

# INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

**Applications** Procurement and Distribution Control

**Type of Industry** Reprography Equipment

**Name of User** Xerox Corp.  
Rochester, N. Y.

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**Equipment Used** IBM 1401 Data Processing System

IBM 632 Calculating Typewriter Systems (three)

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## Synopsis

Rapid growth has characterized the history of Xerox Corp., Rochester, N. Y., whose sales have soared from \$31 million in 1959 toward an estimated \$350 million by 1965. This growth has been fully matched by that of the firm's vital procurement and distribution activities. They come under a single unit, Xerox's Procurement and Distribution Div. whose management has evolved comprehensive systems to ensure constant availability of parts and materials both for Xerox plants and for customer servicing.

Procurement procedures begin with processing by one of three IBM 632 calculating typewriter systems of packs of 8 to 10 cards keypunched for each order for semi-automatic preparation of purchase orders on continuous forms. For each line item on each purchase order, a by-product, typed and keypunched Purchase Order Analysis card is automatically created. These cards provide statistical input to an IBM 1401 computer for production of a variety of procurement reports.

Procurement reports thus produced provide two basic types of information. First is raw activity data which helps buyers spot items which can be purchased through long-term contracts, following company policy. The second type of information documents purchasing's role as a profit-maker for Xerox, measuring, as it does, buyers' cost reduction performance for each order. Another report summarizes the quality performance of each Xerox supplier on a monthly and quarterly basis. This report is an important one as quality is always a critical factor in the company's operations.

To fulfill its distribution functions, the Division must serve over 1,000 field technical representatives who service machines in customers' offices. To do so, Xerox has established a coast-to-coast network of seven warehouses and a Xerox LDX facsimile transmission system which links 10 Xerox locations in Illinois, New York and New Jersey.

Another distribution activity being developed is "skin packaging" the packing of spare and replacement parts in vacuum-formed clear plastic blisters containing a prepunched tab card carrying a printed description of the item. This both provides a foolproof visual identification system and permits the use of data processing in inventory control.

Materials management has developed along an original path at Xerox Corp., Rochester, N.Y. To fulfill its functions for one of the nation's fastest growing companies, the Procurement and Distribution Division is responsible for traffic and distribution as well as procurement. This is because Xerox sells a copying service rather than a product and must therefore have a continuing relationship with all its customers across the U.S. The consequences are twofold. First, product quality is even more important to Xerox than for most companies. Secondly, responsibility for distribution means that the purchasing department must have a highly efficient system to provide customers with supplies and replacement parts.

To meet these needs, a veteran Xerox management team headed by Alex N. Telischak, vice president of procurement and distribution, is implementing a comprehensive purchasing and controlled distribution system supported by IBM 632 calculating typewriters and IBM 1401 computers. Its aim is to ensure timely supplies of high-quality production parts while optimizing service for both customers and the company's technical representatives.

### Procurement at Xerox Corp.

Rapid growth has highlighted the history of Xerox Corp. whose sales are soaring from \$31 million in 1959 toward an estimated \$350 million by 1965. Naturally, purchase volume has also kept pace and Telischak's number one problem is to maintain a purchasing operation that can cope with the company's ever increasing requirements.

In talking about the procurement problems that result from the company's growth, Telischak cites supplier capacity as an area that needs critical attention. He points out that in 1959, Xerox dealt with about 200 local production suppliers. Today, for machine parts alone, it does business with a nationwide network of 750 suppliers. The total number of suppliers is over 8,000, who supply more than 150,000 line items to fill 90,000 purchase orders. The value of these orders is in the neighborhood of \$150 million and are expected to increase rapidly during the next five years. "That ought to make us one of the largest procurement activities in the country—certainly we'll be in the top 100", says Telischak.

The nature of Xerox purchasing is also changing as a result of company product innovations. The firm's stated goal is to cover all kinds of graphic communications from new ways of sensing images, to new methods for transmitting and recording them. Similarly, the functions of the purchasing department are being changed through its being made responsible for distribution (which it took over from sales). Xerox distribution is basically a service function since almost all of the company's equipment is leased.

