INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Management Information System, Inventory Control, Production Orders, Standard Cost, Sales Analysis Reports, Accounts Receivable, Accounts Payable
Type of Industry	Electrical Transmission Equipment Manufacturer
Name of User	A. B. Chance Co. Centralia, Missouri

Equipment Used	Honeywell H-120 Honeywell H-200 Honeywell H-1200 A-M Corp. Data Collection Equipment

Synopsis

About 90 percent of all A. B. Chance products are sold to the electric utility industry for use in construction, maintenance, and operation of electrical transmission and distribution systems. Expanding through acquisition and product development, Chance now has four domestic divisions, an international division and a Canadian manufacturing-marketing subsidiary. These "profit centers" are the Chance Div. and the International Div. in Centralia, Mo.; Pitman Div. in Grandview, Mo.; Universal Pole Bracket Div. in Houston, Tex.; the Insulator Div. in Parkersburg, W. Va.; and the A. B. Chance Co. of Canada, Ltd., Toronto. Chance also has plants in York, Pa.; Industry, Calif.; Portland, Ore.; Atlanta, Ga. and Montreal, Quebec. Data Processing began as a function of the accounting department with the installation of electric accounting machines in 1950. The first applications included payroll, order interpretations and invoicing. Over the course of the following 12 years these applications were expanded to include production orders, standard cost, sales analysis reports, accounts receivable and accounts payable.

BACKGROUND TO EDP

"We turned to computerized data processing in an effort to meet the data processing demands of present and anticipated expansion in all our major product lines," says C. C. Hough, vice president and treasurer of A. B. Chance.

Chance catalogs some 10,000 different items ranging from simple nuts, bolts, and washers to sophisticated high voltage switchgear and powerful truck-mounted devices for mechanized maintenance and construction tasks. The company sells to nearly all of the 3,000-plus American utilities and to utilities in more than 60 other countries.

THE OBJECTIVES

A Honeywell H-200 was selected as the primary processor and work began on a full inventory control system. The primary objectives for this system were to reduce the levels of inventory, provide the necessary tie from order entry to bill of materials explosion, and produce timely cost information on the production of goods.

A. B. Chance Co. began as a little hardware-making firm in 1907 in Centralia, Mo. Since 1941, Chance has been doubling its sales every five years. It has grown to a $70 million-a-year manufacturing complex with 3,400 stockholders and more than 2,400 employes.

THE OFFSHOOTS AND EVALUATIONS

During the first two years on implementation, many other applications were found as natural offshoots of the initial systems. A full management information system began to evolve as the company continued to grow and, consequently, the demands of data processing became greater. The data processing department has increased its staff from 10 to 25.

In August 1966 evaluation was made of the then current status of data processing and the future needs of the company. Inventory values had not been reduced sufficiently and information produced by the system was not always accurate. A task force was established to evaluate the problems and determine what corrective actions would be necessary. This task force was headed by the manager of data processing and consisted of the senior systems analyst, the manager of inventory control, and a senior marketing analyst of the marketing services department. Analysis showed that too much time was spent by the data processing department maintaining the data files without enough effort applied to identifying the cause of the problems. Data processing had accepted the maintenance of the actual data files as the system evolved and, consequently, was bogged down with attempts to correct data errors without proper knowledge of why they had occurred and their source. The solution to this problem lay in the education of the using departments and giving them the responsibility for maintaining their own data. Thus freed, data processing could concentrate on refinements of the system and implementation of new concepts; the solution also provided a better, more accurate data base.

The next step was to analyze the inventory system for the factors most responsible for the failure to reduce inventory values. The problem was identified as twofold. First, the reports produced, such as stock status and open production order reports, were historical in nature and did not project or correlate future requirements. The second problem was the mixture: some classes of inventory items were being maintained on the computer while other inventory items were maintained on the old electric accounting machine system. In short, a complete transition had never occurred.

