Applications	Order Entry and Order Inquiry system
Type of Industry	Steel Service Center
Name of User	Ryerson Steel Inc. Chicago, Ill.

Equipment Used	IBM System/360 Model 50 60 IBM 2260 CRT terminals

Synopsis

Ryerson Steel Corp.'s data processing center is in the Chicago corporate headquarters. There, standard data processing functions for other Ryerson service centers are maintained along with an extensive on-line real time order entry and order inquiry system. Salesmen present orders on "scratch sheets" to operators who key in the order on IBM 2260 cathode ray tube terminals after a preliminary typed dialogue with the system to verify information and answer questions. Also, salesmen, credit personnel and management staff may use the terminals for inquiry purposes: to determine where an order is at the present time, to check or verify credit standings; to order special material or expedite an order or make emergency substitutions. Other activities of the data processing center include regular inventory control functions, accounts receivable and accounts payable. Other "housekeeping" functions such as employe payroll are accomplished separately.

BACKGROUND TO EDP

Ryerson Steel is a steel service center, filling orders for specially cut and particular strengths of steel. The fabrication operation at the Chicago plant is duplicated in 22 other service centers in the U.S. Other Ryerson installations and operations are in Amsterdam, Netherlands; Tel Aviv, Israel (Solpek Steel Corp., Ltd.). The company deals not only in steel, but aluminum, industrial plastics and newer metals as titanium, molybdenum and zirconium.

Ryerson has a long history of data processing. Computers were first used in the late 1950's, and in the early 1960's, Ryerson, with Arthur D. Little and IBM devised an automatic stock replenishment signal system several years before the same type of system was marketed by IBM as IMPACT. Presently, there are four computer systems operating at Ryerson's data processing center. An IBM System/360 Model 50 (with a Model 40 for back-up and program testing) is used by the order entry and inquiry system. A 7070 does the regular data processing, mostly basic accounting work, for Chicago Ryerson and the other service centers which transmit their data via Teletype for processing.

THE EQUIPMENT

The IBM/System 360 Model 50, most used for order inquiry and entry, has 512 thousand characters of information available in main storage. The system is set up to eventually accommodate 2,000 orders a day; at present, orders total approximately 1,500. Five 2848 display controllers handle the 60 CRT terminals. The system is used by the Ryerson sales force: 40 salesmen in the Chicago office and 60 in the field. Additional Model 50 equipment includes a 2314 direct access storage unit, two 1443 250 line-per-minute printers. There are 27 programers and systems analysts busy at Ryerson. Three write applications for other members of Ryerson's group, the Inland Steel family. Five concentrate on the 1401-7070 systems -- maintenance and writing new applications, 12 others program the System/360 in both Cobol and Assembler Language and 7 modify the operating systems and write system interface programs. Ryerson's data processing management feels that the system is presently large enough to last for quite some time due to a fairly complex overlay system. This method involves maintaining successive routines or programs in the same internal storage area.

THE SYSTEM

In the Ryerson-Chicago service center, sales and executive offices are surrounded by four large warehouses, containing some 12,000 stock items. The sales orders arrive by telephone, through the mail and via Teletype lines. The system is put into action when, for instance, a customer calls the Ryerson sales desk to order material. Salesmen jot the orders on "scratch sheets," then hand these sheets to an adjacent order entry typist. Flashed on the Typist's CRT screen are a series of questions:

Account number (the customer's)
Ship to number
Customer order number (the customer's purchase order)
Date of order
Phone or mail
Tax code (the customer's tax type)
Inside salesman (who wrote the scratch sheet)
Phone extension (salesman's)
Job control number (A Ryerson-generated number for the work order)

The questions are projected in a series and can cover up to 99 items on a single order. Sets of questions are flashed until the operator enters an "L" for last. Each keyed-in answer appears on the screen opposite the question, then the computer summarizes each series of answers and "plays back" the information for visual review. There is one edit check for each item on order and the operator verifies that an entry is correct by keying-in OK or NG. After an NG, the system redisplays the particular item in question and enters changes. Also, an editing program checks the answers against the data base and flashes questions made to indicate unacceptable answers.

When all the questions on an order have been answered, the system goes to work. The appropriate unit weights are retrieved from master inventory records and the weight of each item is calculated for a total weight ordered figure. The value of each item is estimated to obtain a total order value.

