Applications	Service Parts Inventory Management
Type of Industry	Construction Equipment Manufacturer
Name of User	International Harvester Company

Equipment Used	IBM System 360/Model 40

Synopsis

International Harvester is keeping spare parts where they are needed --
on the distributor's shelf -- with an inventory system called SPIM.

SPIM, which stands for Service Parts Inventory Management, is currently
serving approximately 44 IH construction equipment distribution outlets
across the country, providing fast and easy access to replacement parts by
eliminating bottlenecks in parts ordering practices.

At the heart of SPIM is an IBM System/360 Model 40 computer with a
storage capacity of 128,000 characters of information. Located at IH's
data processing center in Broadview, Ill., the computer handles all items
in a distributor's total parts inventory plus small supply items. It is not
restricted to handling data on International Harvester parts, but also includes
data on replacement parts of other manufacturers and suppliers.

The system's intent is to eliminate peaks and valleys in parts ordering
practices, reduce emergency shipments and allow the manufacturer to
improve parts production planning.

A worldwide manufacturer of heavy truck, farm and construction equipment, International Harvester sells over $4 billion of equipment a year in the United States and abroad and employs 80,000 persons in the U.S. alone.

It has major subsidiaries in Argentina, Australia, Brazil, France, Germany, Great Britain, Mexico, the Philippines, South Africa and Sweden. Harvester is a participant in joint manufacturing ventures in El Salvador, India, Japan, Tunisia, Turkey and Venezuela, and has selling subsidiaries in Belgium, Denmark, Italy, Kenya, New Zealand, Peru, Puerto Rico, Spain, Switzerland and Uruguay.

The SPIM system described in this report is used by the construction equipment division of the company's U.S. operations.

BACKGROUND TO SPIM

In the past, International Harvester has made it a practice to utilize data processing equipment wherever applicable. The SPIM program came into being when a distributor, who recognized that his parts inventory control methods were becoming inadequate, asked IH management what could be done to assist distributors with this problem.

IH systems experts worked in tandem with a team of the company's parts specialists for more than a year to solve the problem. What evolved is a unique system that is eliminating the peaks and valleys so common in the parts handling business.

The complexity of the distributor's ordering and stocking problem requires the capacity of a large computer. But the cost factor -- when weighed against the fact that the average distributor would need only about 10 minutes a week to process his orders on a large scale computer -- makes it more practical for International Harvester to provide the service for a relatively small fee. The distributor is able to bear his portion of the costs. In return, he benefits from the speed and efficiency with which the computer can process his orders without making a large commitment to EDP equipment which would go unused much of the time.

Ordering With SPIM

The SPIM ordering process begins in Broadview, Ill., at IH's computer center. Each week each distributor receives a weekly International Harvester stock order predicated on automatically determined order points for each item in his inventory. The computer determines when a specific part is needed - and specifies the exact quantity to order to replenish inventory.

In theory, the system is very much like old style visible order systems. EDP, however, speeds up the manual steps considerably and processes orders at a much faster pace.

The distributor has the last word on the weekly suggested parts purchase order. He can agree or disagree with the computer's calculations of his inventory needs, deleting or adding items as he sees fit. When the form is completed two of the three copies are mailed back to IH's parts depot. The third copy goes to a distributor, and the second copy is eventually shipped with the material as a packing list.

The distributor also gets a suggested parts purchase order which is sent weekly to outside vendors. The distributor also has the option to change these as he sees fit. The first copy is perforated so the extended amount can be torn off and the listing attached to the distributor's own purchase order.

THE SUGGESTED PARTS PURCHASE ORDER IS PREPARED BY THE COMPUTER EACH WEEK FOR EACH OF THE HARVESTER BRANCH VENDORS.

AN ORDER IS WRITTEN FOR A HARVESTER PARTS DEPOT EVERY WEEK AND SENT TO A BRANCH FOR REVIEW. THE BRANCH MAKES CHANGES, MAILS THE FIRST AND SECOND COPIES TO THE DEPOT: THE SECOND COPY COMES BACK TO THE BRANCH AS A PACKING LIST.

Besides keeping track of low and out of stock items, the computer also eliminates duplicate parts ordering where there is a surplus inventory at a distributor's second location. Weekly, as the daily transactions are processed, each part number is screened by the system's memory to determine what portion of the inventory is surplus stock, as well as the location of that surplus. Thus, when there is more than one branch involved the computer can order the needed parts from the overstocked location, rather than going through another supplier. This is only done, however, when the dollar value warrants it.

