INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications: Controlling Computer Costs

Type of Industry: Manufacturer of Photographic and Audio-Visual Equipment

Name of User: Bell & Howell Co., Photo Products Group
Chicago, Ill.

Equipment Used: IBM 7070

IBM System/360 Model 40

Synopsis

Determined to answer the questions, "Where's all the money going," the Photo Products Group of Bell & Howell Co., Chicago, Ill, undertook a project to pinpoint the cost of its systems and programing personnel. By installing a project control system called Data Project Management System, division management can track down the time spent on a project (both personnel and machine) maintenance effort expended, the accuracy of project cost estimation, and reasons for excesses or over-run. Weekly reports are produced to management that detail the exact costs of the systems and programing projects by the Photo Product Group's staff.

Background

The Photo Products Group of Bell & Howell is a worldwide leader in developing and marketing photographic equipment in all areas of demand, including movie projectors and cameras, slide projectors and still cameras. Located at the firm's corporate headquarters in Lincolnwood, Ill., a Chicago suburb, the Photo Products Group's data processing power is supplied by an IBM 7070 and 360/40. The latter has a 265K memory which has been partitioned into two units of 90K memory and one to 60K. The remaining memory is for three supervisory programs. With three complete sets of peripherals, the partitioning, in effect, produces three separate computers for simultaneous operation.

The Group is comprised of some 90 people, about half of whom are involved in data processing operations, and the others in systems analysis and programing. Director W. R. Snyder is a veteran of over 25 years in systems and data processing work. He reports to the controller of the Photo Products Group, R. C. Ziebarth.

The division's systems, programing and data processing costs are not only pinpointed, they are all charged out on a monthly basis to the "user" departments, who have budgeted for these costs based on the prior year's experience or planned new projects. In addition, management has available weekly reports which detail the estimated and actual costs of the division's 40-man systems and programing staff.

The System

This tight control of EDP costs was achieved by installing a project control system called Data Project Management System. The system was designed by Snyder, to provide him and his management with computerized reports which detail the percent of staffing spent on authorized projects; where non-project time is spent; the backlog in hours and projects; which departments receive most of the staff effort; and why more programers and/or analysts are necessary, if such a need is indicated. The reports also indicate the backlog of a programing team, the amount that a project exceeds or runs below the budget and the reasons for excess or over-run. Other facts furnished by the reports indicate the anticipated project cost and what remains to be done. The reports also answer the questions: Who did what? Are individual task assignments on schedule? How much maintenance effort is being expended? Is a particular task done to the satisfaction of the project leader? Was this a poorly estimated project? And what tasks did the project systems or program entail?

Behind DPMS is the philosophy that in any company, requests for the development of new systems, the programing involved and the ultimate increase in data processing costs will always exceed the available professional manpower and machine time. Add to this the constant demand to modify or alter existing applications and programs, and there are many demands competing for the available resources.

This demand means that an evaluation system is necessary in order to equate the demands and resource expenditures in such a way that each request is economically justified, and that the allocation of resources is being applied to the projects that are most meaningful to the company's needs and profitability.

To this end, the Photo Products Group has a standard policy and procedure covering the requests for the services of the systems and data processing department. The policy states that proposed costs of the request will be based on the current price schedule for EDP services, and where savings are estimated as a result of the project, the requesting department manager must agree to reduce his expense budget accordingly. Appropriate budget transfer forms are then processed by the budget department. All requests submitted to systems and EDP must have Division or Functional Head approval for evaluation.

PHOTO PRODUCTS GROUP
SYSTEMS & ELECTRONIC DATA PROCESSING PROJECT REQUEST

35861 (Rev. 8-67)

REQUESTED BY	REQ. DEPT.	TELEPHONE	DATE SUBMITTED	DATE REQUIRED

Project Title:

Problem:

Objectives & Justification:

REPORT FREQUENCY	Form or Paper Size	No.of Copies	Distribution

ANALYST NO. & NAME		MACHINE CODE		
ACTION DATE	ESTIMATED MAN HOURS	REVISED MAN HOURS	Current Annual Costs:	
			Development Costs:	
COMPLETION DATE	C O D E S		Annual Operations Costs:	
	REJECT	PRIORITY	Annual Savings:	
			Amortization:	

CARD CODE 1 2 4	PROJECT NUMBER	PROJECT DESCRIPTION
4		
4		

Approved for Evaluation		Approved for Implementation	
Division or Functional Head	Date	Division or Functional Head	Date
Manager - EDP	Date	Manager - EDP	Date

A PROJECT REQUEST IS THE START OF ANY SYSTEMS/EDP EFFORT. THE APPROVALS FOR SUCH REQUESTS INVOLVE THE FUNCTIONAL HEAD REQUESTING THESE SERVICES, AND THE DIRECTOR, SYSTEMS AND ELECTRONIC DATA PROCESSING. THE APPROVAL IS IN TWO PARTS, INITIALLY FOR INVESTIGATION OF THE REQUEST AND ITS ECONOMICS, AND THEN IF APPROVED, FOR ITS IMPLEMENTATION.

When estimated costs of the project exceed $500, Division or Functional Head must also approve implementation. Snyder reviews, approves or disapproves all requests. If a request is rejected, systems and EDP will exchange all information with the requestor and, if desired, arbitration of the project may then be referred to the group controller.

Actually, the approval for project requests comes in two steps: initially for investigation of the request and its economics; and then, if approved, for its implementation. Prior to any systems or programing effort, a full evaluation of development and running costs is made, as well as the savings and economic benefits.