This order value is then checked against established credit information. The system either approves the order for processing or, if there is a credit problem, holds it up and automatically prints out pertinent data in the Credit Department on a 2740.

If the credit information clears, the system program then deducts stock requirements of the order from Ryerson inventories, or if the inventory is insufficient, the Sales Department is alerted through automatic printout on a typewriter terminal. Since the company's prime consideration is customer service, the Inventory Department is immediately notified of an insufficiency. They can do one of three things: substitute a higher grade of steel stock to fill the order, purchase the necessary steel from a competitor, or order the necessary supply from another Ryerson service center.

When all order entry processing has been completed, the system prints out an order set (see illustration on page 4) which has seven parts. This consists of a shipping ticket, two plant copies, one file copy, one delivery receipt, one customer copy and one drayage copy which also goes to the warehouse. This form is printed out in the Service Department which is located adjacent to the plant.

Three plant copies are then placed into pneumatic tubes which lead to the four surrounding plants and then to the order filling personnel.

The several warehouse forms are used as work and/or picking tickets. The computer program has arranged the items, entered randomly, on the basis of stock location, commodity classification and cutting requirements to facilitate handling.

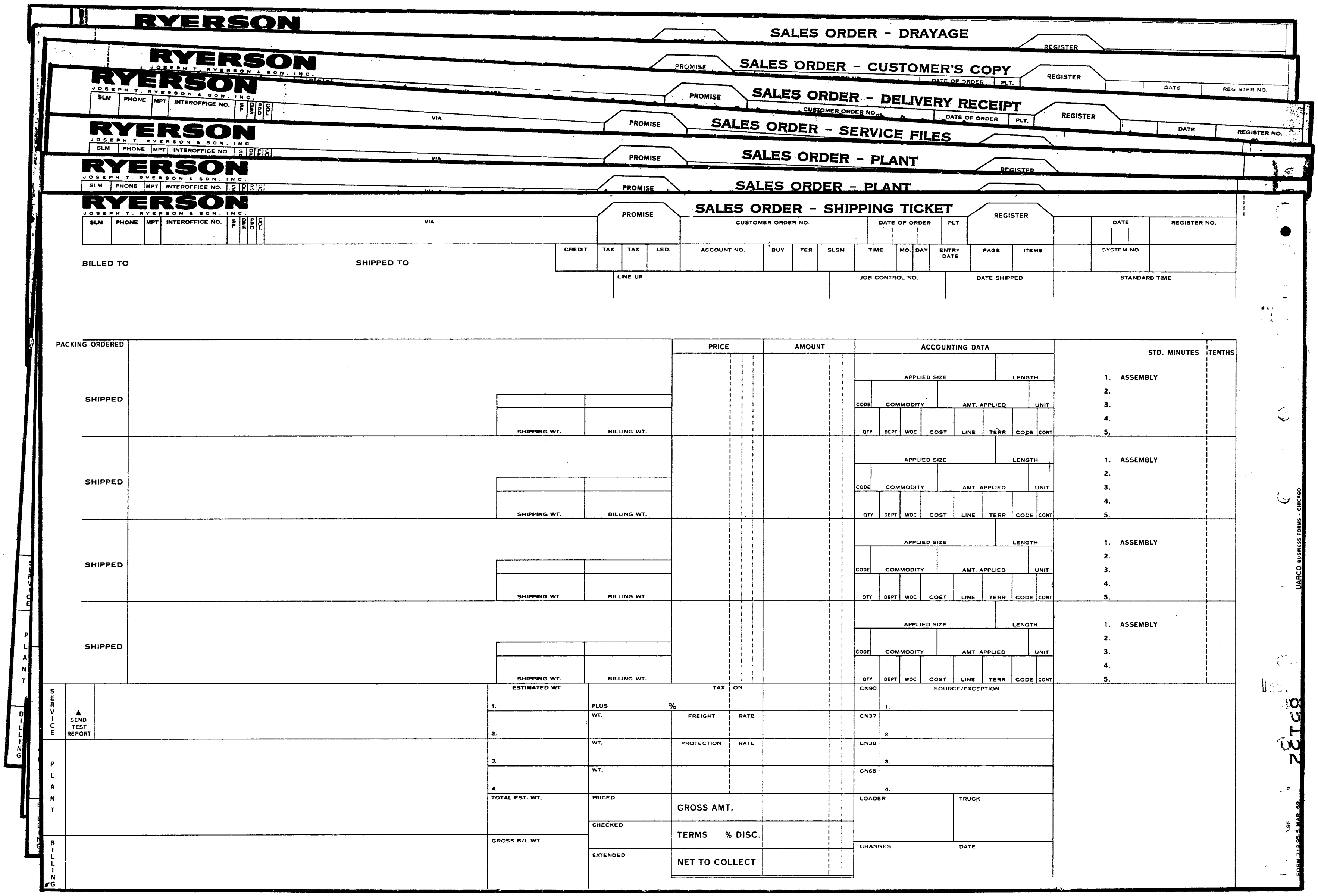
With duplicate forms, several men can be assigned to one order. One plant copy is returned to a data collection center located in the Chicago office building. There, if the shipment is different from the order, inventory is adjusted through a CRT unit. The shipping copy goes to the Billing Department for monetary information. The information from the shipping ticket is key punched, batched, and fed into the 360 computer. A magnetic tape containing all shipped orders is produced and fed into the 7070 computer which produces an invoice. The printout of the plant orders occurs in a real time environment. "We do this because of our short lead times", explains William Oelman, Manager, Systems Development. "We want to get the merchandise out of the warehouse quickly."