Consequently, several projects were begun in an attempt to bring the inventory control system into focus for the management of the inventory control department. Most important of these was a system for forecast and EOQ (Economic Order Quantity) for inventory control. In processing a large mass of data while also maintaining an inventory, it was found that those

functions maintained on the computer and those done manually were not working in unison. In order to provide this tie between all systems, it was decided that the computer must do the work from item-by-item forecasting through production order scheduling for the entire inventory.

It was also decided that a full purchasing subsystem would be required to further link the information from bill of material requirements and inventory stock levels. The purchasing and forecast systems are currently in various stages of programing and implementation with the entire package scheduled for rapid completion. Too, data processing requirements had grown to the extent that a Honeywell H-1200 computer system with six 64KC tape drives had to be installed to keep up with the work load. At the same time, the final electronic accounting machine (EAM) systems were converted from the tab equipment and placed on the computer, thus relieving the operations department from having to maintain two operating staffs.

THE SYSTEM

It was also apparent that some technique for data collection was necessary to aid the using departments in the difficult task of controlling their information on the input side. To use forecast and EOQ, production data had to be accurate. In analyzing the data generated in the factory areas, it was discovered that--with the exceptions of job start time and quantity produced--all of the information recorded by factory personnel had originated with the data processing department at the time the production order was written.

In addition, the old system of using a continuous time log on a single time card was difficult to control. The foremen had to check all of the cards at the end of the shift. This precluded good error analysis because of both the volume of time cards and the physical span of time (a full shift) covered by the cards. Errors in reporting consisted of such things as transposed numbers, wrong order numbers, incorrect labor account numbers, and unreadable documents.

The new data collection system had to help solve not only these problems, but also meet certain work criteria:

1. Cost per station had to be reasonable and within the perspective of sales volume and total EDP budget. Specifically, data collection for this application should not cost much more than the current cost of producing the same data.

2. The system had to be flexible to adapt to the changing structures of growing manufacturing plant areas.

3. The system had to be adaptable to applications other than labor reporting to fully utilize the preparation and conversion devices.

4. The system had to be universal enough to fit divisions outside of Centralia.

5. The system had to be simple to operate and consistent in usage to allow for easy training and minimize retraining as employes are moved from department to department.

6. The system had to be capable of handling the growth of the company for the foreseeable future.

The Addressograph Multigraph Corp. "source data automation" system was selected for the factory areas. This equipment consists of the 12-97-5 Data Recorder, the 6800 Automatic Graphotype, and the 9620 Optical Scanner. The A-M system applies the plastic credit card technique to manufacturing data collection. Plastic cards are made up at the time a production order is written with the basic information needed to report time and quantities. The Data Recorder, similar to the device used by service stations, is simple to operate and provides a machine-scannable document.

A. B. CHANCE CO. PRODUCTION ORDER & PARTS LIST

CODE	STOCK PART OR CAT. NO.	NAME			QUANTITY	STARTING DATE
C	SPC850	3 IN SCREW ANCHOR		STOCK	29	
PROD. ORDER NO.	R. S. DATE	DRAWING NO.	SEND ORDER TO	PAGE	ORDER DATE	LEAD WKS.	COMPLETION DATE
125681	11/21/66	SPC850	ALLEN ST. PLANT	1	08/07/67	6	

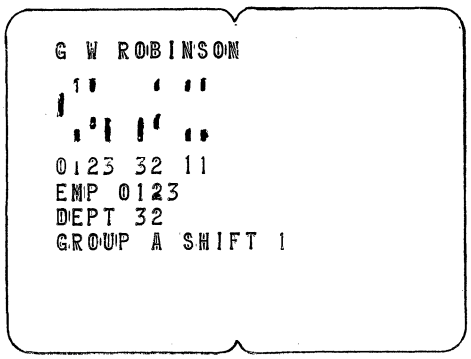
CODE	STOCK NO.	STOCK DESCRIPTION	X DECIMAL/EACH	÷ PCS./EACH
S	4614	CO2 WELDING GAS		

TOTAL QUAN.	U/M	STK. O.K.	AVAIL. INV.	ACTUAL INV.	SCH. DATE	ROUGH WT./100	SCRAP WT./100	FINISH WT./100	U/M	DEPT. USING
2	LBS	YES				5.00		5.00	LBS	