Priorities and target dates are established for the approved projects and the relative priority of each project is directly related to the economic gain to the company. This excludes certain program modifications that occur which are mandatory in nature, such as payroll tax changes and similar management edicts.

A most important aspect of systems development is that it must look beyond individual projects and their justification. For example, the Data Processing Management Group has already done a great deal of work on the initial stages of a management information system but with the knowledge that any individual system module or project must fit into an overall planning structure for the MIS development.

BELL & HOWELL COMPANY (EXHIBIT "B")
PROJECT CONTROL INITIALIZATION

Project Number_____ (1-8) Description_____ (14-53) Requesting Dept._____ (54-57) Wk. Subm._____ (65-67)

System Number_____ (1-8) Description_____ (14-53)

Program Number_____ (1-8) Description_____ (14-53) Wk. Started_____ (59-61) Target Wk._____ (62-64)

Task Number	Task Description	Analyst Number	Priority Code	Week Started	Target Week	Estimated Hours	Analyst Profile
01	Review Present System/Operations						
02	Conduct Interviews and Determine User Needs						
03	Define System Requirements						
04	Determine Report Requirements						
05	Review Findings with User						
10	Prepare Systems Flow Chart						
11	Prepare General Report Layouts and Content						
12	Determine File Contents						
13	Define Data Base Requirements						
14	Define Conversion Required						
15	Recommend Equipment Requirements						
16	Review with User						
20	Detail Report Formats						
21	Detail Input Formats						
22	Detail Files						
23	Prepare Specifications						
24	Prepare Volume Test Data						
25	Design and Order Forms						
26	Write EDP Operating Procedures						
27	Write User Operating Procedures						
28	Develop Systems Test Plan						
29	Develop Implementation Procedures						
40	Conduct Systems Test						
41	Analyze Systems Test						
42	Review Systems Test with User						
43	Assist in Implementation						
50	Review Program Specifications						
51	Prepare Detail Block Diagrams						
52	Desk Check Logic						
53	Code and Desk Check						
54	Develop Program Test Plan						
55	Prepare Program Test Data						
56	Test and De-Bug						
57	Documentation						
9-10		11-12	58	59-61	62-64	74-78	79-80

