INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Advanced Integrated Information System
Type of Industry	Valve Manufacturer
Name of User	The Lunkenheimer Co. Cincinnati, Ohio

Equipment Used	IBM 1440 Data Processing System

Synopsis

Development of an advanced integrated information system, utilizing an IBM 1440 computer, has enabled The Lunkenheimer Co., a broad line valve manufacturer, to reduce costs, boost production efficiency and improve customer service.

Designed primarily to facilitate manufacturing functions, the computer system actually provides a totally integrated operating approach offering advantages in accounting and sales, as well as in the plant. Control functions cover production forecasting, order entry processing, inventory management, work scheduling, manufacturing work order processing, and management information development. Key to the operation are centralized information files, using interchangeable 1311 disc packs. Records maintained on these files include parts lists, inventory (finished stock, components and materials), prescribed method of manufacturing (work sequencing and standards), unshipped orders and work-in-process (assemblies and manufacturing work orders), and sales statistics and payroll data.

 Beginning with an annual forecast of estimated sales volumes for the calendar year, the computer breaks down the dollar projections to valve types, components, raw materials and labor requirements. After management review and computer adjusting to actual market conditions, assembly orders for various finished end products are developed for the coming quarter. This includes computer determination of required components, check of component stock inventory file and issuing of manufacture order or purchase requisition, development of plant routing sequence, and scheduling of start dates and machine load hours required. Also prepared is a traveler document which accompanies each order through the various production and assembly stages and which is used to update the work-in-process file.

This interrelated cycle is geared in such a manner as to provide the company with the most economical order quantities for materials and parts, the correct plotting of capital expenditures, and a continuous classifying of inventory problems.

Order entry and follow-up, which also is linked to the system, gives further manufacturing/management controls which enable the company to adjust day-to-day operations and respond quickly to changing market conditions.

The Lunkenheimer Co., manufactures valves and considers itself a moderate size manufacturer. Subsidiaries include the Hale Co., Tulsa, Okla.; Lunkenheimer-Morrison Canada Ltd., Toronto, Canada. An affiliate, Fabrica De Valvulas Senkowski S.A., in Guadalajara, Mexico, is planned to manufacture and sell certain valves in Mexico. Licensees are M. B. John & Hattersley Ltd. in Ballarat, Australia and Siderurgica Termec, S.A.I.V.C. in Buenos Aires, Argentina.

Lunkenheimer, using an IBM 1440 computer and 1311 direct access magnetic disc data files, has built an integrated operating approach which helps control the entire business cycle--from forecasting market requirements to delivering the finished products.

EDP at The Lunkenheimer Co.

The Lunkenheimer Co. did not develop its integrated information system overnight. It had been using an IBM RAMAC system since 1960 when nearly all of the data processing job functions were implemented. The 1440 was installed to provide the processing speed and versatility, and the information storage capacity, needed to perfect an integrated systems approach.

Information storage, built around the concept of centralized information files, is basic to Lunkenheimer's information system. Master records are maintained on direct access, interchangeable disc packs where all, or any part, of any stored record is instantly available for review or updating. The key master files include a listing of all valve components, a record of finished valves in stock, components in stock, and materials needed to manufacture components. Also included in these master files are data showing prescribed methods of manufacturing (both sequencing and standards), and unshipped order information and work-in-process listings (assemblies and manufacturing work orders). Other disc packs are used to accumulate such management data as sales statistics and payroll requirements.

The System

Constantly evolving, yet continuously available information helps the company reduce costs, boost production efficiency and improve customer service. This is accomplished by utilizing the computer for:

Production Forecasting. The computer explodes long-range requirement forecasts to pinpoint finished product and component parts needs. It quickly adjusts forecasts to shifting customer buying patterns. Thus, Lunkenheimer production can stay in tune with the actual needs of the marketplace.

Order Entry Processing. Automated order entry produces shipping documents and customer acknowledgement copies which quickly indicate the availability of items ordered so that action can be initiated promptly to fulfill shortages.

Inventory Management. Finished goods inventory is updated daily and the system automatically triggers replenishment orders when stock falls below pre-set minimum levels. Order lead time, says company management, has been reduced by at least a week, the Finished Goods short list has been cut an average of 50 percent and there is a better distribution of the inventory investment.

