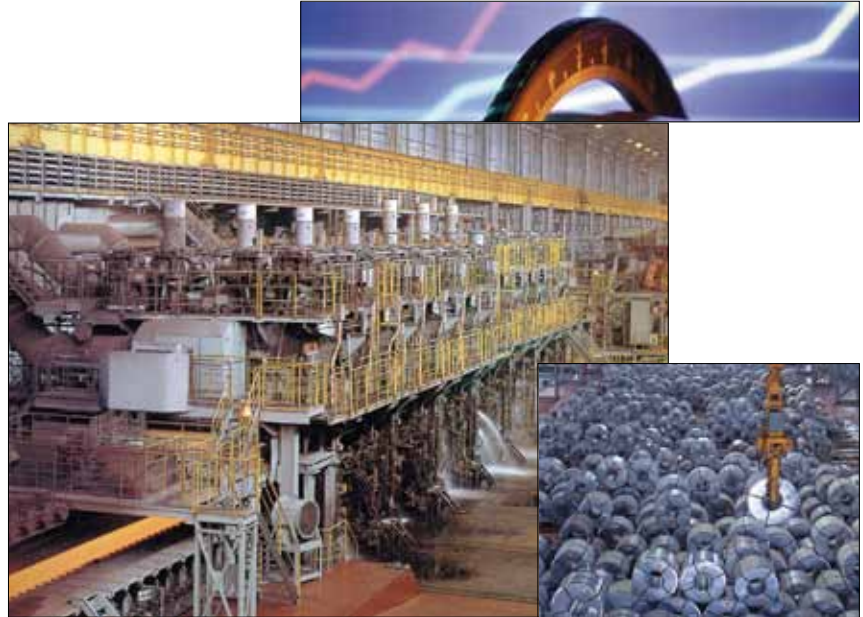
The company has long striven to be the leader in steel making. To reach this goal, the company has worked hard to eliminate bottlenecks in production, because like most steel makers, the steel producer has to operate its facilities at full capacity to make a profit. This production rate reduces setup costs and increases throughput, but it also leads to large inventories and delays in filling customer orders.

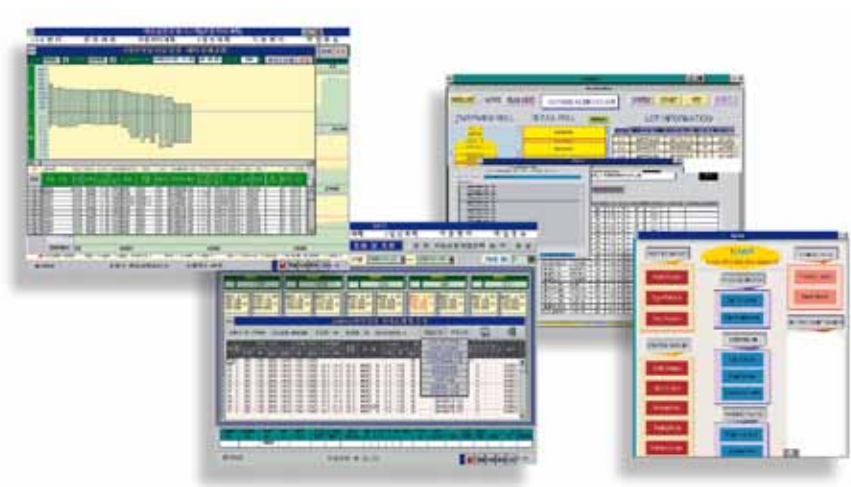
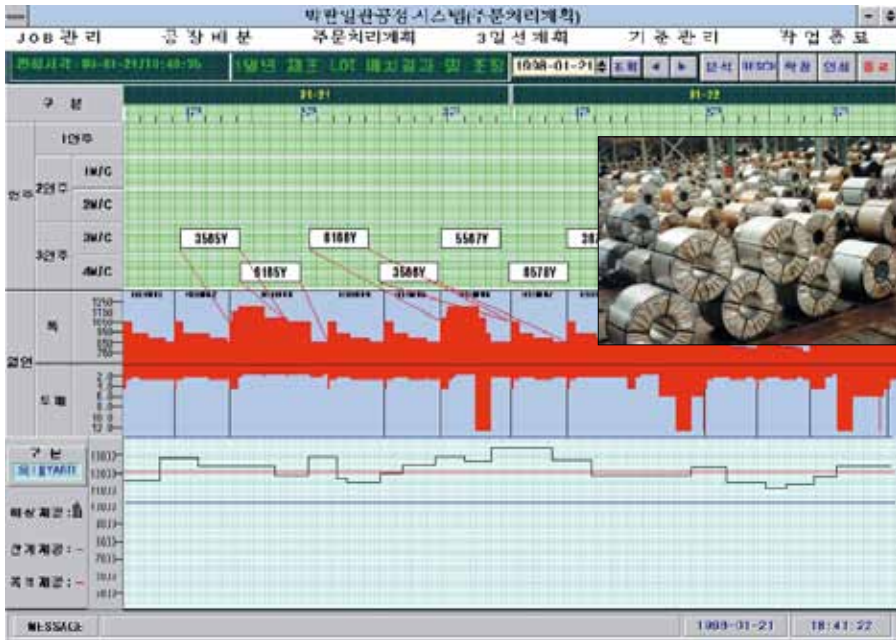
■ **Solution:**