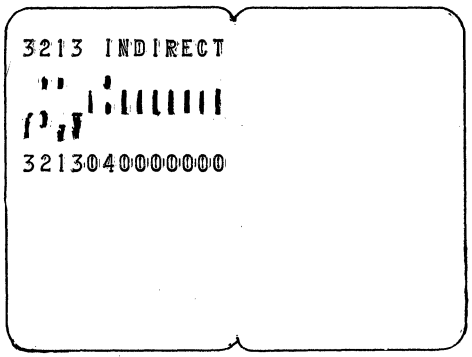
CODE	FINISH NO.	FINISH DESCRIPTION	DEPT. USING	FINISH AMT./100	U/M	TOTAL AMT.	FIN. O.K.

PARTS LIST	QUANTITY PER 100	U/M	CODE	PART NO.	PART NAME	DEPT. USING	PARTS O.K.	AVAIL. INV.	ACTUAL INV.	SCH. DATE	TOTAL QUAN. REQUIRED
OPER-LIST	DEPT. NO.	OPER. NO.		OPERATION	TIME STUDY NO.		MACH. NO.	TOOL NO.	PIECES PER HOUR	STD. HOUR PER 100	TOTAL HRS. REQUIRED
S	4608			**ADDITIONAL STOCKS**							
	1	LBS		045 WELDING WIRE					1.67		
				YES	1.67				1.67	LBS	
				FINISH REQUIRED							
[illegible]				[illegible]					[illegible] 00	LBS	132 NC

A COPY OF THIS PRODUCTION ORDER AND PARTS LIST IS PRODUCED FOR EACH DEPARTMENT THAT PERFORMS WORK ON THE ITEM. THE TOP COPY IS THE FOREMAN'S COPY AND THE BOTTOM COPY IS THE SHOP COPY USED BY THE EMPLOYE. AT THE TOP OF THE BOTTOM COPY IS A POCKET TO HOLD THE PRODUCTION MASTER PLASTIC CARD.



EMPLOYE MASTER PLASTIC CARD CONTAINS THE EMPLOYE NAME ON THE FIRST LINE, EMPLOYE NUMBER, DEPARTMENT NUMBER, GROUP NUMBER AND SHIFT NUMBER ON THE SECOND LINE; ALSO REPRESENTED IN THE BAR CODE JUST ABOVE THE SECOND LINE OF PRINTING--EMPLOYE NUMBER ON THE THIRD LINE, DEPARTMENT NUMBER ON THE FOURTH LINE AND GROUP NUMBER AND SHIFT NUMBER ON THE FIFTH.

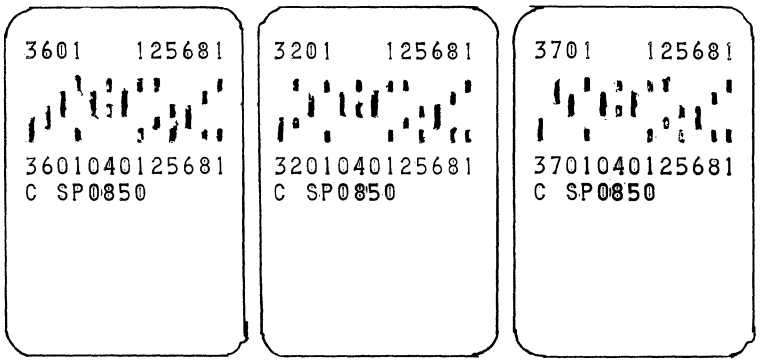


INDIRECT LABOR MASTER PLASTIC CARDS CONTAIN THE ACCOUNT NUMBER AND NAME OF THE ACCOUNT ON THE FIRST LINE, THE ACCOUNT NUMBER, TRANSACTION CODE NUMBER (040) WITH SIX ZEROS TO FILL OUT THE FIELD ON THE SECOND LINE: THIS INFORMATION IS ALSO REPRESENTED IN THE BAR CODE JUST ABOVE THE SECOND LINE OF PRINTING. OTHER INDIRECT CARDS WOULD INCLUDE SET-UP, OVERTIME EXCESS, VACATION AND HOLIDAY. THE FORMAT WOULD BE SUBSTANTIALLY THE SAME.