To meet these responsibilities, Telischak's department is continuing to select new talent and to train new and old employees to fill the gaps in both departmental sections. They presently include about 140 people in purchasing and 500 in distribution. This staff upgrading and expansion stands high among the 10 basic objectives developed for the Procurement Division:

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|-----------------------------|------------------------------------|
| 1. Optimum Quality          | 6. Sound Contract Administration   |
| 2. Best Balanced Value      | 7. Timely Long Range Planning      |
| 3. Continuity of Supply     | 8. Trained and Motivated Personnel |
| 4. Good Supplier Relations  | 9. High Personal Standards         |
| 5. Minimum Acquisition Cost | 10. Creativity and Flexibility     |

Their realization depends in large part on the procurement managers and buyers being informed of their current performance levels in each of these key goals. Formerly, where this information existed it was often impossible or too time consuming to retrieve it manually from company records. All of the Xerox Procurement EDP plans have therefore had as their primary objectives the preparation of data for immediate and future procurement decision making and action taking.

The secondary EDP objectives of record retention and efficient processing, while important in themselves, are not permitted to detract from the primary goal of obtaining appropriate action data.

## The Xerox Procurement System

Purchasing systems at Xerox are buyer-oriented. Company policy, says Telischak, is "to make buyers business managers of the commodities they're responsible for. It's up to purchasing management to get the information the buyers need, train them to use it, and see that they're freed from clerical duties. Otherwise, we'd be licked before we start."

With Xerox' constant rise in its huge volume of requisitions, the peril grew that the buyers would be swamped, too busy handling routine inquiries and orders to have time for discerning evaluation. What was needed was a way to cut clerical work, and at the same time generate feedback information to the buyers.

To do so the Xerox Procurement & Distribution Division now employs three IBM 632 semi-automatic purchase order typewriter systems. These systems with their combination of card input, calculator, and card output units permit semi-automatic preparation of purchase orders on continuous forms. Input for the machines comes from punched cards made up in decks of 8 to 10 for each order.

IBM 632 CALCULATING TYPE-  
WRITER SYSTEMS produce  
Xerox purchase orders and by-  
product output cards.



For each line item on each issued purchase order, a Purchase Order Analysis card is automatically created. This typed and keypunched P. O. Analysis card contains all the statistical data from the purchase order that may later have to be retrieved and used. The cards go to an IBM 1401 computer located in the company's data processing center to provide input for preparation of a variety of procurement reports. With the P. O. cards go other cards, created for production components, containing current, previous and standard cost data for later use in preparing the Procurement Profit (or Cost Reduction) report.

The traveling requisitions that come to purchasing from both of Xerox' two main production groups, the machine and process manufacturing departments, are VISI record forms. When purchasing gets them clerks check the part number to locate two documents: a manually posted order history card and a keypunched "item" card. The history card has a complete record of usage and purchase of the item, while the punched item card is used to write the "item description" when the purchase order goes through the 632 typewriter systems. Both cards are kept in one envelope which has been cut diagonally across the front for easy identification. The envelopes, in turn, are filed by part number and are kept easily accessible in 5 x 8 open-top files.

After the envelope with the history card and item card has been located, the clerk gives the cards, the traveling requisition and a quotation folder to the appropriate buyer. All the buyer has to do is check off the name of the desired supplier and enter price and delivery date. He also adds another punched card which represents a six-digit combined buyer and purchase order number (the first two digits designating the originating buyer). The card later activates "purchase order number" in the 632 unit. Each buyer has his own block of preassigned numbers.

From the buyer, requisitions and cards go to the typing section. If there are any standard phrases that should appear on the order, prepunched cards take care of them, too. Typical phrases are "Blueprint attached," "Confirming our phone order dated \_\_\_\_\_", and "Mfg. through revision \_\_\_\_\_."

For each of these phrases, there is a card to match, as well as other cards for buyer's name, vendor name, address and terms, receiving location, and other constant data. Assembled by the 632 operator into a pack, the cards provide input for automatic order preparation; all the typist has to do is to enter manually, variable data such as quantity, price and shipping date.

### Procurement Reports

The 632's output cards provide computer input for preparation of a wide variety of reports to buyers. The information in these reports falls into two basic areas. First, is raw activity data: number of orders placed, and dollar commitments by commodity, commodity group and supplier. This information helps buyers spot items which can be purchased through semi-annual or annual contracts. Company policy is to buy as many items as possible on long-term contract.

The second type of information provided by the reports, documents purchasing's role as a profit-maker for Xerox. It lists cost reductions made by buyers, and so measures their performance on each order against two specific yardsticks: previous price paid for the item and the annual "standard cost" (established jointly by purchasing and cost accounting).