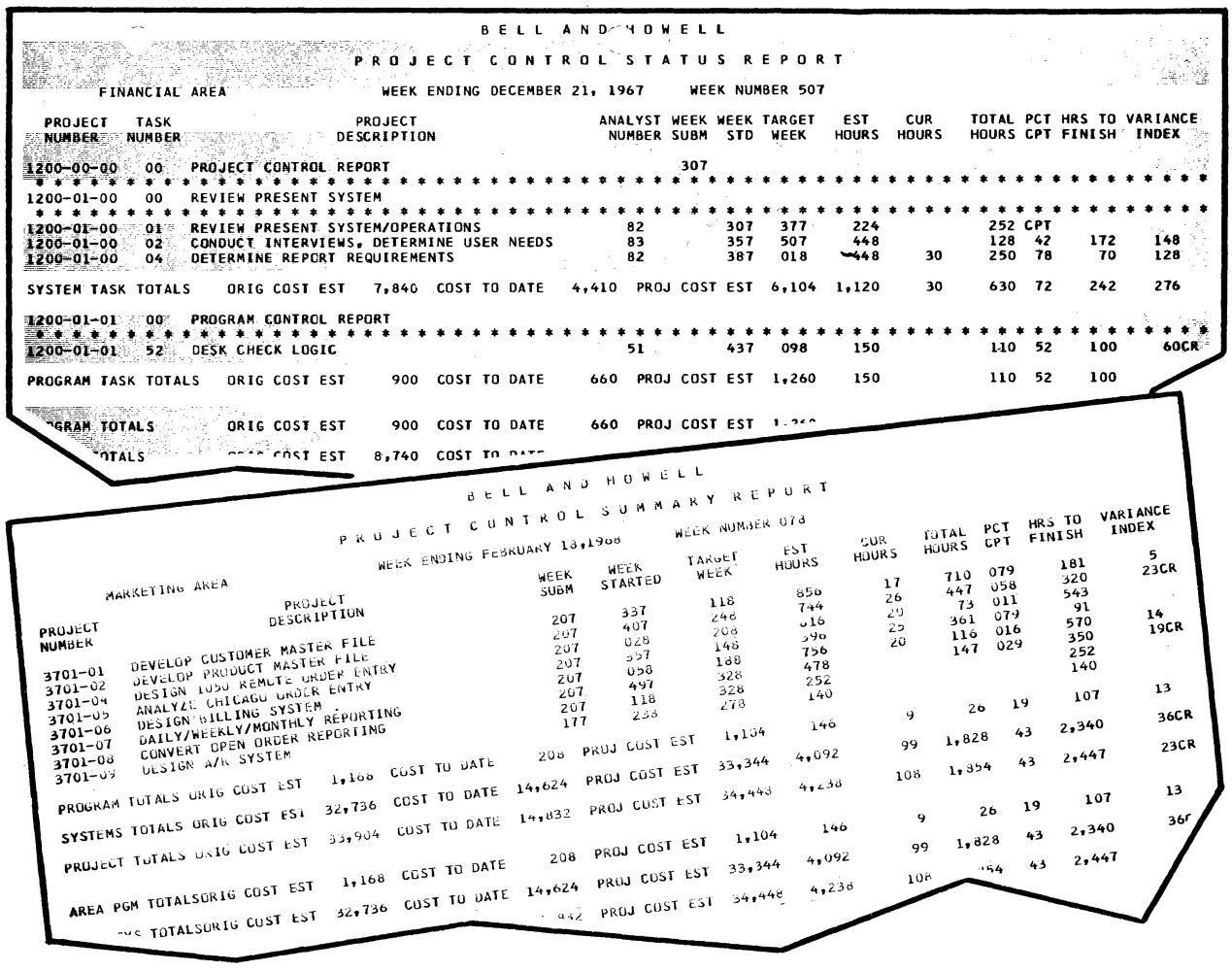
Form 35969-A

WHEN A PROJECT REQUEST IS APPROVED FOR DESIGN AND IMPLEMENTATION, THE SYSTEMS AND PROGRAMING ANALYSTS WORKING WITH THE APPROPRIATE SUPERVISORS, PREPARE TASK ESTIMATES FOR EACH DETAIL TASK THAT MUST BE PERFORMED TO DESIGN AND PROGRAM THE SYSTEM. THESE TASK ESTIMATES, WHEN APPROVED, INITIALIZE THE PROJECT IN OUR COMPUTERIZED PROJECT CONTROL SYSTEM. (EXHIBIT "B") INDICATES THE VARIETY OF TASKS THAT MAY BE INVOLVED IN ANY GIVEN PROJECT).

And finally, of course, all approved projects, when operational, must be reviewed to establish that the systems objectives have been met, and that the costs and savings were as estimated. With project request approval, the systems and programing analysts, working with the appropriate supervisors, prepare estimates for each detail task that must be performed to design and program the system. These task estimates, when approved, initialize the project in the computerized Data Project Management System. The identification of tasks is quite thorough, as evidenced by the project control initialization form which lists some 30 items.

Key to the control is the project, task and analyst number. The eight-digit project number identifies the user department and application. The task and analyst numbers are self-explanatory.

Each systems analyst and programer reports his hours applied weekly by project and task, along with his estimate of hours to finish each task. These time sheets become weekly keypunched input for the weekly project control detail reports and the summary report which provides project totals by department.



BELL AND HOWELL

PROJECT CONTROL STATUS REPORT

FINANCIAL AREA WEEK ENDING DECEMBER 21, 1967 WEEK NUMBER 507

PROJECT NUMBER	TASK NUMBER	PROJECT DESCRIPTION	ANALYST NUMBER	WEEK SUBM	WEEK STD	TARGET WEEK	EST HOURS	CUR HOURS	TOTAL HOURS	PCT CPT	HRS TO FINISH	VARIANCE INDEX
1200-00-00	00	PROJECT CONTROL REPORT			307							
1200-01-00	00	REVIEW PRESENT SYSTEM										
1200-01-00	01	REVIEW PRESENT SYSTEM/OPERATIONS	82		307	377	224		252	CPT		
1200-01-00	02	CONDUCT INTERVIEWS, DETERMINE USER NEEDS	83		357	507	448		128	42	172	148
1200-01-00	04	DETERMINE REPORT REQUIREMENTS	82		387	018	448	30	250	78	70	128
SYSTEM TASK TOTALS		ORIG COST EST 7,840	COST TO DATE 4,410		PROJ COST EST		6,104	1,120	30	630	72	242	276
1200-01-01	00	PROGRAM CONTROL REPORT										
1200-01-01	52	DESK CHECK LOGIC	51		437	098	150		110	52	100	60CR
PROGRAM TASK TOTALS		ORIG COST EST 900	COST TO DATE 660		PROJ COST EST		1,260	150		110	52	100	
PROGRAM TOTALS		ORIG COST EST 900	COST TO DATE 660		PROJ COST EST								
TOTALS		COST EST 8,740											

BELL AND HOWELL

PROJECT CONTROL SUMMARY REPORT

WEEK ENDING FEBRUARY 13,1968 WEEK NUMBER 078

MARKETING AREA PROJECT NUMBER	PROJECT DESCRIPTION	WEEK SUBM	WEEK STARTED	TARGET WEEK	EST HOURS	CUR HOURS	TOTAL HOURS	PCT CPT	HRS TO FINISH	VARIANCE INDEX
3701-01	DEVELOP CUSTOMER MASTER FILE	207	337	118	856	17	710	079	181	5
3701-02	DEVELOP PRODUCT MASTER FILE	207	407	248	744	26	447	058	320	23CR
3701-04	DESIGN 1050 REMOTE ORDER ENTRY	207	028	208	016	20	73	011	543	
3701-05	ANALYZE CHICAGO ORDER ENTRY	207	557	148	396	22	361	079	91	
3701-06	DESIGN BILLING SYSTEM	207	058	188	756	20	116	016	570	14
3701-07	DAILY/WEEKLY/MONTHLY REPORTING	207	497	328	478		147	029	350	19CR
3701-08	CONVERT OPEN ORDER REPORTING	207	118	328	252				252	
3701-09	DESIGN A/R SYSTEM	177	253	278	140				140	
PROGRAM TOTALS ORIG COST EST	1,168	COST TO DATE	208	PROJ COST EST	1,104	146	9	26	19	107	13	
SYSTEMS TOTALS ORIG COST EST	32,736	COST TO DATE	14,624	PROJ COST EST	33,344	4,092	99	1,828	43	2,340	36CR	
PROJECT TOTALS ORIG COST EST	33,904	COST TO DATE	14,832	PROJ COST EST	34,448	4,238	108	1,854	43	2,447	23CR	
AREA PGM TOTALSORIG COST EST	1,168	COST TO DATE	208	PROJ COST EST	1,104	146	9	26	19	107	13	
AREA TOTALSORIG COST EST	32,736	COST TO DATE	14,624	PROJ COST EST	33,344	4,092	99	1,828	43	2,340	36CR	
			14,832	PROJ COST EST	34,448	4,238	108	1,854	43	2,447	23CR	