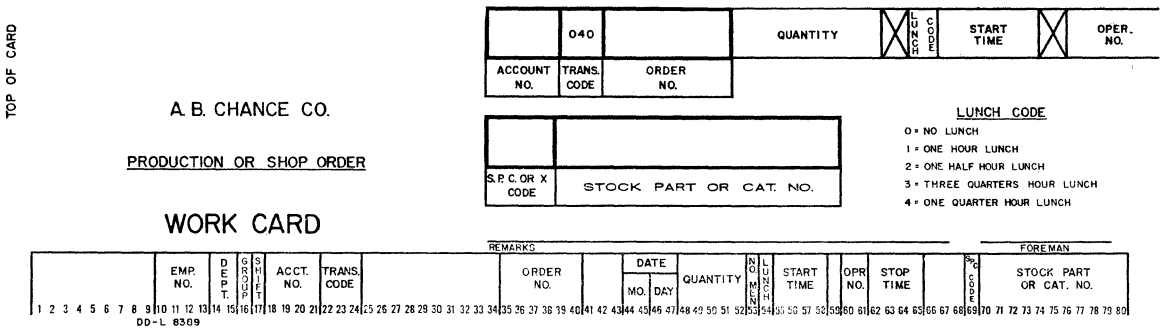
The Data Recorders have the ability of recording information from as many as four separate plastic cards plus being able to enter 14 digits of variable information. These units are inexpensive enough that several machines can be placed in production departments to allow for continual smooth work flow. The scanning device is relatively inexpensive and allows the output to be punched in a pre-planned format. While scanning, the system checks character count and parity check with expanded character scanning. It is a complete system in that the

data comes from the EDP department in the form of cards that are used to create the plastic cards on the Automatic Graphotype. These cards then go to the recorders which produce a scannable copy which, in turn, permits entry into the computer.

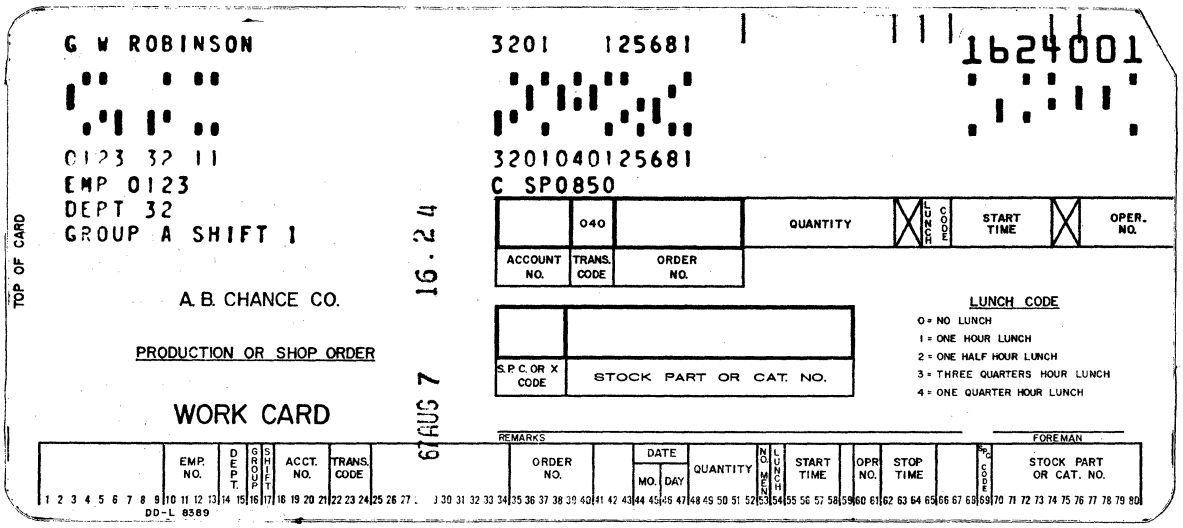
As the production orders are being processed, the H-1200 produces production order cards. These are fed to the Addressograph 6800 which, in turn, produces embossed plastic production order cards. The plastic cards, about 2x1-1/2 in., are put into specially designed pockets in the production order forms. When a production order is released to the factory, each production department on that order receives its own copy with the card attached. As an employe is assigned his work he inserts his employe plastic card, along with the production order plastic card from the production order form, into the Data Recorder. He also sets the variable keys to indicate start time and operation code. Inserting a work card (tab card) in the left side of the Recorder, he activates the recorder platen, removes his data cards to work racks, and goes about his assigned task. When the employe finishes this particular operation, he then inserts the same work card (this time to the far right of the recorder), sets in his quantity produced and whether or not there was lunch time taken during this particular operation, and records the information. This then gives us a human and machine sensible document with all the information necessary for labor reporting, production control, and inventory purposes. The completed documents are then edited, approved, and forwarded to the EDP department for processing on the 9620 Addressograph Scanner. This device punches the bar code information into tab cards for updating the "In Process" file.