Telischak believes that these measurements are extremely important and from the very beginning, he has geared the Division's procedures to these documents which now include the following key reports:

Procurement Profit Performance Report predates automation at Xerox. Prior to the 632s' installation, buyers were filling out Purchase Profit Program Report forms. In these reports, they listed variations from either standard or previous costs, using the six following notations:

N - Negotiated	M - Market
NS - New Source	Q - Quantity
VA - Value Analysis	EC - Engineering Change

To give added weight to these reports, which went from Telischak to group vice president John W. Rutledge, buyers were instructed to include data on price increases.

Under the present system, the six codes used in the old profit report have been replaced by 56 codes, in nine general categories. For example, there are eight separate codes just for value analysis. Instead of keeping their own running records on price variance, buyers merely code the requisitions as they prepare them for order writing. At the end of the day, the statistical section posts price variance cards for the 5 x 8 filing jackets, and also keypunches this information into cards. These cards accompany the order analysis cards for computer processing.

The most obvious benefit of the procurement profit performance report procedure is that it doubles the scope of price variance measurements. Instead of comparing a current price against either a previous or standard price, the method makes it possible to show comparisons with both previous and standard prices.

"Suppose, for example," says Telischak, "that one of our buyers paid \$1.50 each for a certain part the last time around. Let's assume that the standard price has been set at \$1.75. If he now buys the part at \$1.65, he's still beating the standard -- but is it realistic to look at it only in that light? Actually, he hasn't done as well as he did the last time, and to my way of thinking he should be called on to explain the difference. Under our system, he is, and he's given the codes to do it with."

**IMPORTANT - THIS FORM TO BE USED FOR NON PRODUCTION - NON CAPITAL EQUIPMENT OF \$200 OR LESS TOTAL ORDER VALUE. ORIGINATOR COMPLETES BLUE PRINTED PORTION ONLY - TYPE OR PRINT WITH BALL POINT PEN LEGIBLY AND FIRMLY. BE NEAT - THIS FORM WILL BE MAILED TO SUPPLIER BY PROCUREMENT DEPARTMENT.**

**XEROX**  
XEROX CORPORATION ROCHESTER, NEW YORK 14603

**REQUISITION/PURCHASE ORDER**

**TO SUPPLIER**  
 ORDER DATE [ ] ORDER NUMBER [ ]  
 ADDRESS [ ] SUPPLIER CODE [ ]  
 CITY [ ] STATE [ ] ZIP CODE [ ]

INTERNAL USAGE [ ]  
 ORDER DATE [ ] ORDER NUMBER [ ]

REQUISITION NO. [ ] REQUISITION DATE [ ] MAT'L REQ'D DATE [ ]  
 BUDGET CTR. [ ] ACCOUNT [ ] PROD. PROJECT [ ]

KINDLY FURNISH THE ITEM(S) LISTED BELOW IN ACCORDANCE WITH SPECIFICATIONS, PRICES AND TERMS AS STATED HEREIN, AND SUBJECT TO THE PROVISIONS OF THE ATTACHED RIDERS, IF ANY, AND TO THE TERMS AND CONDITIONS ON THE REVERSE HEREOF.

SHIP TO:  800 PHILLIPS ROAD, WEBSTER, N.Y. BLDG. [ ]  961 LYLE AVENUE, ROCHESTER, N.Y.  
 282 HOLLENBECK STREET, ROCHESTER, N. Y.  MIDTOWN TOWER, ROCHESTER, N.Y. ROOM [ ]  
 367 ORCHARD STREET, ROCHESTER, N.Y.  3750 MONROE AVENUE, PITTSFORD, N. Y.  
 800 SALT ROAD, WEBSTER, N.Y.  OTHER [ ]

SEND INVOICE IN TRIPPLICATE WITH BILL OF LADING TO OUR ACCOUNTS PAYABLE DEPT.  
 P.O. BOX 1540 ROCHESTER, NEW YORK 14603

**SHIP TO MEET MATERIAL REQUIRED DATE SPECIFIED BELOW.**

**DO NOT MAKE PARTIAL SHIPMENTS**

SHIP THIS QUANTITY [ ] MATERIAL REQUIRED OUR PLANT [ ]

ITEM NO.	QUANTITY ORDERED	QUANTITY RECEIVED	UNIT OF PURCHASE	DESCRIPTION (INCLUDE SEE, MODEL, TYPE, ETC.)	PRICE PER UNIT OF PURCHASE	SHIP THIS QUANTITY	MATERIAL REQUIRED OUR PLANT	COMMODITY CODE	ESTIMATED UNIT VALUE

