# INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

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| **Applications** | Production Materials Procurement |
| **Type of Industry** | Data Processing Equipment Manufacturer |
| **Name of User** | International Business Machines Corp.<br>Poughkeepsie, N.Y. |

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| **Equipment Used** | IBM 7010/1301 Data Processing System<br>IBM 7080 Data Processing System<br>IBM 1050 Data Transmission Terminals |

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## Synopsis

A procurement system that minimizes guesswork and increases purchasing efficiency is being used at IBM's Poughkeepsie, N.Y., plant. Called COMPASS (Computer Oriented Management Planning and Scheduling System), the system is used to recommend suppliers for the large number of production materials required in manufacturing computers and data processing systems.

COMPASS makes recommendations regarding suppliers on the basis of price, quality and past delivery performance formulas after considering the many variables of purchasing, accounts payable, production control and materials distribution. It alleviates the clerical burden of the buyer, allowing him to devote more time to professional duties, involving price negotiations with vendors. COMPASS does this while controlling all aspects of material procurement from the time a need to buy is made known, through vendor selection, order creation, order follow-up and expedite, receipt of material and payment of the supplier's invoice.

Centered around an IBM 7010 computer, the COMPASS' procurement cycle is set in motion when the plant's perpetual inventory system, operating on an IBM 7080 data processing system, indicates a future purchase requirement. In turn, a request-for-quotation is generated and monitored until the item is successfully bid for, ordered, received, and the information regarding delivery and payment entered into the computer.

COMPASS accepts and utilizes plant operating information and provides operating guidelines on a real-time basis. It equips the IBM buyer with information allowing him to purchase more efficiently and enabling him to plan for a more effective and more economical use of his time. In addition, the system permits him to explore new avenues for reducing production costs.

Optimizing purchasing efficiency for a plant operation that must select the suppliers of more than 15,000 items of production materials used in the manufacture of computers and data processing systems requires extremely effective control. Through the application of its COMPASS, computerized procurement control system, IBM's Poughkeepsie plant is minimizing guesswork and increasing purchasing efficiency.

## Background to COMPASS

Developed by the IBM Plant Control Study Team, IBM's COMPASS -- which stands for Computer Oriented Management Planning and Scheduling System -- is aiding in the selection of suppliers for the large number of production materials used in manufacturing computers and data processing systems at the Poughkeepsie plant.



IBM 1050 TERMINALS transmit and receive inventory information at 10 stations in each department.

Comparing information provided by the Purchasing, Accounts Payable, Production Control, and Materials Distribution Departments, COMPASS makes recommendations regarding suppliers on the basis of price, quality, and delivery performance. When this capability is projected across the more than 100,000 purchase orders that originate annually from 30 buyers and 20 assistants, the indirect benefits weigh as heavily as the direct achievement of purchasing efficiencies. Buyers can now focus on professional duties since COMPASS reduces the amount of time they spend on order processing. Also, because records are maintained on data processing equipment, buyers have much less paperwork to do. The professional buyer's time, the company feels, should not be spent writing requests for quotations to more than 4,000 suppliers, nor should it be spent writing, recording, and following up on orders.

As the system permits the achievement of new clerical efficiencies, it is forseen that paperwork volume will be reduced by half. In addition, a further reduction of the time spent on expediting is also expected by operation on an exception basis. Through the use of its computerized system IBM hopes to separate professional purchasing responsibilities from clerical duties and reduce the cost of materials going into its products without sacrificing quality and delivery performance. Price reductions, it is felt can be achieved through more favorable price negotiations, long term contracts where practical, and "family of parts" contracts with high volume suppliers.

## EQUIPMENT

The COMPASS system uses an IBM 7010 computer with a 100 K core memory which maintains perpetual inventory, manufacturing order status, purchase order status and supplier data on 1301 disc storage files, with purchase order history and other information on tape files. Ten IBM 1050

terminals at various stations transmit and receive information between departments and to the computer via an IBM 7740 communication control system.

When the COMPASS system was introduced, inventory and other production control data were batched and stored on tape by an IBM 7080 system with a 160 K core memory, and linked by two I/O channels to 20 IBM 729 VI magnetic tape units. With COMPASS, this information is maintained on three 1301 disc files by the 7010 system and is updated as additional information is transmitted to the computer. The perpetual inventory ordering system generates an order authorization form based on inventory needs well in advance of the manufacturing function's need for the particular item.

COMPASS procedures require only 17 percent of available computer time, and the services of two 7010 operators and one part-time 1050 operator. Other procedures for which the system is used include payroll and process automation for the 7010, and MASA and cost control for the 7080.



IBM 7010 COMPUTER SYSTEM maintains inventory, manufacturing order and procurement data.

### The COMPASS System

Purchasing by computer cycle begins when the perpetual inventory system indicates a future purchase requirement to the COMPASS system. The COMPASS system in turn generates a Request-For-Quotation if it does not have a current quotation on file. The buyer receives this request for quotation from the computer 45 days before the planned ordering date. The request lists the item description and negotiation guides, such as the annual quantity required, the projected quantity needed for the next year and other information. These guides give the buyer added flexibility in seeking long-term contracts wherever possible.

Requests for quotations are sent to the suppliers, who complete and return them to the buyer. The three best supplier quotes are placed in the computer. Based on delivery and quality experience, the computer calculates a weighted quality and delivery performance rating. Using these factors, the computer then automatically recommends the supplier, calculating the tradeoff between price, quality, and delivery. Afterwards the 7010 assigns a purchase order number to the planned transaction and produces an Automated Purchase Requisition form which indicates the selected supplier as well as a Parts History Request Form which shows his quality and delivery performance rating. The buyer then reviews the purchase order requisition form. If he approves it, a release is processed with other batch input once each day to the 7010 system, which prints out the purchase order requisition. The transaction is reported to the 1301 disc files where the appropriate data is recorded and previous data updated. On the morning after review and approval of the requisition, the purchase order is sent to the buyer, who mails it to the supplier.