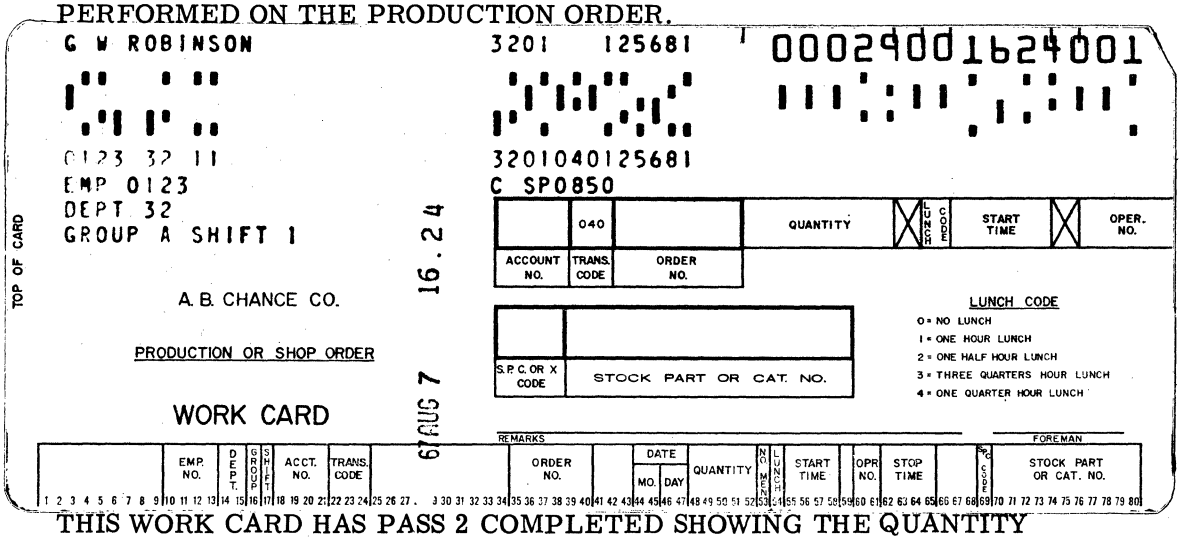
PRODUCTION MASTER PLASTIC CARDS CONTAIN THE ACCOUNT NUMBER AND PRODUCTION ORDER NUMBER ON THE FIRST LINE, ACCOUNT NUMBER, TRANSACTION CODE (040) AND PRODUCTION ORDER NUMBER ON THE SECOND LINE AND STOCK, PART, OR CATALOG CODE AND NUMBER ON THE THIRD LINE. THERE IS ONE CARD FOR EACH DEPARTMENT ON THE PRODUCTION ORDER.