ATTENTION OF [ ]

RECOMMENDED SUPPLIER [ ]

SPECIAL SHIPPING AND/OR ACCOUNTING INFORMATION ATTACHED [ ]

NOTES [ ]

**DO NOT MAKE PARTIAL SHIPMENTS**

TOTAL ORDER ESTIMATED VALUE [ ]

ORIGINATOR'S SIGNATURE AND DEPARTMENT [ ]

APPROVAL SIGNATURE [ ]

APPROVAL SIGNATURE [ ]

REVIEWED BY PROCUREMENT RECORDS SECTION [ ]

MAKE ALL INQUIRIES TO BUYER

EXEMPT FROM MONROE COUNTY SALES AND USE TAX UNDER CERTIFICATE NUMBER 970

**XEROX CORPORATION**  
 PROCUREMENT DEPARTMENT  
 P.O. BOX 1540 • ROCHESTER, N.Y. 14603  
 TELEPHONE: TR 2-2000 AREA CODE 716

**THIS ORDER IS NOT VALID IF OVER \$200.00 IN TOTAL VALUE**

FORM 45788

**THIS FORM TO BE USED FOR NON-PRODUCTION NON-CAPITAL EQUIPMENT \$200.00 OR LESS IN TOTAL ORDER VALUE.**

XEROX PURCHASE ORDER FORMS are automatically typed by IBM 632 systems, using punched card input.

Supplier Quality Performance Report is produced by combining procurement output cards with incoming inspection data to summarize the quality performance of each Xerox supplier on a monthly and quarterly basis. This report is an important one, for quality is always a critical factor in Xerox operations. The reason is that the reliability of the machines leased to customers is not limited by a warranty period. Xerox units must therefore be able to turn out copies as long as the users want them. Getting that kind of reliability built into the machines is one of Xerox procurement's most important jobs. To do this job, purchasing relies heavily on a long range supplier education and training program.

To spot how suppliers are doing in maintaining quality, buyers get monthly reports from the quality control department. The reports show the rejection rate on individual basic commodities. All casting suppliers, for instance, are listed on the same page so that buyers can make meaningful comparisons.

**XEROX CORP.**

The report headed by the supplier's name and five-digit identifying number shows part number, total lots received, lots accepted, lots rejected and lots accepted as is. It also shows percent accepted, percent rejected and percent accepted as is.

Open Purchase Order Status Report is prepared by combining Procurement Open Order Status cards made up for each order with receiving department data. To summarize the status of open production purchase orders. The report, which is organized by supplier and due date, measures procurement performance from requisition receipt, through buying, order preparation and delivery. Through it, expeditors are better able to assure on-time delivery of open orders.

Dollar Commitments Report is provided monthly to each buyer and lists his dollar purchases with each of his suppliers. This dollar commitment data is also broken down by the supplier's geo-

PART NUMBER	DESCRIPTION XEROX CORP. PURCHASE PRICE RECORD				U/P	PRODUCT CODE	COMMODITY	UNITS/MACH.	
NOTES	DATE	PURCHASE ORDER NO.	SUPPLIER'S NUMBER	ORDER QUANTITY	CURRENT UNIT PRICE	PREVIOUS UNIT PRICE	STANDARD UNIT PRICE	VARIANCE CODE	UNITS PER MACH.
FORM NO. 45661									
SUPPLIER'S NO.		SUPPLIER'S NAME AND ADDRESS							

**PURCHASE PRICE RECORD CARD** provides source document from which is keypunched data card input for automatic preparation of procurement profit report.

graphical location to measure local and out-of-town purchases and by individual sub-commodities. For example, formed components can be broken down into stampings, sheet metal, consoles, tanks, and so forth. Dollar commitment data is also provided to supervisors or each budget center within the company.

Lead Time Report is designed to help solve one of the problems faced by most purchasing departments -- that of obtaining enough lead time to adequately meet the objectives of good purchasing. This output report lists the lead time provided for procurement for each requisition and commodity. It promptly provides the buyer with a hard copy record of past lead times to aid him in negotiations with the user departments and suppliers and in planning for adequate lead times in the future.