WEEKLY DETAIL REPORTS AND SUMMARY REPORTS ARE PRIMARY CONTROL TOOLS FOR TRACKING PROGRESS AGAINST THE COMPONENT TASKS OF EACH PROJECT, PROVIDING CLEAR INDICATION OF PROGRESS AND PROBLEMS. EACH SYSTEMS ANALYST AND PROGRAMER REPORTS HIS HOURS APPLIED WEEKLY BY PROJECT AND TASK, ALONG WITH HIS ESTIMATE OF HOURS TO FINISH EACH TASK. THIS IS USED AS WEEKLY INPUT TO THE WEEKLY RUN OF THE PROJECT CONTROL REPORT.

SHIFT	O.T. CODE							
SHIFT	O.T. CODE	7830	005	060	F	LST A/R REQ	T1003	116-1
SHIFT	O.T. CODE	7830	005	050	C	SORT DT + A/R NO		
SHIFT	O.T. CODE	7830	005	020	C	SELECT NO A/R NO		
SHIFT	O.T. CODE	7830	005	040	B	INT PUN CDS		
SHIFT	O.T. CODE	7830	005	030	F	PUNCH A/R NO	T2038	
SHIFT	O.T. CODE	7830	005	010	F	TAB TOT GRPS AB	T5031	116-1
1	—							

DATE	
2-12	
ELAPSED START	ELAPSED STOP
8:00	8:16
METER START	METER STOP
937	942
EMPLOYEE NO.	
16	
FORMS QTY.	RERUN CODE
100	—

SAMPLE OPERATIONS CARD PACK "ROUTING" USED TO RECORD START/STOP TIMES, OPERATOR DATA, SHIFTS, METER TIMES AND ETC. IT IS USED FOR EVERY OCCURRENCE OF EACH JOB RUN BY OPERATION.

BELL & HOWELL CO. PRODUCTION JOB TICKET

TAPE RECORDER REPORTS TWICE MTHLY UPON REQUEST PAGE NO. 1

JOB-NO DEPT	JOB	OPER NO	OC	OPERATION DESCRIPTION	PROG NO	S H	O T	STD MIN	ELAPSED-TIME START	ELAPSED-TIME STOP	METER - TIME START	METER - TIME STOP	EMPL NO	FORM NO	FORM QTY	F C	R C	DATE MO	DA	YR
1462	001	010	B	INTERPRET BD#8		*	*	*	*	*	*	*	*	*		R				
1462	001	020	C	SORT C/C 16-10		*	*	*	*	*	*	*	*	*		R				
1462	001	030	F	PRINT REPORT	M9001	*	*	*	*	*	*	*	*	*143-4		R				
1462	001	040	C	SORT C/C 76		*	*	*	*	*	*	*	*	*		R				
1462	001	050	F	PRINT REPORT	M9001	*	*	*	*	*	*	*	*	*143-4		R				
	001	060	C	SORT C/C 74-69		*	*	*	*	*	*	*	*	*		R				

THE "RUN SHEET" IS USED BY THE SHIFT SUPERVISOR AS A CENTRAL SOURCE FOR STAGING (SEQUENCING) THE JOBS TO BE PERFORMED ON HIS SHIFT. THE CARD PACKS ARE FILLED OUT BY THE INDIVIDUAL OPERATORS BY OPERATION, AND RECORD OUR MACHINE USAGE, SUPPLIES USED, AND LABOR COSTS FOR EACH JOB.

JOBS ON FLOOR AS OF FEBRUARY 06,1968

M	1762	014	OPTICS PLANNING FROM C.M.	01-31-68
W	2157	002	LABOR ERRORS WEEKLY	02-01-68
M	2905	008	MISC. PLANNING RUNS MONTHLY	01-24-68
W	2905	010	SUPPLIES AND COMMODITIES TWICE WKLY	02-02-68
M	2905	011	SUPPLIES AND COMMODITIES MONTHLY	02-02-68
M	2905	016	CHICAGO FINISHED GOODS INVENTORY MTHLY	01-26-68
R	2905	028	CREATE E.L.S. PRT. & PCH.	01-23-68
W	2950	001	PREMIUM PERFORMANCE REPORTS WEEKLY	02-05-68
O	5801	001	SORT V.F.P. CDS FOR SDS RUN	02-05-68
A	7781	014	YEARLY GROSS REPORTS	01-29-68
D	7808	001	DAILY ACCOUNTS PAYABLE	02-03-68
W	7808	002	WEEKLY A/P	02-02-68
M	7808	004	VOUCHER REGISTER MONTHLY	01-29-68
M	7808	004	VOUCHER REGISTER MONTHLY	02-01-68
M	7808	005	TRAVEL EXPENSE MONTHLY	01-24-68
M	7810	005	SERVICE MATERIAL MONTHLY	02-01-68
M	7810	014	CREATE COST FILE PRINT MONTHLY	02-02-68
M	7810	015	CANON SERVICE MONTHLY	02-01-68

A DAILY SCHEDULE IS ALSO LISTED FOR THE SCHEDULED JOBS ON THE DATA PROCESSING FLOOR AS OF THE START OF THE FIRST SHIFT EACH DAY. A SIMILAR LISTING OF JOBS COMPLETED IS PREPARED FOR EACH 24 HOUR PERIOD.