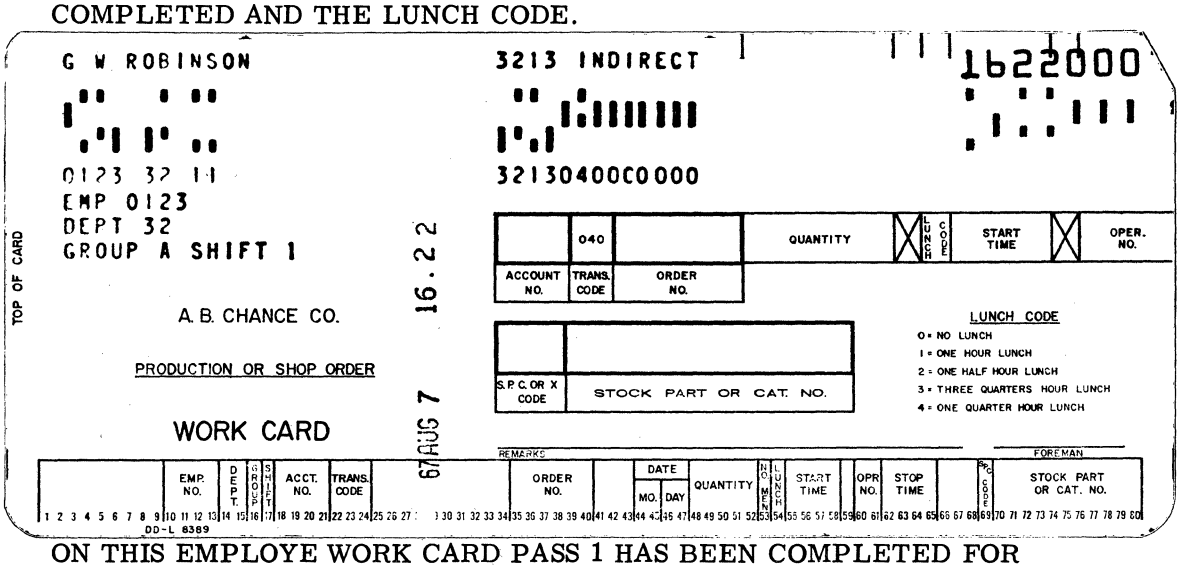
BLANK EMPLOYE WORK CARD.



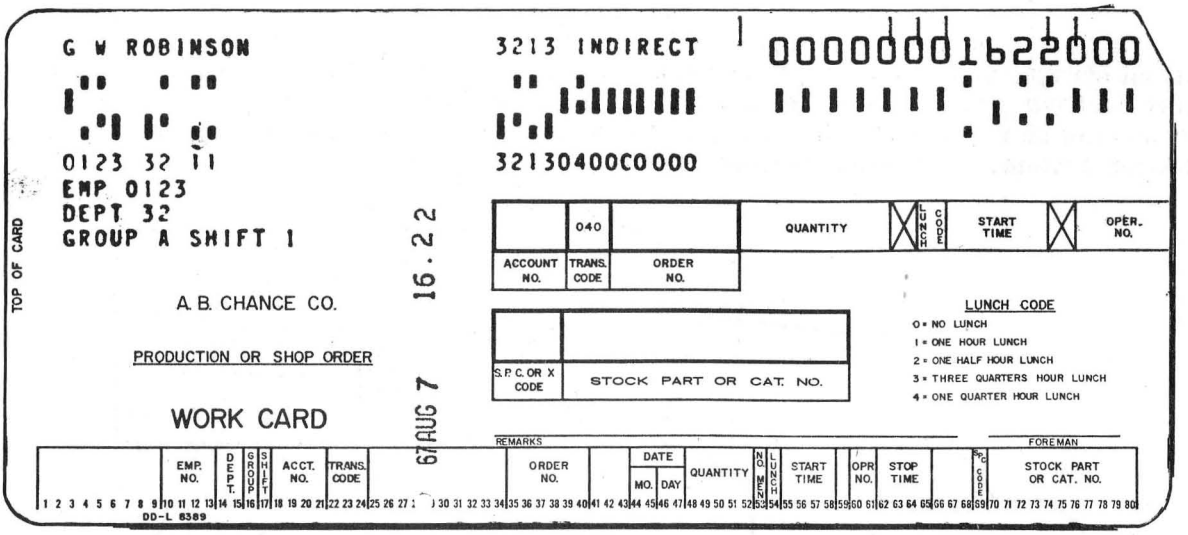
THIS EMPLOYE WORK CARD SHOWS THE COMPLETION OF PASS 1 ON THE DATA RECORDER. THE TIME IS RECORDED ON A JOB CLOCK AND THEN THE MASTER PLASTIC CARDS ARE USED TO GIVE THE INFORMATION ABOUT THE EMPLOYE: WHAT TYPE OF WORK HE IS DOING, START TIME AND OPERATION NUMBER. THE CARD REPRESENTS DIRECT LABOR WHICH IS PERFORMED ON THE PRODUCTION ORDER.



