INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Vendor Ordering and Production Control
Type of Industry	Oil Well Equipment Manufacturer
Name of User	Reed Roller Bit Co. Oil Tool Div. Houston, Texas

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Equipment Used

IBM 1460 Data Processing System
IBM 1441 Central Processing Unit
IBM 1311 Disc Storage Drives
IBM 729V Magnetic Tape Units
IBM 1461 Input/Output Control
IBM 1402 Card Read Punch
IBM 1403 Printer
IBM 1001 Data Transmission Terminal
Bell System Data Phone Equipment
IBM Data Collection System

Synopsis

The first half of a comprehensive integrated information system, utilizing data communications concepts, has been completed at the Oil Tool Division of Reed Roller Bit Co. Part of a four-year project, which is expected to culminate in one of the nation's first "total" computer control operations, the system currently provides minute-to-minute manufacturing supervision, direct vendor purchasing and immediate decision-making information for all levels of management. Other benefits may include a 95 percent reduction in division-wide paperwork and a $2 million cut in the cost of inventory.

Through an IBM 1001 "automatic" ordering network, the company now purchases better than 6,000 items directly from Houston Industrial Distributors. By early 1966 about 12,000 items will be ordered through the system, or about two-thirds of all company tool and material requisition order requirements. This will total about 800 orders a month.

Manufacturing supervision is obtained through an in-plant data transmission network of 18 IBM 1030 data collection units. Polled continuously by an IBM 1460 computer, these terminals provide up-to-the-minute data on some 24,000 manufacturing operations. From this information, the 1460 automatically updates inventory records and prepares new manufacturing instructions.

"In today's business world the only way you can beat competition is through better and faster methods of information processing. You've got to reduce paperwork and improve production control to the extent that the cycle time between order receipt and product delivery is but a matter of hours."

This is the reasoning Controller William F. Cannon gives for Reed Roller Bit Co.'s development of a "total" computer control system. Two years away from completion, the already established IBM 1001 and 1030 data communications procedures used, respectively, for vendor purchasing and manufacturing control have directly influenced a steady rise in company profits. In addition, an IBM 1460 computer has reduced division-wide paperwork, lowered the cost of inventory, and strengthened management's decision making abilities through more complete data documentation.

Upcoming improvement to the system will include the installation of an IBM System/360 Model 30 and a computer-to-computer hook-up with one distributor's IBM 1440. The 1001 data transmission unit now used will be replaced by an IBM 1050, thus enabling a faster and more extensive flow of information between the company and its vendors.

Currently, the system is being used only in the Oil Tool Div. since it is responsible for the major portion of the company's $35 million annual sales. Eventually, however, all data processing procedures will be extended to include the company's three other divisions (Cleco Air Tool, Diamond Metal and Rolo).

The System

Due to the highly competitive nature of oil well equipment supply, Reed's Oil Tool Division must maintain complete supplies of drill bits, collars and other tools at all well sites. Since the customer selects his needs from what is available, stock outs represent lost business. This means the plant must be highly responsive to the needs of the field at all times. Well equipment that is sold must be replaced immediately. Production must be timely, and it also must be profitable.

To achieve these requirements, Reed management in 1963 instituted a four-year program of complete data processing modernization. To date, this has involved the development of two distinct data communications procedures — one for manufacturing control and the other for vendor purchasing — plus the updating of an IBM 1401 tape computer to a 1460/1311 system.

Manufacturing Control

For manufacturing control, Reed has established an in-plant transmission network of 18 IBM 1030 job reporting terminals. Used by some 800 plant workers, these units are on-line to the 1460, which polls them continuously.

This 1030 production reporting system provides a fast and efficient method of getting performance data from the shop floor to the computing center. Each time a factory employe is ready to start work on a new assignment, he reports the number of parts he has just produced into the closest 1030 data station. Entry of data is accomplished by placing his identification badge into a slot to identify himself, and by slipping a data cartridge — a plastic device on which he moves buttons to indicate the number of pieces completed — into another slot. The time at which this is done is automatically recorded by the computer system.

Each day, approximately 2,000 transmissions are made through this system. Following receipt of each message, the 1460 works through a program to determine which job should be handled next, using previously stored schedule information taken from the attached 1311 disc files. These instructions are then printed out on a reporting terminal back on the shop floor.

The next computer operation is to correct the work in process file, to enter the completed production data to the employes' records (simultaneously calculating piece wages), and to update the inventory