Snyder explains: "The weekly reports are our primary control tool for controlling each project and its tasks. They allow us to track progress against the component tasks of a project and provide a clear indication of progress and problems at an incremental level instead of against a total estimate for an entire project." The reports also provide the project supervisors with current data as to the performance of individuals under their supervision.

The summary report drops out the task detail and indicates status at a project level. These reports are used primarily for management review and to publish project status to the requesting departments. The right-hand column of the reports indicates all variances to original estimates, and at the detail level the variances by tasks are important as "early warning" indicators. The costs are indicated by project at a standard hourly rate in the form of original cost estimates, cost to date and projected finished cost.

As the control system relies greatly on the need for individual time records for analyst and programer personnel the question naturally arises as to how one "sells" these professional employes on keeping an individual time sheet. Traditionally, systems and programing personnel have resisted time records that suggest "shop control."

This problem was overcome, according to Snyder, by pointing out to personnel that the weekly reports enabled management to factually evaluate individual programer and analyst performance. The reports are also invaluable in forecasting future professional manpower requirements.

Other practices that provide a full measure of control during the project development phases include: user approval of the design package prior to programing; standards for all systems and program documentation; full systems tests at various stages of development, including parallel testing to manual or mechanical criteria; development of back-up or bypass procedures on critical applications; thorough review of control and audit trail procedures; and user training procedures as needed.

Snyder concedes that the very nature of systems and programing work precludes 100 percent accuracy in estimating tasks and target dates. But there is convincing evidence available that the estimating practices and task controls employed furnish the division with more than adequate controls over the entire systems and EDP operation.

Prior to a new or modified application becoming a routine processing job in the data processing department, a review occurs involving programing and data processing. This review makes certain that the system has been fully tested and that perfect documentation for the computer operators is on file. It assures that the job, when scheduled, can be performed in a routine manner and that proper balancing control exists. A negotiated start and completion schedule is then established and published for the user, and the job is then set up in the scheduling system.

This system, also computerized, involves a number of control ingredients. One of the outputs is a weekly report that shows each keypunch operator's performance to predetermined standards for the current week, past 13 weeks and the past 26 weeks. This information is the primary control on keypunch operators' performance to standards and, as Snyder points out, is "extremely effective."

Among the reports emanating from the scheduling system is a daily "flash" report issued each morning by the dp department. The report shows dp performance during the past 24 hours for such items as jobs processed, jobs late, reruns and reasons for same, overtime, absences, computer usage, machine downtime, etc. This daily information is summarized and plotted monthly for trend study and setting improvement goals.

WEEKLY K.P./VER. PERFORMANCE REPORT (EXHIBIT "L") DATE 0[illegible] 1-68

OPER. NO.	HOURS WORKED	TIME OFF STANDARD	TIME PUNCHING	TIME VERIFYING	ERRORS PER CENT	K.S.PER HR PUNCHING	PER CENT OF GRP AVG	K.S.PER HR VERIFYING	PER CENT OF GRP AVG
CUR.WK TOTAL 43	6 HRS MIN	HRS MIN	4 HRS 30 MIN	1 HRS 30 MIN	9 .6	11268	83.2	16920	88.2
CUR.MON TOTAL 43	25 HRS 15 MIN	1 HRS 10 MIN	19 HRS 45 MIN	4 HRS 20 MIN	65 1.2	9671	76.3	18046	96.9
[illegible] YR	36 HRS 35 MIN	3 HRS 50 MIN	28 HRS 10 MIN	4 HRS 35 MIN	106 1.5	9427	76.3	18868	107.3

WHEN DATA IS RELEASED FOR KEYPUNCHING AND KEY-VERIFYING, BATCH CARDS ARE ATTACHED TO THE DATA TO RECORD TIME SPENT ON PUNCHING AND VERIFYING, AND THE NUMBER OF KEYPUNCH ERRORS. THE OPERATORS IDENTITY IS ALSO RECORDED. THESE BATCH CARDS ARE ALSO USED TO PREPARE A PERFORMANCE REPORT WEEKLY, THAT SHOWS EACH OPERATOR'S PERFORMANCE TO PREDETERMINED STANDARDS FOR THE CURRENT WEEK, THE MONTH TO DATE, AND THE PAST 12 MONTHS. IT ALSO SHOWS EACH OPERATOR'S PERFORMANCE IN RELATION TO THE GROUP AVERAGE PERFORMANCE. THIS INFORMATION IS OUR PRIMARY CONTROL ON KEYPUNCH OPERATOR PERFORMANCE TO STANDARDS, AND IS EXTREMELY EFFECTIVE.