THIS WORK CARD HAS PASS 2 COMPLETED SHOWING THE QUANTITY COMPLETED AND THE LUNCH CODE.



ON THIS EMPLOYE WORK CARD PASS 1 HAS BEEN COMPLETED FOR INDIRECT LABOR IN DEPARTMENT 3200. THE START TIME IS RECORDED AND ZEROS ARE USED TO COMPLETE THE OPERATION NUMBER FIELD.

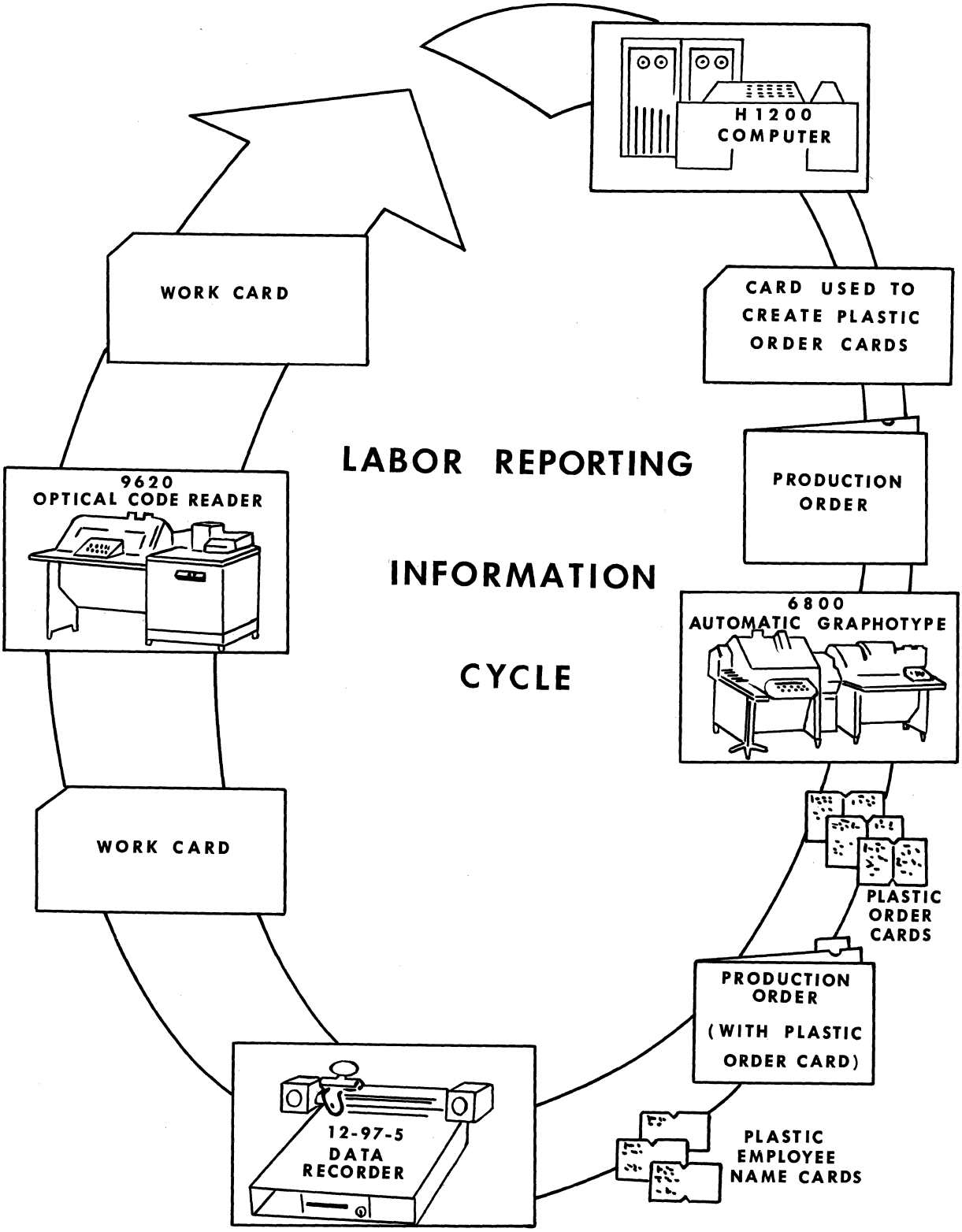


THIS CARD SHOWS PASS 2 COMPLETED. NO QUANTITIES ARE REPORTED ON THIS CARD, BUT ZEROS ARE USED TO COMPLETE THE FIELDS.

Potential applications include receiving and maintenance, as well as production. For example, as a purchase order is issued, there is a plastic card made to indicate vendor, date, and purchase order number. This is then forwarded to Receiving along with a copy of the purchase order which is filed by purchase order (P.O.) number. As the vendor items are received, the particular line of the P.O. that an item is written on is set in as a variable on the recorder along with quantity accepted. If a quantity is to be rejected, this, along with a reason code, may also be entered. Maintenance men have embossed plastic employe cards and plastic work cards consisting of machine number and location, color coded as to time the maintenance is to be performed. The foreman assigns each man a specific machine and makes a recording from these two cards along with start time and operation code, whether scheduled, special, etc. The maintenance man then performs his work on that machine and records his stop time and sets in whether or not there were any special items that required attention. If so, he writes the information in by hand, returns the work card to the foreman and is assigned another job.

AN OPERATOR MAKES A RECORDING ON THE DATA COLLECTION DEVICE. PERSONNEL CARDS AND INDIRECT SET UP AND OVER-TIME EXCESS CARDS ARE IN THE RACK TO THE LEFT. THE CARD AND STORAGE RACKS ARE IN THE BACKGROUND.

Some other areas which appear to lend themselves to this system are foundry scrapping, material scrapping, and warehouse inventory, all of which follow the same basic concept. "We believe we have found a data collection system simple and accurate enough (not to mention inexpensive) to be implemented in areas that would never have been feasible with any other collection system," says Data Processing Manager Scott Schawl.