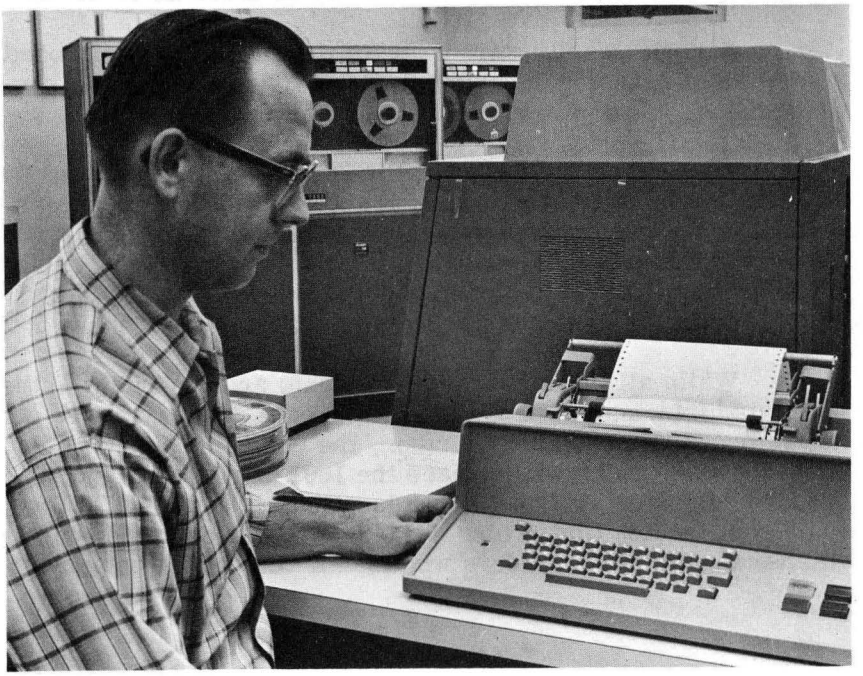
Because the computer system responds quickly to all production operations and because it maintains performance data on disc file, management is able to pinpoint situations that are detrimentally affecting production or could conceivably be a problem in the future. This insight is gained through computer preparation of daily performance reports, which advise of the previous day's activities. These reports are also used to check employe hours and efficiency.

Management also receives on a periodic basis reports which (1) indicate the status of every production order; (2) compare scheduled vs. actual performance time; (3) analyze work-in-process backlogs; and (4) survey departmental manpower and machine needs for the coming week. Performance data is also analyzed each month to provide a measurement of actual costs vs. budgeted costs. Dollar figures reported here are so itemized that a foreman or manager can see exactly where his problems are occurring if he is falling behind.

Vendor Purchasing

Initiation of the Reed vendor purchasing communications system began in early 1963 when it became one of the first companies to join the IBM 1001 ordering network sponsored by the Houston Industrial Distributors. This is a direct facility-to-facility phone line hook up between parts suppliers and equipment manufacturers which utilizes punched cards as the input and output medium.

Currently, some 12,000 parts are ordered by Reed from various suppliers through this system, or about two-thirds of the Oil Tool Division's total tool and material requisition order requirements. For each parts order, a pre-coded card, punched to indicate quantity, is simply inserted in the 1001, an attached Data-Phone dialed to secure a line to the designated supplier, and the information automatically transmitted. Output of this is then picked up on the vendor's 1001 system, and relayed to a punched card unit where the order data is punched on cards. Subsequent processing



OPERATOR INQUIRES AND RECEIVES REPLY ON WORK STATUS USING TYPEWRITER.

through the vendor's data processing system then results in whatever documents may be required — packaging slip, invoice, etc.

Unlike most other manufacturers using the system, Reed has not negotiated blanket or other long-term contracts with suppliers but is operating via verbal agreements on nearly all items. The reason for this is that Reed wants to delay negotiation of blanket contracts until it has established direct computer ordering, which will require built-in prices.

Before the Oil Tool Division's purchasing department moved into the 1001 operation, the cost to prepare every order was about $15. Most of this expense was tied up in paperwork or in personal handling. For every purchase order, between four and seven copies were required, and an equal number of receiving reports were also necessary. None of these items is needed with the 1001 system; the input punched card serves both as an ordering and a receiving document.

Results and Future Plans

Spectacular results already are credited to the first half of Reed's total data processing control system. Company sales for 1964 were up 20 percent and profits increased 157 percent. There is expected to be almost an equivalent gain again this year.

Use of the 1001 ordering procedure, the 1030 data collection terminals and the 1460 central processor has reduced paperwork by almost 50 percent, with further reductions expected. Elimination of the dispatching function formerly required for manufacturing control has been accomplished, thus saving $5,000 a month, and cost of inventory has been dropped substantially.

In an analysis of inventory control procedures, company management found that 90 percent of the material department's time was spent keeping records on 10 percent of the dollars of inventory. This paperwork requirement has now been eliminated; the company has set up a bin control system — managed by the 1460 — for all locally purchased items with a low unit cost and low dollar inventory. This includes any item that turns less than $100 a year (this may be increased to $500) or items costing less than 25 cents each that turn less than $1,000 a year. Management expects that through constant computer analysis of these inventories plus other inventory control methods, the overall cost of inventory may eventually be reduced by as much as $2 million.

Savings resulting from use of the 1001 ordering procedure also are significant. So far this year, the purchasing department has lowered order costs some $24,000, this being achieved through an increase in the number of orders processed through the system.

Each day at Reed Roller Bit some 800 plant workers dispatch approximately 2,000 messages through the integrated information system. Reporting errors have been reduced from about 100 a day under the old handwritten system to no more than 15 or 20. Furthermore, the company has been able to move 17 men from dispatching to other jobs and thereby save $5,000 a month. Rework has been reduced by 34 percent, or $90,000 a year, and has resulted in a 10 percent, or $25,000, annual saving in scrap. This latter saving may eventually be pushed to as high as $100,000.

While all these cost improvements are important to the Oil Tool Div., Reed management feels the rapid information processing aspects of the system are still the real criteria for its development. To improve this capability further, the company has scheduled for installation an IBM 1050 data transmission unit, which will replace the 1001 now in use, and an IBM System/360 Model 30. This advanced computer system will replace the 1460, and will allow a direct computer-to-computer hookup with one Houston Distributor's 1440. Similar computer-to-computer ordering links also will be established with other vendors who install compatible equipment.