DAILY "FLASH REPORT for 2/2/68

NO. OF REPORTS

	Scheduled	Reruns	Total	Completed	InComplete	Lates (Completed)
Daily	16	1	17	16	1	2
MTD	116	2	118	115	-	12

NO. OF RERUNS (due to--):

	Input Error	Input Omission	Operator EAM	Operator Comp.	Machine EAM	Machine Comp.	Prog. Error	Lost Output Cards	Lost Output Reports	Keypunch Error	Keypunch Omission	Document Error	Document Omission
Daily	1	0	0	0	0	0	0	0	0	0	0	0	0
MTD	1	0	0	0	0	1	0	0	0	0	0	0	0

RERUN TIME (clock hours):

	Input	Operator	EAM	1401	7070	360/30	Prog.	Output	Keypunch	Document
Daily	1.4	0	0	0	0	0	0	0	0	0
MTD	1.4	0	0	0	0	0.4	0	0	0	0

RERUNS/LATES/INCOMPLETE REPORTS

Job No.	Title	Date Sched.	Estim. Compl.	Remarks
7811-009	BUDGET FORECAST	1/25/68	2/2/68	INPUT ERROR

NO. OF COMPLIES:

	Beg. Bal.	Recd	Comp-leted	Rem-aining
1401	0	0	0	0
7070	0	4	4	0
360/30	0	7	7	0
Daily	0	11	11	0
MTD	XXX	64	64	XXXX

NO. OF TESTS:

	Beg. Bal.	Recd	Comp-leted	Rem-aining
1401	0	0	0	0
7070	0	2	2	0
360/30	0	12	12	0
Daily	0	14	14	0
MTD	XXX	66	66	XXXX

COMPUTER DOWN TIME (clock hours):

	Partial Daily	Partial MTD	Complete Daily	Complete MTD
1401	0	0	0	0
7070	0	0	0	4.0
360/30	0	0	0	4.0
Totals	0	0	0	8.0

OVERTIME (man hours):

	Daily	MTD
Keypunch	0	34.0
Operations	22.0	128.0
Control	6.0	41.0
Totals	28.0	203.0

LOST TIME (man hours):

	Vacation Daily	Vacation MTD	Ill.	Pers.	Death	No Rpt.	Other
Keypunch	0	0	16	0	8	0	0
Operations	0	0	0	0	0	0	0
Control	0	0	0	0	0	0	0
Totals	0	0	16	0	8	0	0

COMPUTER METER RECORDS:

	1401	7070	360/30	Totals
Beginning		734807	053657	XXXXXXXX
Ending		763299	055211	XXXXXXXX
Daily		15.0	15.5	30.5
MTD		59.1	55.0	114.1

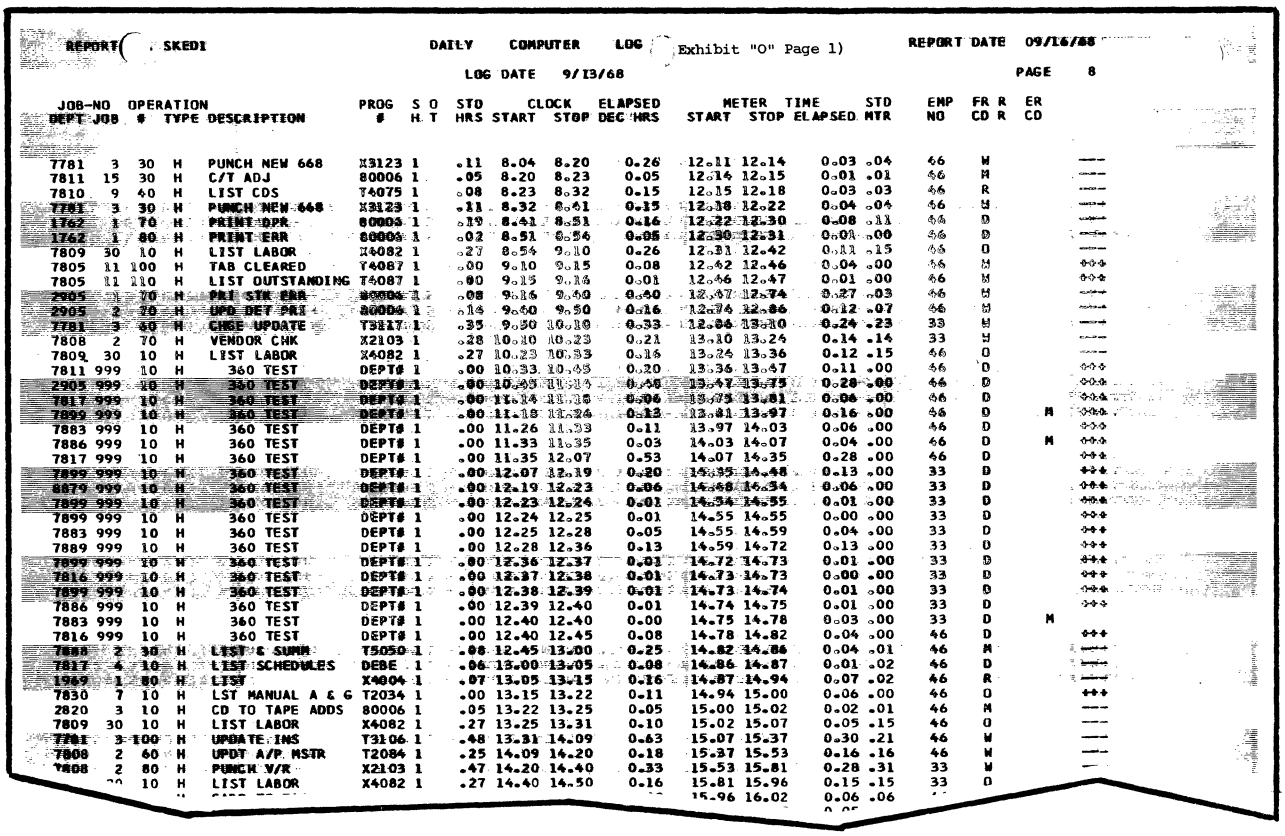
(EXHIBIT "N")

Bell & Howell - E.D.P. - #7883. Submitted by: _____

A DAILY "FLASH REPORT" IS ALSO ISSUED BY DATA PROCESSING EACH MORNING. THIS REPORT PORTRAYS DATA PROCESSING PERFORMANCE DURING THE PAST 24 HOURS, FOR SUCH ITEMS AS JOBS PROCESSED, JOBS LATE, RERUNS AND RERUN REASONS, OVERTIME, ABSENCES, COMPUTER USAGE, MACHINE DOWN-TIME, AND ETC.