RESULTS AND FUTURE PLANS

In addition to these data processing developments at corporation headquarters in Centralia, there is parallel progress in the Pitman Div. headquarters and at Universal Pole Bracket. Pitman leases a Honeywell H-120 for accounts receivable, accounts payable, stock status, bills of material, and order entry processing. Universal Pole Bracket uses an outside data processing service for its inventory control system and for assistance in engineering problems. President Nathan A. Toalson lists these primary objectives for the corporation as a whole:

1. Increased inventory turn with its accompanying reduced inventory dollar values.

2. Better utilization of factory equipment and personnel.

3. Better forecasting for management planning.

4. Increased customer service provided by better communications between the various sales offices and factories.

5. More timely and accurate management reports.

6. Computer assistance to the Engineering Departments for the solving of complex design and analysis problems."

To meet these objectives, three things must occur. First, the final portion of the present system must be completed and overall systems must be perfected. Second, a communications network must be established to link the sales offices from around the country to the home office computer. And third, the total system must be generalized to allow its application for the various divisions.

To meet these needs, a five-year program has been outlined. It calls for: delivery of random access files, real-time application of the MIS, on-line engineering applications, inventories of other plants on-line and field warehouse inventories on-line. When these have been accomplished, it will then be possible to put the sales offices on-line to the master inventory, thereby completing the link between sales offices and the factories.