DISTRIBUTOR _____ BRANCH _____	TRANSACTION REPORT				DATE _____

VENDOR	PART NUMBER	SEQUENCE NUMBER	TYPE ENTRY	DOCUMENT NO.	QUAN. / STOCK CLASS / VENDOR	EXTENDED COST / UNIT COST / REPLACING (NEW) PART NUMBER	C. T. REBATE / LOCATION /	EXTENDED PRICE / UNIT PRICE / REPLACING SEQU. NO.	VENDOR	PART NUMBER	SEQUENCE NUMBER	TYPE ENTRY	DOCUMENT NO.	QUAN. / STOCK CLASS / VENDOR	EXTENDED COST / UNIT COST / REPLACING (NEW) PART NUMBER	C. T. REBATE / LOCATION /	EXTENDED PRICE / UNIT PRICE / REPLACING SEQU. NO.

THE TRANSACTION REPORT IS A WEEKLY RECORD OF ALL INPUT ENTRIES PROCESSED BY THE COMPUTER

An important aspect of SPIM is billing price verification. The computer checks each item billed against price, and notifies the distributor if any discrepancies are found.

Receipt Cards

At the same time the distributor receives purchase orders from the data processing center, he also receives a deck of punched receipt cards -- one card for each item ordered. The cards are filed as unfilled purchase orders (after corrections and deletions from the purchase order are made). They're used to alert the distributor to a number of conditions.

When the distributor receives the exact quantity ordered he pulls the receipt card from the unfilled purchase order file and submits it to the data processing center. If a partial quantity is received and the balance back-ordered, the distributor destroys the receipt card and punches a new one. Acknowledgement of the exact quantity received is sent to Broadview and a second receipt card containing the quantity back-ordered is placed in the unfilled purchase order file.

The receipt card serves as double check on the supplier. When the quantity received differs from the quantity shown on the purchase order or packing list, adjustments are made on the card, either by adding or subtracting the exact amount received. A remarks column on the card provides a special place for overshipments, undershipments and cancellations.

Items cancelled or no longer available are also shown on the receipt card. The part number is entered on the SPIM master record and forwarded to the data processing center to prevent the computer from ordering the part again on the next stock order. A similar procedure is followed when part numbers are changed or new replacement parts are added to replace older numbers.

THE SYSTEM

Coding & Initiating the System

Each distributor is assigned a three-digit code number which serves as his identification within the system. The number is punched on all cards sent to the data processing center and is included on all reports. If the distributor has several branches, an additional two-digit code is assigned to each branch.

Another three-digit code is used to identify each of the vendors who sells to distributors. The vendor codes are divided into three different groups: vendors coded by IH, vendors not coded by IH (these may be assigned numbers by the distributor) and codes covering used and rebuilt parts.

In order to program the computer to recognize the different factors to be considered when calculating order points and quantities, a stock class code is assigned to each part number.

There are stock class codes for seasonal and non-seasonal items, stock and non-stock items and items purchased locally.

An eight-column field is available in the computer reports to record the warehouse location and quantity of each part. Each distributor may take a physical inventory on pre-punched and pre-printed cards and record the warehouse location of each item. This is not a prerequisite for starting the system.

In order to initiate SPIM, three sets of cards are required. They are master record cards, stock status and demand history cards and replacement part record cards. The replacement part record cards are used for items still in a distributor's inventory which have been assigned new part numbers.

ORDER ANALYSIS & STOCK STATUS REVIEW

STOCK CLASS LEGEND
1 NON-SEASONAL 7 ORDER LOCALLY
2 SEASONAL 8 NON-STOCK (3 ORDERS)
6 NEW MODEL 9 NON-STOCK (2 ORDERS)
F SPECIAL STOCK ITEMS

I H BRANCH UNION, N.J.
DISTRIBUTOR 735   BRANCH 02   DATE 09-15-67

SYMBOL LEGEND
BLANK-TENTATIVE ORDER
1 - NEGATIVE ON HAND
2 - NEGATIVE ON ORDER
3 - CHANGE STOCK CLASS
4 MANUAL ORD POINT OVER-RULED
5 INQUIRY
8 REVIEW MONTH IS ZERO
9 RECLASSED TO NON-STOCK
D DROPPED

VENDOR	SEQUENCE NUMBER	PART NUMBER	DESCRIPTION	STK CLASS	SYMBOL	UNIT COST	ON HAND	PREVIOUS UNFILLED ORDER	NEW ORDER	PKG MULT	SET MULT	CURR. MO. DEM'D	PRIOR 12 MO. DEMAND	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SALES ORDERS	ORDER POINT
100		3044436R1	O RING	9	1	.16	1.0-					1			RE	PLAC	ED-B	Y**100-			-38	18	71	R1			
223		204196M1	TOOTH	1		18.13	4.0		2		1	17			4			7						6	6	6
295		HS898	ELBOW	F	3	.27			1		1	1					1							2	1	
295		W900-204	GASKET	1		13.39		1	1		1	4							1	1				2	5	2
		371338	BLADE	1		4.92	1.0		1		1	4		1					2	1				5	2	
		109352H1	FELT	1		1.09	3.0		4		4	10	4	3			1				1	3	-2	9	4	
		109376H1	DOWEL	.		.12	30.0					.05	16	46	6			9		8			20		12	

THE ORDER ANALYSIS AND STOCK STATUS REVIEW SHOWS THE STATUS ON EACH PART ORDERED SO THE ORDER CAN BE APPROVED OR ADJUSTED BEFORE IT IS SENT TO THE SUPPLIERS.