Special Study Reports are prepared, if the data is available and easily retrievable, to quickly meet new, special information needs. For instance, Xerox' accumulated procurement data has been



## Other Reports

The IBM 632 typewriter systems were primarily installed to permit automated forms handling and preparation, coupled with operator intervention for entry of variable information. The units, however, have also been found suitable for preparation of simple status reports whose timing does not permit transportation to and waiting-in-line at the Xerox data processing center. Two daily and weekly reports thus prepared are:

Procurement Assurance Report documents the availability of often complex new parts. This is a major factor in Xerox purchasing since buyers are busy studying the parts and materials that go into a new product as long as two years before it is announced. Their aim is to make sure that they can obtain the items in production quantities, on time, at reasonable cost, in accordance with manufacturing and engineering specifications. Xerox calls this pre-production buying effort Procurement Assurance.

Originally developed in 1961, the procurement assurance program has since been subject to constant refinement. Presently, it is based on keypunched assurance data cards. Buyers use the assurance data cards to note significant information, such as supplier name, price, tooling charges, lead time, and so forth, that lead to their final entry in the "Disposition" box. An "OK" in the disposition box signifies that the buyer and the supplier accept the component design as is, and that the buyer certifies the acceptability of the supplier's price, quality and capacity. If the buyer or the supplier feel some clarification of design is necessary, the buyer enters a "CL" in the disposition box. If the change is a major one, he enters "RE" to indicate a formal request to engineering.

From the buyers' penciled notes, the 632 operators keypunch the cards which are then used to formulate assurance status reports. These reports are distributed weekly to procurement, manufacturing, engineering, quality control and cost accounting personnel.

Each department then selects the information appropriate to its needs. Process Engineering, for example, picks up the price information for make or buy decisions. Tool costs are available for capital tool budgets, and the lead time information helps engineering and manufacturing to plan their releases of parts.

As far as the buyer is concerned, his assurance task is not complete until all CL or RE items have been resolved and he has put an OK in the disposition box for every part assigned to him.

## Distribution

Being responsible for distribution also, Xerox Procurement and Distribution Divisions must be as systems-minded in that area as it is on its basic buying job. Its mission is to provide better service to both customers and Xerox field representatives and to put distribution inventory control on a scientific basis.

To perform its distribution functions, the Procurement and Distribution Division must serve over 1,000 field technical representatives. They work out of sales offices and are part of the marketing division. Their job is to service machines in the customers' offices by giving them routine maintenance and replacing parts when necessary. Each of them must therefore be supplied with an adequate field inventory. To do so, Xerox has established a network of seven warehouses coast-to-coast. The 1,000-acre Webster, N. Y., plant (just outside Rochester) is the marshalling yard for materials (consummable supplies and replacement parts) coming from Xerox manufacturing and nearby suppliers. From Webster, the goods are sent in consolidated shipments to cities (New York, Rochester, Atlanta, Dallas, Seattle and Los Angeles), located in the six geographical regions: eastern, central, southeastern, southwestern, northwestern and western United States. Each warehouse will take care of the sales offices in its region.

In addition, Xerox is also installing a facsimile transmission network using Xerox Ldx equipment spanning one third of the continent. It will then be possible to transmit anything written, typed

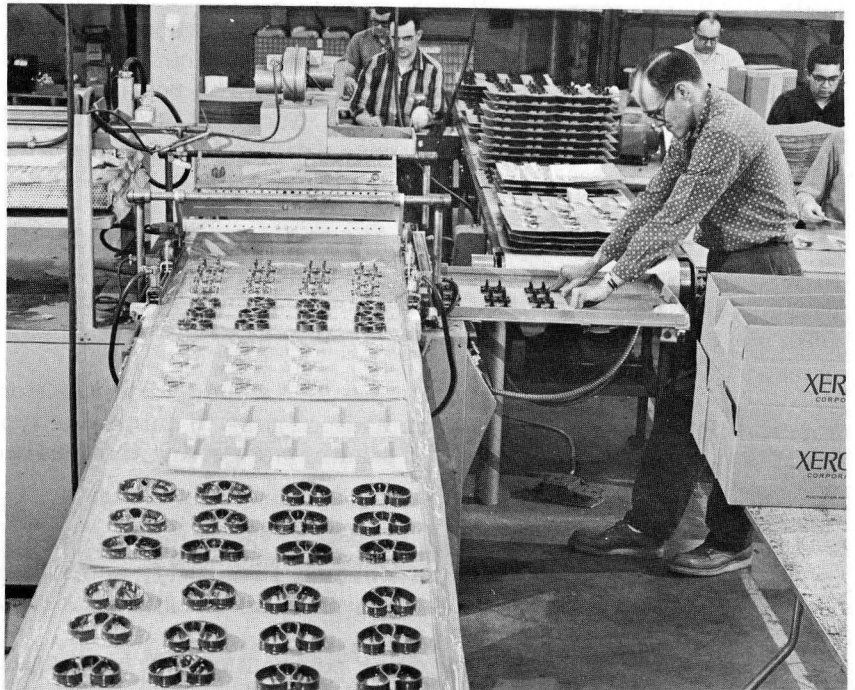


or drawn over phone lines between Xerox offices in 10 locations in Illinois, New Jersey and New York. Three categories of papers will be transmitted over the system, which can move documents at the rate of eight 8-1/2-by 11-inch pages per minute. They are:

- Priority executive correspondence and internal directives.
- Action documents pertaining to marketing, manufacturing and engineering functions, including orders, requisitions and inventory statements.
- Computer-related data to be transmitted between operating departments and the company's computer installations.

This distribution system is designed to balance and control inventories of Xerox products throughout the U.S. and to improve service. An important factor is that it will also centralize responsibility.

SKIN-PACKAGED CARDS mounted in plastic blister with identifying tab card permit machine processing for inventory control.



Regional inventory control is among the most vital elements of the distribution system. To improve it, the company has developed a unique skin-packaging program. It calls for spare and replacement parts to be packed in vacuum-formed plastic blisters and is looked to as a large step toward putting regional inventory control on a scientific basis.

This program is under the direction of George Turianski, supervisor of distribution Industrial Engineering. "Original aim of skin packaging," says Turianski "was to make it easier to identify spare parts. Many tech. reps. in the field are new to Xerox, so they needed a foolproof visual identification system. Next step was to put a prepunched tab card carrying a printed description of the item in the skin package. The purpose of this was, of course, to make it possible to use data processing in inventory control."

Each skin-packaged part is mounted on a base of corrugated paper. The identification tab card, folded in thirds, is inserted between the part and the mounting board. The mounting boards are perforated and come in two master-panel sizes: 18 x 20 in. and 18 x 24 in.

The smaller panel holds thirty 3 x 4 units and the larger one holds twenty-four 3 x 6 units. When folded, the panels fit into various modular boxes- up to 24 inches long. The tech. reps. carry these boxes on their service calls.

This type of packaging makes it easy for the tech. rep. to spot the part he needs. Once he has located it, he merely tears it off the master panel. The three sections of the identification tab card are separated. One part is sent to the regional warehouse, another part goes to the tech. rep's sales office, and the third to Rochester. There, it is computer-processed for inventory control.

An important feature of the tab-card skin pack (for which 80 percent of Xerox machine parts are eligible) is that the cards can be used to build up a history of parts replacement frequency. This makes possible preparation of a report showing one part's usage history in relation to other parts. Distribution can thus determine what mix of parts to mount on the masterpanels.

### Results and Future Plans

The changeover from manual to automated purchasing procedures has encountered little difficulty at Xerox. This, according to Gaylord E. Powell, director of purchasing of the Procurement and Distribution Division, resulted from two reasons: First, redesign of the order form was not a major job. While some new information had to be added -- commodity code, number and date of requisition receipt, for example -- the rest of the routing data merely needed reorganization for use with the new continuous form version. Secondly, the purchasing system is self-contained. No other departments had to change their requisitions or other records. This meant that Purchasing could govern the changeover without worrying about how the phase-in would affect other groups.

Within a few months after the 632s were installed, each of them reached the target of 100 orders per day. This achievement would already have been worthwhile if reduction of clerical work had been the only benefit to purchasing. However, Telischak and Powell feel that by-product buyer information turned out by the new system is even more important.

"After all," Telischak notes, "we were getting the work out when we were using snapout forms. Presumably, even if we had not gone to automatic typing, we'd be getting the orders out somehow. On the other hand, if we are not getting the feedback to buyers, we cannot possibly know whether we are getting the best value."

The search for improved methods for gathering, processing, storing and evaluating procurement data is a continuing one at Xerox. Presently, some 26 additional procurement data projects are being considered. Three of the most noteworthy data needs identified are:

- Measurement of supplier performance in conforming to the number of specified lost on each order.
- Forecasts and updating of procurement requirements for six quarters in advance, to assist long-range planning on supplier capacity, source development and the preparation and updating of annual contracts.
- Retrieval from magnetic tape storage within 15 minutes of the request of any historical procurement data up to five years old.

Through the fulfillment of these and other needs, future Xerox procurement EDP plans will continue to have as their primary objective the preparation of data for immediate and future procurement decision making and action taking.