Finding ways to maintain full production while meeting customer demand is a constant challenge for the company and its search for solutions led to a system based on the IBM® ILOG Optimization Suite.

■ **Benefits:**

The Suite enables the steel maker to exactly match production to demand in meeting customer orders while cutting its plant's hot coil rolling ratio by 10 percent.





The IBM ILOG Views graphical user interface of the system

The steel maker created the application in two years—a 70 percent reduction in development time—at a cost of U.S. \$590,000. The main program is run on a UNIX® workstation that is accessible through several terminals and a PC with Windows® 3.1. The C++ libraries of the ILOG Optimization Suite make the scheduler portable throughout the two leading computer platforms. The Suite's object-oriented programming environment facilitated development and the suite's modular structure aided not only creation but enhancement, helping the company to readily change the system to meet new constraints and production methods. The steel producer plans to develop a similar system for its thick plate mills once the new system has been fully introduced in its thin plate operations.

Challenge

In the company's steel plant, there are four types of thin plate rolling: hot, cold, annealing and galvanizing. Each is closely coordinated with the others and because each has unique technical limitations, the steel producer keeps a separate inventory for each mill. This ensures stable production but also results in high inventories, causing low delivery performance and loss in production opportunity. To solve

Products and services used

Software

- IBM® ILOG Optimization Suite
 - IBM® ILOG Solver
 - IBM® ILOG Scheduler
 - IBM® ILOG Views
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“The IBM ILOG based application is directly responsible for a considerable reduction in our stock.”

-- Crude steel producer

this problem, the company needed a highly efficient system for scheduling its mills. The new system needed to schedule every process to satisfy all the variables and fully control the inventories. High inventory levels meant longer processing times and loss of opportunity, while low inventory levels meant insufficient production. A balancing act was needed and IBM ILOG Solver and IBM ILOG Scheduler were chosen to do the performance. The resulting IBM-based mill balancing system gathers information on capacity and repair work throughout a production run and makes schedules meeting the desired inventory levels.

Solution

For development purposes, the company concentrated on the thin plate rolling mills at one plant, where the constraints included the number of steel coils fed into a mill and the thickness of the sheet metal produced. The results of the system have been extremely impressive. Based on test runs with the

system, the steel producer expected to achieve a 30 to 40 percent reduction in stock. Using Solver's constraint-based planning and scheduling engine and Views for a highly responsive real-time user interface, the system optimizes steel production by controlling the plant's inventories and maximizing the total throughput. In other words, it increases the time the steel is rolled without having to be reheated, reducing costs by saving time and energy and targets customer orders, scheduling them by deadline and volume into the most productive mix.

Benefits

- Maintain full production while meeting customer demands
- Meet new constraints and production methods
- Schedule every process to satisfy all variables and fully control inventories



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IBM Corporation
Software Group
Route 100
Somers, New York 10589
U.S.A.

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