STOCK STATUS & BIN LOCATOR

PAGE

VENDOR	SEQUENCE	PART NUMBER	DESCRIPTION	STK CLASS	BIN LOCATION	ON HAND	ON ORDER	PRICES				PER C BYPASS	DEMAND			SALES ORD PRIOR 12 MOS	PKG MULT	SET MULT	CURR MONTH SALES	ORDER POINT
								CT	LIST	COST			2ND PRIOR CAL. YEAR	1ST PRIOR CAL. YEAR	CURR. YTD					

THE STOCK STATUS AND BIN LOCATOR REPORT SHOWS THE STATUS OF INVENTORY AT MONTH END AND INVENTORY VALUES BY STOCK CLASS AND VENDOR. IT ALSO SHOWS DEMAND HISTORY OF ITS PARTICULAR PART NUMBERS.

The cards may be punched directly from the distributor's stock card, or by drawing off the required information onto work sheets for keypunching. One working sheet is required for IH parts. Another is for recording parts received from suppliers other than IH. Because the selling price and unit cost of IH parts are already coded into the computer, it is not necessary to include them on the work sheets.

A master card is punched for each part which is either in inventory or on an unfilled stock order. Cards are not punched for items on open or special (one-of-a-kind) order. For each master record card a stock status and demand history card is punched.

Other Input and Output

The distributors supply the computer center with a variety of input. Cards are punched for orders, receipts, sales, transfers, customer returns, returns to vendors, inventory adjustments and lost sales. When this information is digested by the computer, it compiles marketing and inventory information for the distributors.

Sales

Each sales invoice form and credit memo contains a vendor code, part or sequence number, description, stock replenishment number, shipping data, back order date, price and amount.

Sales of material procured on special purchase orders are recorded differently from sales shipped from inventory because there is not always a computer master record for special orders. Special order sales are not price checked because the price is normally not recorded on the computer stock status record.

Weekly output besides stock and purchase orders include messages, zero balance tests, transaction lists, transfer orders, an order analysis and stock review and receipt cards.

In addition to weekly reports, monthly data, including locations and price lists, company availability reports and stock status reports are received by distributors. An annual surplus list is also printed-out.

Benefits of the System

Many distributors consider faster availability of parts as the system's major benefit.

International Harvester also benefits from the system with better ordering practices, better distributor relations, more efficient parts distribution, resulting in better service to the user. Management believes that in the future, further applications will result from increased user feedback enabling the SPIM system to provide IH distributors with better marketing and inventory control information.

One of the most valuable tools to come out of the SPIM system is the Weekly Parts Order Analysis and Stock Status Review. It shows all items that have been tentatively ordered by the computer; any item which should be analyzed for changing from a non-stock to a stock classification; those items in which the on-hand plus on-order quantity is below the order point; any item on which the number on order plus the quantity on-hand is still below the order point and the status of any part the distributor requested to be analyzed by the computer.

These conditions continue to remain on the report until something is done to correct them, and serve as a reminder to the distributor.

The report also contains a monthly breakdown of sales which the distributor can use to evaluate his inventory. The computer takes abnormal sales orders into account when calculating reorder points, thereby eliminating the possibility of an unusually large order forcing a change in what should be normal re-order points.

Time Supply	Inventory Code	Letter	Inventory Code	Letter	Inventory Code	Letter
No. Demand for Three Years	8, 9	A	1, 2, 4, 5, 7	B	6, F	L
Inventory Exceeds 3 Year's Demand	8, 9	C	1, 2, 4, 5, 7	D	6, F	M
Inventory is a 2 to 3 Year Supply	8, 9	E	1, 2, 4, 5, 7	F	6, F	P
Inventory is a 1 to 2 Year Supply	8, 9	G	1, 2, 4, 5, 7	H	6, F	R
Inventory is Under a 1 Year Supply	8, 9	J	1, 2, 4, 5, 7	K	6, F	T
Replaced Items	9					

S. P. I. M.
COMPANY AVAILABILITY

DISTRIBUTOR_____ DATE_____

The quantities shown will be the inventory at each branch unless the inventory quantity is less than the order point for stock items. If the inventory is less than the order point, the order point will be shown.

The letter code after each quantity indicates the time supply.

