

Dolan Steel of Bridgeport, Connecticut distributes strip and sheet steel in the Northeastern part of the United States. Coils of steel of various widths, tempers and gages are cut from larger coils which Dolan purchases from the major steel producers.

One of the major problems Dolan has to contend with is the prevention of waste created as a result of cutting the coils into individual orders. This trim loss has, with the aid of the IBM 1440 computer, been reduced to less than one percent.



PROCESSING OF COILED STEEL LAYOUT REQUIREMENTS IS BEGUN ON AN IBM 1440 COMPUTER. THIS PROCEDURE HAS ENABLED DOLAN STEEL TO REDUCE STRIP WASTE TO LESS THAN ONE PERCENT.

The largest program on the computer deals with optimization of layouts for orders. That is, it determines just how the large steel coils are to be cut into the individual orders. Naturally, for the orders to be processed, the raw material must exist in Dolan's inventory. Maintaining control over some 30 million pounds of coiled steel is another task performed by the computer.

A master layout computer program selects the best solution from the many layout possibilities. By analyzing customer orders as they are received, the system produces coil cutting instructions. Approximately 1,200 coil orders - averaging 10,000 pounds an order - are processed each month.

THE SYSTEM

All orders received during a given day are keypunched and stored on magnetic discs. At the end of the day, all orders representing a specific gage and temper and which involve critical delivery are compared by the computer until an acceptable cutting pattern is developed.

Orders which do not involve critical delivery - within 48 to 72 hours - are held for processing with the next day's batch of orders. The result is a continuous order analysis cycle culminating in a shop order. Order information which is stored on the disc files contains all the information needed to prepare invoices, work orders, an acknowledgement of the order, etc.

Information stored on the discs include the Dolan reference number, the customer number, the weight of the order, the minimum and maximum widths, the percentage of overage allowed, the amount scheduled to date, the amount cut to date, the minimum and maximum gage specified on the order, the minimum and maximum hardness, the finish desired, and other data relating to price, delivery routes, etc.



BY ANALYZING AND COMPARING CUSTOMER ORDERS MAINTAINED ON MAGNETIC DISCS, DOLAN STEEL IS ABLE TO PRODUCE COILED STEEL CUTTING PATTERNS. INVENTORY FILES ENABLE THE COMPANY TO ACHIEVE BALANCED INVENTORIES AND RAPID CUSTOMER SERVICE.

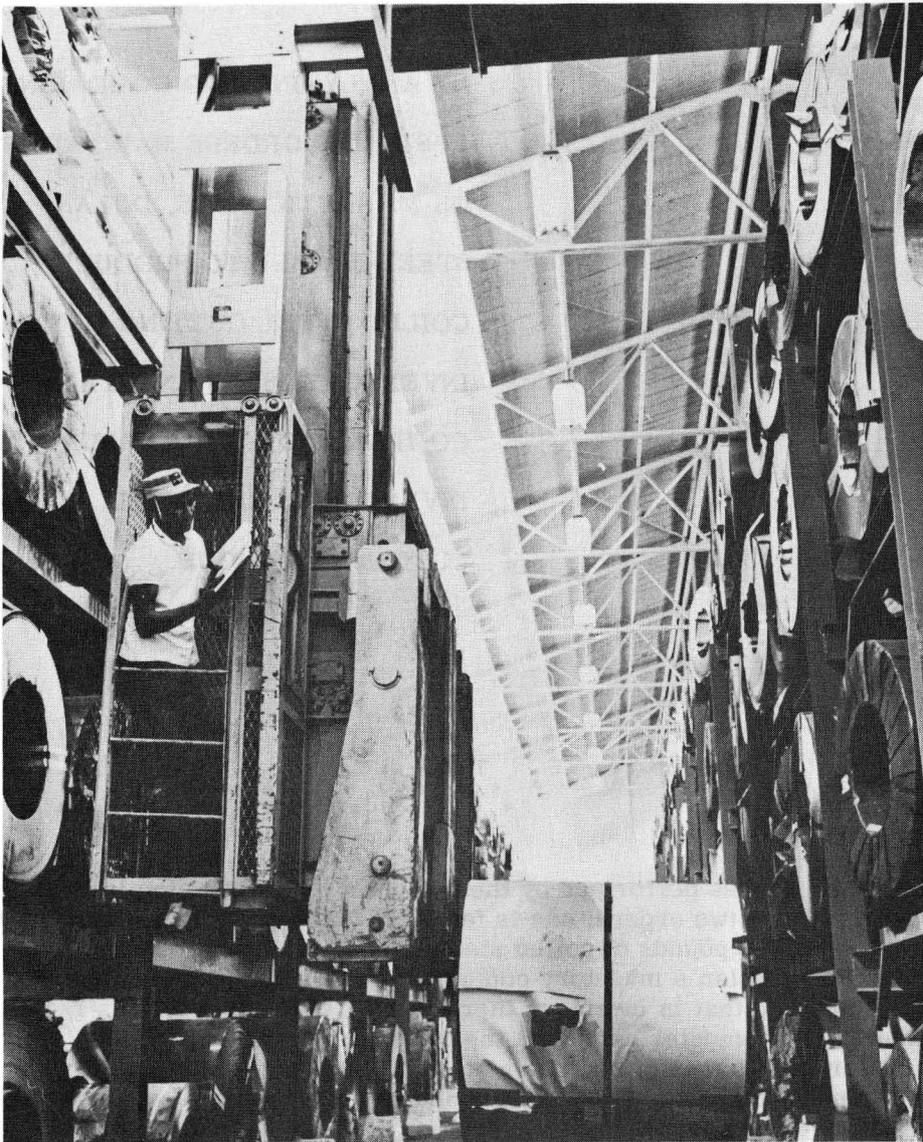
In order to illustrate the layout process performed by the computer, a rather simple example is given here. Let us assume that there are two orders; one is for 10,000 pounds of coiled steel slit two inches wide; the other order is for 5,000 pounds of coiled steel slit one inch wide. The system will search its files to determine whether Dolan's inventory contains a coil of the proper specifications to meet these particular orders. It is found that in inventory there is a 17,000 pound coil 40-1/4 inches wide which meets the specifications. The computer performs the division, $17,000 \div 40-1/4 = 422$. The figure arrived at, 422, stands for the number of pounds in one inch wide strip from the 17,000 pound coil. Therefore, between 23 and 24 inches are needed to make up 10,000 pounds and between 11 and 12 inches are needed to make up 5,000 pounds.