THIS "FLASH REPORT" INFORMATION IS SUMMARIZED AND GRAPH PLOTTED MONTHLY FOR TREND STUDY, AND SETTING IMPROVEMENT GOALS.

Another daily report, the computer log, shows the prior 24 hours of activity by work center (i.e. -- punched card equipment, 7070 computer, 360/40 computer by partition, etc.) The report indicates within the work centers the sequence in which all jobs were performed, the meter and occupancy times, comparisons to standard times, and other analytical data. The computer logs are reviewed daily by dp management with the view of not only analyzing the past 24 hours' performance, but improving future operations.



REPORT (SKED1 DAILY COMPUTER LOG (Exhibit "O" Page 1) REPORT DATE 09/16/68

LOG DATE 9/13/68 PAGE 8

JOB-NO DEPT	JOB	OPERATION #	TYPE	DESCRIPTION	PROG #	S O H T	STD HRS	CLOCK START	CLOCK STOP	ELAPSED DEC HRS	METER START	METER STOP	TIME ELAPSED	STD MTR	EMP NO	FR CD	R	ER CD	
7781	3	30	H	PUNCH NEW 668	X3123	1	.11	8.04	8.20	0.26	12.11	12.14	0.03	.04	66	M			——
7811	15	30	H	C/T ADJ	80006	1	.05	8.20	8.23	0.05	12.14	12.15	0.01	.01	66	M			——
7810	9	40	H	LIST CDS	T4075	1	.08	8.23	8.32	0.15	12.15	12.18	0.03	.03	66	R			——
7781	3	30	H	PUNCH NEW 668	X3123	1	.11	8.32	8.41	0.15	12.18	12.22	0.04	.04	66	M			——
1762	1	70	H	PRINT DPR	80005	1	.19	8.41	8.51	0.16	12.22	12.30	0.08	.11	66	D			——
1762	1	80	H	PRINT ERR	80005	1	.02	8.51	8.54	0.05	12.30	12.31	0.01	.00	66	D			——
7809	30	10	H	LIST LABOR	X4082	1	.27	8.54	9.10	0.26	12.31	12.42	0.11	.15	66	D			——
7805	11	100	H	TAB CLEARED	T4087	1	.00	9.10	9.15	0.08	12.42	12.46	0.04	.00	66	M			†††
7805	11	110	H	LIST OUTSTANDING	T4087	1	.00	9.15	9.16	0.01	12.46	12.47	0.01	.00	66	M			†††
2905	1	70	H	PRI STR ERR	80004	1	.08	9.16	9.50	0.40	12.47	12.74	0.27	.03	66	M			——
2905	2	70	H	UPD DET PRI	80004	1	.14	9.50	9.50	0.16	12.74	12.86	0.12	.07	66	M			——
7781	3	60	H	CHGE UPDATE	T3117	1	.35	9.50	10.10	0.33	12.86	13.10	0.24	.23	33	M			——
7808	2	70	H	VENDOR CHK	X2103	1	.28	10.10	10.23	0.21	13.10	13.24	0.14	.14	33	M			——
7809	30	10	H	LIST LABOR	X4082	1	.27	10.23	10.33	0.16	13.24	13.36	0.12	.15	66	D			——
7811	999	10	H	360 TEST	DEPT#	1	.00	10.33	10.43	0.20	13.36	13.47	0.11	.00	66	D			†††
2905	999	10	H	360 TEST	DEPT#	1	.00	10.43	11.13	0.48	13.47	13.75	0.28	.00	66	D			†††
7817	999	10	H	360 TEST	DEPT#	1	.00	11.14	11.18	0.06	13.75	13.81	0.06	.00	66	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	11.18	11.24	0.12	13.81	13.97	0.16	.00	66	D	M		†††
7883	999	10	H	360 TEST	DEPT#	1	.00	11.26	11.33	0.11	13.97	14.03	0.06	.00	66	D			†††
7886	999	10	H	360 TEST	DEPT#	1	.00	11.33	11.35	0.03	14.03	14.07	0.04	.00	66	D	M		†††
7817	999	10	H	360 TEST	DEPT#	1	.00	11.35	12.07	0.53	14.07	14.35	0.28	.00	66	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	12.07	12.19	0.20	14.35	14.48	0.13	.00	33	D			†††
8879	999	10	H	360 TEST	DEPT#	1	.00	12.19	12.23	0.06	14.48	14.54	0.06	.00	33	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	12.23	12.24	0.01	14.54	14.55	0.01	.00	33	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	12.24	12.25	0.01	14.55	14.55	0.00	.00	33	D			†††
7883	999	10	H	360 TEST	DEPT#	1	.00	12.25	12.28	0.05	14.55	14.59	0.04	.00	33	D			†††
7889	999	10	H	360 TEST	DEPT#	1	.00	12.28	12.36	0.13	14.59	14.72	0.13	.00	33	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	12.36	12.37	0.01	14.72	14.73	0.01	.00	33	D			†††
7816	999	10	H	360 TEST	DEPT#	1	.00	12.37	12.38	0.01	14.73	14.73	0.00	.00	33	D			†††
7899	999	10	H	360 TEST	DEPT#	1	.00	12.38	12.39	0.01	14.73	14.74	0.01	.00	33	D			†††
7886	999	10	H	360 TEST	DEPT#	1	.00	12.39	12.40	0.01	14.74	14.75	0.01	.00	33	D			†††
7883	999	10	H	360 TEST	DEPT#	1	.00	12.40	12.40	0.00	14.75	14.78	0.03	.00	33	D	M		
7816	999	10	H	360 TEST	DEPT#	1	.00	12.40	12.45	0.08	14.78	14.82	0.04	.00	46	D			†††
7888	2	30	H	LIST & SUMM	T5050	1	.08	12.45	13.00	0.25	14.82	14.86	0.04	.01	46	M			——
7817	4	10	H	LIST SCHEDULES	DEBE	1	.06	13.00	13.05	0.08	14.86	14.87	0.01	.02	46	D			——
1969	1	80	H	LIST	X4004	1	.07	13.05	13.15	0.16	14.87	14.94	0.07	.02	46	R			——
7830	7	10	H	LST MANUAL A & G	T2034	1	.00	13.15	13.22	0.11	14.94	15.00	0.06	.00	46	D			†††
2820	3	10	H	CD TO TAPE ADDS	80006	1	.05	13.22	13.25	0.05	15.00	15.02	0.02	.01	46	M			——
7809	30	10	H	LIST LABOR	X4082	1	.27	13.25	13.31	0.10	15.02	15.07	0.05	.15	46	D			——
7781	3	100	H	UPDATE INS	T3106	1	.48	13.31	14.09	0.63	15.07	15.37	0.30	.21	46	M			——
7808	2	60	H	UPDT A/P MSTR	T2084	1	.25	14.09	14.20	0.18	15.37	15.53	0.16	.16	46	M			——
7808	2	80	H	PUNCH V/R	X2103	1	.47	14.20	14.40	0.33	15.53	15.81	0.28	.31	33	M			—
[illegible]		10	H	LIST LABOR	X4082	1	.27	14.40	14.50	0.16	15.81	15.96	0.15	.15	33	D			
											15.96	16.02	0.06	.06					