One third, approximately, of the Ryerson steel orders come via the Teletype system from outlying Ryerson plants. These are entered into the system via the message switching network and encounter the same program as an order entered through the CRT terminals. However, the Teletype orders go straight to the information maintained on disc, and are not visible until they are printed out, in the Service Department, as seven-part forms with all the other orders. A code on the order indicates that it arrived via Teletype; otherwise, it is treated no differently than the other orders.

RY/4

(S45) INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

RYERSON STEEL INC.



RYERSON — SALES ORDER - DRAYAGE

RYERSON — SALES ORDER - CUSTOMER'S COPY

RYERSON — SALES ORDER - DELIVERY RECEIPT

RYERSON — SALES ORDER - SERVICE FILES

RYERSON — SALES ORDER - PLANT

RYERSON — SALES ORDER - PLANT

RYERSON
JOSEPH T. RYERSON & SON, INC.

PROMISE

SALES ORDER - SHIPPING TICKET

REGISTER

SLM | PHONE | MPT | INTEROFFICE NO. | VIA | CUSTOMER ORDER NO. | DATE OF ORDER | PLT | DATE | REGISTER NO.

CREDIT | TAX | TAX | LED. | ACCOUNT NO. | BUY | TER | SLSM | TIME | MO. | DAY | ENTRY DATE | PAGE | ITEMS | SYSTEM NO.

BILLED TO

SHIPPED TO

LINE UP | JOB CONTROL NO. | DATE SHIPPED | STANDARD TIME

PACKING ORDERED | PRICE | AMOUNT | ACCOUNTING DATA | STD. MINUTES | TENTHS

SHIPPED — SHIPPING WT. | BILLING WT. — APPLIED SIZE | LENGTH — CODE | COMMODITY | AMT. APPLIED | UNIT — QTY | DEPT | WOC | COST | LINE | TERR | CODE | CONT — 1. ASSEMBLY 2. 3. 4. 5.

SHIPPED — SHIPPING WT. | BILLING WT. — APPLIED SIZE | LENGTH — CODE | COMMODITY | AMT. APPLIED | UNIT — QTY | DEPT | WOC | COST | LINE | TERR | CODE | CONT — 1. ASSEMBLY 2. 3. 4. 5.

SHIPPED — SHIPPING WT. | BILLING WT. — APPLIED SIZE | LENGTH — CODE | COMMODITY | AMT. APPLIED | UNIT — QTY | DEPT | WOC | COST | LINE | TERR | CODE | CONT — 1. ASSEMBLY 2. 3. 4. 5.

SHIPPED — SHIPPING WT. | BILLING WT. — APPLIED SIZE | LENGTH — CODE | COMMODITY | AMT. APPLIED | UNIT — QTY | DEPT | WOC | COST | LINE | TERR | CODE | CONT — 1. ASSEMBLY 2. 3. 4. 5.

SERVICE — SEND TEST REPORT

PLANT

BILLING

ESTIMATED WT. 1. 2. 3. 4. TOTAL EST. WT. GROSS B/L WT.

TAX ON — PLUS % — WT. — FREIGHT RATE — WT. — PROTECTION RATE — WT.

PRICED — CHECKED — EXTENDED

GROSS AMT.