VENDOR	SEQUENCE NUMBER	PART NUMBER	DESCRIPTION	UNIT COST	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22

BRANCH ORDER POINTS OR INVENTORY (WITH ASTERISK)

EACH BRANCH RECEIVES A COMPANY AVAILABILITY REPORT EACH MONTH. IT SHOWS WHAT MATERIAL IS AVAILABLE AT EACH OF THE BRANCHES AND CAN BE USED TO LOCATE MATERIAL TO FILL CUSTOMER ORDERS.

DISTB 735   BR 00   FILE MAINTENANCE LISTING   09-15-67

VEN	PART/SEQ NO.	T/E	DOCMT	DEMD	LOCATION	S/C	PRICE	COST	CN ORD	ON HAND	REPLACING VEN/SEQ/PART
100	104938	F	CT109				.40				
100	1856993	F	CT109				.18				
100	1903870	F	CT109				.18				
100	1910225	F	CT109				1.30				
100	2A7ZDC	F	CT109				22.00	14.60			
100	24A7ZDC	F	CT109				22.00	14.60			
100	27A9ZDC	F	CT109				42.50				
100	702378C1	F	CT109				55.22	35.89			
100	817076	F	CT109				.25				
100	260477R11	9	RP512								100/ /251050R2
100	260477R11	9	RP512								100/ /260477R1
100	260477R11	9	RP512								100/ /250610R2
100	260477R11	0									100/ /250617R1
											/221421R1

ANOTHER LISTING OF ALL INVENTORY ITEMS FOR A SPECIFIC COMPANY (BRANCH).

I H BRANCH   BALTIMORE, MD.   09-15-67   PAGE   1

I H BRANCH   SACRAMENTO, CAL   09-15-67   PAGE   1

FILE MAINTENANCE ERRORS

DISTB 730   BR 01   ZERO BALANCE TEST   09-15-67

VEN	PART/SEQ NO.	T/E	DOCMT	QUANTITY	COST	PC	SC	SMI	DESCRIPTION	COMMENTS
100	320113R1	2	S0823	1.						
100	332664R91	2	S0823	1.						
100	341328R1	2	S0823	2.						
251	21-300	2	S0823	2.						
			S0823							OUT OF BALANCE 6
295	103546H1	2	S0825	2.						
			S0825							OUT OF BALANCE 2
100	278272R1	2	S0830	1.						
100	279302R1	2	S0830	2.						
100	279304R1	2	S0830	1.						
100	290045R1	2	S0830	5.						
100	293139R1	2	S0830	1.						
100	324387R1	2	S0830	1.						
100	327424R92	2	S0830	1.						
100	329797R1	2	S0830	1.						
		2	S0830	1.						

FILE MAINTENANCE ERRORS LISTINGS ARE PART OF THE REGULAR OUTPUT.

The computer program is keyed to catch human errors and notify the distributor if price and quantity don't agree. This report is sent out weekly to vendors. Changes in parts and equipment, as well as in part numbers can number up to 1,500. In the past these required constant updating and a great deal of lost time invested in parts inventory records. Changes are run through the computer weekly and the distributor is mailed a concise report.

The distributor also receives a monthly stock status report which is probably SPIM's most outstanding feature. It provides a total inventory picture, including non-stock items, with demand history, plus the cost of all parts in inventory. The value of this monthly report is that it gives the parts manager a more frequent overview of his inventory, along with total costs -- a big help when figuring the yearly inventory audit. Decisions on what should not be stocked can also be made more easily.

Problems

The SPIM team is still faced with solving a number of problems. SPIM does not show the specific model number of the machine that is related to its parts in the computerized reports and distributors know that new models and modifications require intimate knowledge of both machine and parts.

Turnaround time from parts sale to replenishment receipt needs to be speeded up. IH has for the most part corrected this using Data-phone data sets, and by having parts orders go directly to the IH parts depot and not back through the distributor.

Because each distributor has unique problems and methods of operation, the SPIM program cannot provide individualized service unless that service can be utilized by other distributors.

Conversely, there is a benefit to be gained in having the parts problems handled by a central clearing house and distributors can benefit from an exchange of information with other distributors.

Finally, good manufacturer-distributor relationship is essential to the system to eliminate any danger of the distributor becoming wholly dependent on the manufacturer.

RESULTS

The results of the SPIM system appear to be satisfactory and the system has provided I-H distributors with speed, knowledge and efficiency by bringing ordering techniques up-to-date with electronic advances. It has provided I-H distributors with the use of a computer for ordering and marketing information at a minimal cost. A major advantage to distributors with more than one location is that SPIM enables them to know what merchandise is on hand and where it can be found. This eliminates unnecessary orders and reduces total inventory investment. Thus cash can be allocated for other purposes.