SHOP ORDER RELEASE CARD

F. 1172 LUNKENHEIMER CO.

| SHOP ORDER NO | PART NUMBER | RAW MATL AMT | RAW MATERIAL CODE NO | AMT. FT | U M | M | PCS/BOX | START | FINISH | QTY ORDERED |

| SHOP ORDER NO. | RAW MATERIAL CODE NO | PART NUMBER TO BE MADE | MATL | AMT OF RAW MAT REQUIRED | M S NO | UNIT MEAS | QUANTITY ORDERED | SHOP ORDER ADDR. | PCS PER BOX | START DATE | FINISH DATE | AMT IN FEET | RAMAC ADDR OF RAW MATL | C C |

REMARKS

JOB CARD

F. 816 LUNKENHEIMER CO.

| ORDER OR ACCT NO | SYMBOL OR FIGURE | OPER NO | QTY ORDERED | SETUP HRS | STD / 100 | SET UP FRACT | RATE | HRS WK | QTY GD | ENTY WK | EMP NO |
| SIZE | SYMBOL OR FIGURE | DESCRIPTION | WEEK ENDING DATE | | | | | SPECIAL ORDER OR ACCOUNT NO | | | |

EMPLOYEE NO. | MACHINE P.R. NO. | OPERATION NO. | DESCRIPTION

QUANTITY GOOD | FDRY DEFECTS | TYPE OF JOB CARD | REMARKS

☐ BRACKET   ☐ COMPLETE

HRS BRGHT FWD. | STD TO BE PD | AUTHORIZATION | SETUPS ALLOWED MOLDING ONLY 1 2 3 4 5 6 7 | STD | HRS | PREM | HRS

SETUP TO BE PD | SETUP FRACTION | PREM WAGES

CURRENT WK HRS

COST CENTER | PAY PER | 1 2 3 4 5 6

MATERIAL EXPEDITE CARD

F. 1174 LUNKENHEIMER CO.

| SHOP ORDER NO. | PART NUMBER | RAW MATL AMT | RAW MATERIAL CODE NO | AMT FT | U M | M | PCS/BOX | START | FINISH | QTY ORDERED |

| SHOP ORDER NO. | RAW MATERIAL CODE NO. | PART NUMBER TO BE MADE | MATL | AMT OF RAW MAT REQUIRED | M S NO | UNIT MEAS | QUANTITY ORDERED | SHOP ORDER ADDR | PCS PER BOX | START DATE | FINISH DATE | AMT IN FEET | RAMAC ADDR OF RAW MATL | C C |

PURCHASE ORDER NO | QUANTITY | SUPPLIER | DATE WANTED

DESCRIPTION

DATE | DATE PROMISED | BUYER | PROD. P. L. AUTHOR

MATERIAL REQUISITION

F. 1171 LUNKENHEIMER CO.

| SHOP ORDER NO | PART NUMBER | QTY ORD. | RAW MATL CODE NO | AMT FT | U M | M | COMP ADDR | DATE | AMT RESERVED |

| SHOP ORDER NO. | RAW MATERIAL CODE NO | PART NUM BE MADE | | QUANTITY ORDERED | UNIT MEAS | AMT OF RAW MAT REQUIRED | LOCA | RAMAC ADDR OF COMP | DUE DATE | AMT IN FEET | RAMAC ADDR OF RAW |

DELIVERED | BALANCE

PREM. SOU. 9X10

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PUNCHED CARDS USED TO MAINTAIN INVENTORY RECORDS AND TO UPDATE DISC FILES.

Work Scheduling. The system not only balances plant loading of the various work centers but sequences individual order operations work flow for the most efficient utilization of machines and manpower. Waiting and set-up times are held to a minimum, and there is much higher percentage of performance on scheduled operations.

Manufacturing Work Order Processing. The automated and integrated system procedures quickly determine material and components availability, thus eliminating unnecessary delays in scheduling. Purchase Order lead time for the replenishing of materials and components inventories has been reduced as much as two weeks. Updated work-in-process files, moreover, keep track of the progress of each manufacturing order from its inception to its receipt in the stockroom.

Management Control. The computer system furnishes up-to-date, accurate information management needs for both long-range planning and day-to-day decision making. Executives can request from the system status information on inventory, schedules or production. Regular exception reporting flags attention to potential shortages, excessive cost buildups, performance variations and other trouble situations.

Control Strategy

The trigger for the Lunkenheimer 's integrated information system is the annual forecast. This spells out, in advance, estimated sales volumes for the calendar year. Using statistical techniques, the computer performs a series of explosions from the long-range dollar forecast data -- breaking down the projection from dollars to valve types -- to components -- to raw materials -- to labor requirements.