TERMS % DISC.

NET TO COLLECT

CN90 SOURCE/EXCEPTION 1. — CN37 2 — CN38 3. — CN65 4.

LOADER — TRUCK

CHANGES — DATE

VARCO BUSINESS FORMS - CHICAGO

FORM 712-95-5 MAR 69

89132

The information associated with filling orders is accumulated for periodic management action reports, including the annual inventory. "This," says Ryerson vice president-treasurer Kenneth Baker, "could be considered part of our management by exception theory. Using the system, we are able to ask specifically what's been bought, what certain stock situations are, and what certain final figures are. And instead of wading through reams of paper, we can interrogate the system for specific pieces of information."

Order Tracing

The key to the order tracing capability provided by Ryerson's system is the customer order number. Keying-in the customer order number for tracing purposes, brings to the CRT screen the customer name, the ship-to address, the item number, the date, the order status, and the order weight. Given the information fed into the system from the various states of the order's operations, the status message flashed back on the CRT might read, "Held in credit".

Stock Inquiry

To use the stock inquiry system, a salesman must use the stock number of the item from a catalog at his desk. The number is entered on the terminal keyboard followed by the character "D" for detailed. The salesman then presses the "enter" key. The information is extracted from the data sets and flashed back on the CRT:

Description	Discrepancy
Size Length	Quantity on order
Pieces per ton	In transit
Avail. for sale	Resv. inbound
In process	Cust. reserve
Damaged mdse.	Resv. on hand

Next to the description would appear the name of the product and its stock number along with the catalog number describing it. The "available for sale" figure represents the most current inventory as calculated by the system and stored on the inventory data set. "In process" refers to the orders released to the warehouse and "Discrepancy" identifies the number of items returned as faulty. These are added to goods on hand but are not for sale.

When Ryerson finishes programming the system, it is estimated that the responses to the order inquiry will reflect orders entered two seconds before. A salesman may trace the current status of an order in process or get an estimated weight of any item.

Inventory Control and Ordering

All information management material runs on the 7070 which carries the bulk of inventory control and ordering. The activity of every product in Ryerson's inventory is examined every month. A 360 program is run against the master inventory data set to pick up item information (such as quantity on hand, last month's sales, amount on order). The tape produced by this step is then run through the 7070 and new vendor orders and management information reports are produced. The new order tape is then run back into the 360 to update the system. This monthly product examination is staggered so that the processing department is not overcome with the quantity of work. The quantities of material called out for ordering are, however, checked by the central management staff.

The program that flags items to reorder is the previously noted automatic stock replenishment system, NOSROP.

Receiving Raw Material

In order to maintain accurate records of material received at the warehouse, each shipping manifest, arriving with materials, is sent via pneumatic tube to the data collection area. There, items are entered into the system via a 2260 CRT, updating the inventory files. The operation enters the actual shipment by the purchase order numbers which the computer maintains in a purchase order file. The order which comes in is matched for legitimacy and the quantity is checked for over-shipment.

Message Switching

The system also switches administrative messages for the Inland Steel family. This is the function of software routines which receives, queues and retransmits messages. For instance, a message from Los Angeles may arrive at Chicago's computer center but will be destined for New York. The routines hold the message, waits until the appropriate line is open, and sends the message on its way. Various types of administrative messages, including memos and long item lists, are switched this way. QUAM (Queued Telecommunications Access Method) controls Ryerson's message traffic (via 74 terminals) in the Inland Steel group. Twenty-one telephone lines terminate in 2702 transmission control units. The message control system resides in the A Model 50.

Future Plans

The entire order entry and order inquiry system is to be expanded to Detroit. "The Detroit system would be like another room attached to Chicago", says Controller Baker. "It will be a smaller version of the Chicago system, with of course, different data sets listing Detroit inventory."

With the extension, Detroit will have access to Chicago's inventory as well as its own. Detroit will also be able to enter orders. For instance, if Chicago had an order to fill in St. Joseph, Michigan, the order could be shipped more conveniently from Detroit. Detroit will be able to access Chicago inventory and fill an order from the Chicago warehouse, especially useful if the former is short of material. At present, such inquiries come in via Teletype and go directly to the central processor as described.

The object of the expansion is lower costs and faster order processing times. Ryerson, with an eye toward the future, plans to tie other service centers into the corporate data processing center as such a course becomes economically feasible.