THIS REPORT IS PREPARED DAILY ON THE COMPUTER TO REPORT THE PRIOR 24 HOURS OF ACTIVITY BY WORK CENTER. (I.E.--PUNCHED CARD EQUIPMENT, 7070 COMPUTER, 360-30 COMPUTER, & ETC.) IT SHOWS WITHIN THE WORK CENTERS THE SEQUENCE IN WHICH ALL JOBS WERE PERFORMED, THE METER AND OCCUPANCY TIMES, COMPARISONS TO STANDARD TIMES, AND OTHER SUCH ANALYTICAL DATA. THESE COMPUTER LOGS ARE REVIEWED DAILY BY DATA PROCESSING MANAGEMENT WITH THE VIEW OF NOT ONLY ANALYZING THE PAST 24 HOURS PERFORMANCE, BUT IMPROVING FUTURE OPERATIONS.

Some time ago, Snyder and his managers presented a seminar series, "Cameras and Computers," which was developed as an information approach to educate the middle management people of the Photo Products Group to the discipline and tools utilized in data processing and systems development.

Snyder stressed to the middle management group that in order for the systems and dp functions to perform in a satisfactory manner and to be of value to management, the same controls and administrative processes are required in the operation as would be found in a well managed business. The presentation emphasized the concept that systems and EDP functions resemble a "factory within a factory." To illustrate this concept Snyder showed comparative functions as follows:

Research & Development	=	Operations Research
Engineering Design	=	Systems Design
Manufacturing Engineering	=	Programing
The Factory Facility	=	Data Processing
Raw Materials	=	Data Inputs
Finished Goods	=	Reports & Information
Customers	=	Information Users

The Data Project Management System establishes excellent control in these areas.

Because of the success of the program, the DPMS package has been made available to other firms and is currently being marketed on a nationwide basis by Lutter and Helstrom, Inc., a Chicago-based management services firm.

But no matter how successful and sophisticated a control system might be, it is Snyder's opinion that unsuccessful data processing applications can usually be associated with situations wherein professional systems and EDP people design applications for the user without involving the user in the planning process. Says Snyder, "Constant reference to the user and his knowledge of the broad systems requirements is the key ingredient for successful use of computer systems."

To accomplish this involvement he insists that his systems analysts participate jointly with the user in such developmental tasks as definition of overall systems objectives; general design criteria; report approvals; audit trails; internal and external controls; scheduling commitments; training for users' people for input creation and output use; miscellaneous clerical procedures relating to the EDP system; and follow-up to ensure systems compliance. Only with this joint effort, and relationship, believes Snyder, can systems/users' goals be achieved.

From a management viewpoint, Robert C. Ziebarth, controller, Photo Products Group, feels that "a necessary foundation on which to build management information systems is a properly managed and cost conscious data processing function."

"Measuring and evaluating performance and accomplishment in a systems and data processing function requires the same basic management control tools found in any other part of a well-managed business. However, due to the fact that to many managers the data processing area manifests a certain 'mystique,' it is essential that the mystery be removed from the control and evaluation process. It is also important that the control tools one adopts do not in themselves cost more than the benefits achieved through control. DPMS measures up well against these criteria."