This forecasting procedure is essential to effective materials and production planning, for the exploded sales forecast gives management the base from which to determine the most economical order quantities for materials and parts, for plotting capital expenditures and for classifying inventory problems. Without the computer, however, these detailed projections would be impossible to develop.

All forecast projections are reviewed by a planning committee and balanced against actual sales and production performances. Current sales patterns, inventory and operating levels are then fed to the computer system which works over the new data (exponential smoothing) to adjust the forecast to market conditions -- what the customers are buying and are likely to buy in the current period. The planning committee subsequently develops a production authorization level for the coming quarter. This production authorization puts the computer to work again, and triggers preparation of required assembly orders for various finished end products. All these assembly orders are then reviewed by a materials control supervisor, after which the assembly data is used by the computer to explode the required components against the parts list master disc file. This file contains the detailed components breakdown for each of the 2,500 valve products and related specialties Lunkenheimer manufactures.

ASSEMBLY ORDERS TO BE REVIEWED BY A MATERIALS CONTROL SUPERVISOR ARE TRIGGERED FOR REQUIRED END PRODUCTS. THE INSPECTION REPORT IS A PERMANENT COPY.

During the parts list run, the computer reviews the component stock inventory file to check for availability and either issues the shop order to manufacture the required components or prints a purchase requisition. A similar computer run explodes the list of shop orders and reviews requirements against the raw materials inventory disc file. The result of this inter-related cycle is a direct production planning procedure from the initial determination of valve requirements for the period to materials specifications and replenishment reordering, all in a matter of hours.

At this point in the materials and production scheduling routine, the 1440 system explodes the list of shop orders against the operations master disc file. This results in the automatic preparation of documents indicating routing sequence through the plant, the schedule date and the machine load hours required. A "traveler" also is prepared at this time, which will accompany each order through the various production phases and which will expedite the entry of individual job information on the work-in-process disc file.

AFTER PREPARATION OF PLANT ROUTING SEQUENCE, SCHEDULE DATE AND MACHINE LOAD, THE TRAVELER ACCOMPANIES EACH ORDER THROUGH THE VARIOUS PRODUCTION PHASES.

When a customer order is entered from any of Lunkenheimer's nationwide network of distributors, or from one of the company's own warehouses, it is immediately converted to punched card form, entered into the 1440 system and checked for availability of merchandise against the finished stock inventory file. If the order happens to be a "make" request, it is checked against component stock inventory file and then scheduled for production.

All inventory records maintained on the disc files are automatically updated against the requirements of the order, and an unshipped order file is created on a transaction disc pack. This transaction pack is used for pricing and sales statistic breakouts and later merged with the master unshipped order disc file.

Actual release of the order for shipment is determined by the order status department, using the customer's requested delivery date, availability and most economical shipping weights as the basis for delivery. After shipment is made, notification is sent to the data processing department and a spread card is prepared showing items, if any, on the order which were not shipped. This card is processed against the unshipped order file, and invoices and back-order lists are printed. Currently, an average of 250 customer orders a day are being processed through the system in this manner.

The only part of the entire order handling procedure which is not included in the integrated information system is Accounts Receivable. This function is accomplished by producing a summary card as a by-product of the invoicing run. This card is used in maintaining an open invoice card file from which monthly statements can be prepared off-line at the end of each month.

Finished stock inventory is reviewed on a daily basis, and a weekly summary shows sales by item for the period, including available (on-hand, on-order) balances. Every four weeks, the system recalculates reorder points (pre-set minimum level triggers) based on actual use patterns.

DAILY AND WEEKLY STOCK AND PARTS REVIEWS KEEP INVENTORY AND REORDER NEEDS BEFORE MANAGEMENT.

Results and Future Plans

For Lunkenheimer, this information system, with its integration of data in central disc files, has permitted tighter, more responsive control over every phase of operation. Accurate, long-range projections help the company plan for optimum utilization of manpower and physical facilities and to arrange for the most economical inventory investment.

The system also has provided a flexibility to adjust forecasts and manufacturing commitments to respond to changing market conditions. Moreover, through automated order entry and follow-up procedures, the potential for costly production bottlenecks is reduced, and standards of performance are upgraded through optimally derived schedules of plant loading and work flow.

Lunkenheimer fully expects that this system will further heighten its market position in this business through better price competition. Through better customer service and reduced operating and production costs, the company feels that even though it is a moderate sized manufacturer, it can compete successfully with even the largest of its contemporaries.