In order to produce the two orders, 12 two-inch strips from the coil will make up the 10,000 pound order and 12 one-inch strips will make up the 5,000 pound order. Of the total 40-1/4 inches in the original coil, some 36 inches are used for the two orders. However, the total coil has not been used; instead each customer is given more than he requested up to the allowable tolerances.

With only two orders, the calculations are relatively simple and straightforward and well within the range of manual layout. With ten or more orders, finding the best solution is considerably more complicated. If these calculations were performed manually, although it would indeed be a time consuming task, the quality and consistency of the solutions would be questionable. With the use of the 1440 computer these calculations reduce the amount of trim to less than one percent.

Working with the information obtained from the orders that come in during the day, the computer performs these calculations after hours and has a set of work orders ready by the following morning.

Theoretically, the more orders the computer has to work with, the better chance there is of arriving at a near perfect solution; that is, orders matched to inventory.



A REPORT PRODUCED
BY THE SYSTEM AS
PART OF THE COILED
STEEL CUTTING
PROCEDURE INDICATES
CUSTOMER REQUIRE-
MENTS, WHICH COIL
TO USE, THE LOCATION
OF THE COIL AND HOW
IT IS TO BE CUT.

If orders cannot be cut, - that is, a workable solution cannot be arrived at - they are put back into the system. They are then combined with new orders when calculations are again performed to produce new work orders.

Each of the work orders specifies which inventory items are to be used, the machine that the order is to be cut on, the specifications of the coil-gage, width, finish, etc. - the number of strips to be cut, the customer's name, Dolan's reference number, the expected yield and the customer's cutting restrictions.

The system also produces a number of reports. One of these reports matches the present inventory with existing orders. Another lists those orders which are designated as problem orders; orders for which the machine cannot find a workable solution. With this report, problem orders are brought to the attention of management and remedial action can be taken.

Other reports include the shop order report, a file status report, and salesman reports. This last report breaks up the orders by accounts thereby giving the salesman an indication of sales trends.



A WIDE VARIETY OF
DISTRIBUTION CONTROL
REPORTS ARE PRODUCED
ON THE IBM 1440 COMPUTER.
THE REPORTS ASSIST
MANAGEMENT IN IN-
VENTORY PURCHASING
AND IN SERVICING
CUSTOMERS BY SALESMEN.

In addition to the layout program, the system also handles accounting functions such as payroll preparation, general ledger and profitability analyses by salesman, customer and product.

RESULTS AND FUTURE PLANS

Perhaps the most significant result the computer system at Dolan Steel has produced is the prevention of losses resulting from the cutting operation. In addition, there has been a half-day reduction in order processing time, and inventories have been consistently balanced.

Other benefits resulting from the automatic preparation of cutting patterns are exact control of tolerances and the ability to enter, lay out, cut and deliver all orders within two to three days of receipt. The exact control of tolerances, both in gage and width, has resulted in a one-third reduction in customer-rejected deliveries. Expressed in dollars, this improvement means savings of several thousands of dollars each year. When new slitting equipment is installed, Dolan Steel anticipates that the order receipt-delivery cycle will be cut to 48 hours. This will enable the company to further reduce the cost of inventory, by speeding up the cycle time to increase the rate of turnover.

Dolan Steel also plans to generate inventory forecasts. That is, they will analyze historical sales information and then generate purchase orders for stock replenishment based on the projected demand pattern. To some extent, this is already being done by automatically evaluating current sales information maintained in the computer's files in terms of existing inventory.

This evaluation is printed by the computer on a daily report to management indicating those items, sheet metal as well as coil, which are over or below previously established minimum inventory levels.

Dolan is also considering using an IBM 357 data collection system with which information can be entered into the computer system directly from the production floor. In addition, if projected computer applications will use more time than is presently available on the 1440, an IBM System/360 Model 30 may replace the present system.