If the buyer does not approve the initial purchase order requisition, however, he makes the necessary change notations on the requisition form. These modifications are keypunched and sent to the computer via punched cards. At this point the purchase order is printed out, the 1301 file is adjusted and a purchase order prepared for forwarding to the supplier.

After the purchase order has been mailed to the supplier, but within 20 days prior to the anticipated delivery, the computer includes this order on the follow-up report to the supplier along with other current due and past due orders. If the supplier cannot deliver on the scheduled date, he uses this form to notify IBM. This information is entered into the computer system to update files and provide input for preparation of Purchase Order Status Reply forms which are sent to all appropriate departments to alert them to the revised delivery date. In addition a purchase order status run is done daily to indicate the status of all procurement transactions still unfulfilled.

When the material arrives at the Poughkeepsie plant, the Materials Distribution (or Receiving) Department enters supplier's packing slip information into the computer using a 1050 terminal. The computer updates the information on the 1301 disc storage file and sends warehousing, inspection, urgency and back order information to the receiving department.

The system also includes a 1050 terminal used for invoice payments. When the invoice arrives from the vendor, Accounts Payable enters the information into the terminals allowing the computer to compare it to the purchase order. The system then furnishes Accounts Payable with a facsimile of what the invoice should contain. The actual invoice is compared against the machine generated invoice, and, if they agree, the computer automatically processes the invoice so that the vendor is paid.

COMPASS procedures provide input for computer production of the following reports and documents:

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| Daily: | 1. | Expedite notices |
| Weekly: | 1. | Purchase order status |
| | 2. | Current and past due report |
| Monthly: | 1. | Price measurement |
| | 2. | Price difference report |
| Quarterly: | 1. | Expenditure report |

## Results and Future Plans

IBM management says the most readily visible advantage of COMPASS is that at any given moment the buyer or other authorized person can ascertain the "real-time," or here and now status of any order without the need for many clerks to search through reams of paper.

Before implementing the system, the Plant Control Study Team intensively investigated procedures in the purchasing function as well as other related departments at the Poughkeepsie facility: production control, purchasing, quality control, manufacturing accounting, manufacturing engineering, industrial engineering and the systems and programing departments. They sought to develop an overall data processing system capable of meeting the requirements of the entire Poughkeepsie plant manufacturing operation.

As designed, COMPASS will accept and utilize plant operating information through data transmission equipment, and when fully implemented on a plant-wide basis should be capable of providing operating data to many plant areas on a real-time basis. The final product of these studies is envisioned as a system divisable into six sub-systems. Procurement has been described here. The system will eventually be expanded to encompass product entry and control; quality control; scheduling and parts planning; cost forecasting and control; and management planning and control.

INDUSTRIAL DATA PROCESSING APPLICATIONS (S2)

INTERNATIONAL BUSINESS MACHINES CORP.

**REQUEST FOR QUOTATION**

FORM 33-923-6065-11

**AUTOMATED PURCHASE REQUISITION**

FORM 33-923-0004-1

MRO CAT. NO. 781001372

QUOTATION NUMBER 1

QUOTATION NUMBER 2

QUOTATION NUMBER 3

LAST 10 BUYS

MISCELLANEOUS SUPPLIER INFORMATION (33 SPACES PER LINE) LINES WILL PRINT IN CODE SEQUENCE

PURCHASING APPROVALS

REQUEST FOR QUOTATION FORMS are generated by the COMPASS system whenever a
current quotation for a needed item is not on file.  After selection of supplier, a purchase
order is printed, based on information from AUTOMATED PURCHASE REQUISITION

IBM/5

Converting the Poughkeepsie Plant purchasing function from a conventional operation to a computerized department did not take place overnight. The system itself did not take form on paper until late 1963 and actual training for the crossover began in early 1964. By June of that year, controlled tests were run with COMPASS performing parallel functions with the conventional purchasing system. By mid-September the crossover was completed.

For the near future, expansion of the COMPASS system is slated to include implosions, forecasts and evaluations, closely followed by manufacturing quality control and finished equipment scheduling. Also scheduled for inclusion are - receiving inspection quality control; work in process scheduling and dynamic dispatching; and cost control with continuous costing.

In an industry where last week's figures are far too out of date to be useful, the computer becomes a valuable tool for the buyer. It can maintain and present records faster and more accurately than the most cleverly devised manual system. In addition, it provides the buyer with this information on a real-time basis.

IBM management believes that in order to be effective, each buyer must have the answers to pressing questions on an immediate basis. Who are his suppliers for a particular item or for a group of items? How much material was ordered from each supplier? How do their prices compare? Which suppliers have the better delivery ratings? Are these suppliers consistent in their delivery and quality? What quantity of a particular item was ordered last year? How do those figures compare with this year's? What will next year's quantity requirements be? Can a long-term contract for this item effect a saving for the company?

These are a few of the questions that present themselves to the buyer. Since most non-computer systems cannot provide this information with a reasonable degree of accuracy and completeness, without major clerical effort, many buyers are forced to operate partly by "intuition" in these areas. Intuition, however, does not produce the lowest-cost solutions to buyer's problems.

Armed with information generated by the COMPASS system, a buyer can make more effective and more economical use of his time. He is now able to analyze purchases for similar items in order to find means for effecting saving, or he can explore new avenues for reducing costs.