Management Services: A Magazine of Planning, Systems, and Controls

Volume 2 | Number 6 Article 5

11-1965

Controlling the Costs of Keypunch Operations

Richard Paulson

Often many of the benefits of an EDP installation are offset by poor cost control measures in the keypunching operation. This article describes an effective system—MTM—for improving such control—

CONTROLLING THE COSTS OF KEYPUNCH OPERATIONS

by Richard Paulson

THE DECISION to install a computer is a major one in most organizations. Typically a great deal of time, thought, and effort goes into the feasibility study, the selection of the equipment, and the systems design. Yet in all too many cases little or no attention is given to the problem of controlling EDP operating costs after the system goes on line.

Even small computers are expensive pieces of equipment by office machine standards. Their supporting staffs are costly, too. Purchase or rental of EDP represents a sizable investment. To produce a fair return on that investment, machine time must be fully utilized. So must the time of keypunch operators and other personnel.

Thus, it might seem obvious that one of management's first steps after installing a computer should be to set up some sort of work measurement and cost control system to ensure that it will get a fair day's production for a fair day's pay. Yet more often than not top management delegates the task of establishing controls to first-line supervisors, who seldom have the time or background to explore the techniques available and therefore have to settle for an inadequate system—or none at all.

This need not be the case. It is neither difficult nor costly to apply a fair, accurate, and consistent work measurement and control system to any keypunch operation anywhere in the world today. Keypunching and other clerical tasks can be easily measured and controlled by means of predetermined time systems. This article describes one of the most widely accepted predetermined time systems, MTM[1] (Methods Time Measurement), and explains how it might be applied to an EDP keypunch operation.

What MTM is

By using predetermined motion times, analysts can avoid the psychological and other disadvantages of time study by a stop watch. A predetermined time system is a listing of all the basic motions that a human being can or will perform in doing factory or office tasks with a

[1] Delman W. Karger and Franklin H. Bayha, *Engineered Work Measurement*, The Industrial Press, New York, 1957.

STANDARD DATA DEVELOPMENT

DESIGNATION	Keypunching and Verifying Machines - I.B.M.-Models 026-027 and 056 (Set Up - Remove Punched Cards From Stacker)
STARTS WITH	Reach To Cards
ENDS WITH	Removed Cards Held in Hand At Work Area
INCLUDES	See Element Analysis
LIMITATION	

DESCRIPTION — L.H.	FREQ.	SYMBOL	TMU	SYMBOL	FREQ.	DESCRIPTION — R.H.
To cards		R 20 B	18.6			
		G 1 A	2.0			
To work area		M 20 B	18.2	R 14 A		To cards
Better control		~~G 2~~	-	G 1 A		Grasp
			38.8			
Rounded to			39.0			

DATE	BOOK	SECTION	EDP
PAGE 1 OF 1		CODE	

EXHIBIT 1

standard performance time for each motion. There are several of these systems; MTM is undoubtedly the most widely used.

It would be neither practical nor feasible to elaborate on all the aspects of MTM in this article. (Many books fully cover the subject matter.) In essence, it is a system whereby standard time values have been assigned to the performance of such basic motions as reach, grasp, and release. These standard time values are performance times for an average worker of average skill exerting average effort. To apply this system, the analyst lists the motions that an operator should use to perform his job, assigns the proper time value to each motion, and adds up the times to arrive at a normal time for the operation.

The time values are stated in TMU's (Time Measurement Units); 1,666.7 TMU's are equivalent to one minute of time. Thus, every elementary motion such as a hand reaching to an object or the grasping of an object has a TMU value, which will vary with the distance of the reach, the type of object grasped, and the like.

Standard times have also been calculated for various common combinations of the basic motion patterns. These times, known as second-level data, make the application of MTM much easier. An example of a motion pattern that occurs frequently enough to be considered second-level data is shown in Exhibit 1 on this page.

A few years after the publication of the first MTM textbook[2] in 1948 a group of management consultants formed the MTM Association for Standards and Research to conduct basic and applied research in the field. The association and various consulting firms have arrived at second-level data in a number of fields of endeavor and are continually adding to the supply. The existence of sufficient second-level data in a particular field such as keypunch enables any qualified MTM analyst to establish performance standards in short order.

To illustrate the technique by means of a hypothetical case, let us assume that an organization found it necessary to establish an EDP control center consisting, in part, of 25 keypunch/verify units. It soon became apparent that there was enough work to keep three shifts busy full time, but the third shift would consist of only 10 operators while the other two had 25 each (for a total of 60 operators).

In order to plan and schedule the work load, departmental supervision decided it would be wise to start keeping records of the department's output. After a few weeks they found that they were punching approximately 120,000 cards per day on the average (which broke down to 2,000 cards per day per operator or 250 cards per hour per operator). So they job loaded and scheduled on this basis.

They realized, of course, that this method of job loading and scheduling was not the best or most accurate. They had not taken the efficiency of the operator into account, nor had they attempted to break down the job by delays, rework, set-up time, etc. But the economics of the situation did not seem to justify a time study of

RICHARD PAULSON is an independent management consultant in Santa Monica, California. In the past he served as senior consultant for Bruce Payne & Associates, Inc., and as systems engineer and industrial engineer for General Dynamics Corporation. He has contributed many articles to professional publications and has spoken on work measurement and cost control. Mr. Paulson is a member of the MTM Association for Standards and Research.

[2] H. B. Maynard, G. J. Stegmerten, and J. L. Schwab, *Methods-Time Measurement*, McGraw-Hill Book Company, New York, 1948.

. . . others go home sick. And production suffers.

every job, nor did they wish to disrupt the department by having random sampling studies made on their operators; some operators become highly nervous when they know they are being observed, while other operators go home sick. As a result production drops off considerably. Under these conditions this department continued to operate with a control system that was admittedly inadequate but that was considered better than nothing at all.

Finally the organization was alerted to the availability of standard data and proceeded to utilize it in establishing standards for all keypunch operations. After 10 days of analyzing the 400 categories of operations, they arrived at a total of 20 different standards that covered all 400. (Many of these 400 were alike in content although not necessarily in scope.) Within six weeks the department had established a control function capable of improving productivity and reducing excess costs by between 20 per cent and 30 per cent.

How it works

One of the ways in which such a control system might work is illustrated in Exhibit 2 below and Exhibit 3 on page 38.

Exhibit 2 shows a typical weekly production report sheet. Each day the operator would record the total number of cards punched and/or verified and the number of setups. The back of the form would be used to report any nonproductive time. At the end of the week these reports would be collected by the representative of the department responsible, in this case the industrial engineering department, and the earned hours would be computed by totaling up the number of cards punched and/or verified and multiplying the total by the standard for the jobs.

The totals at the bottom of each production report for each operator would then be transferred to a

EXHIBIT 2

WEEKLY PRODUCTION REPORT

ORGN. NO.	GROUP NO.	SUB GROUP NO.	WEEK ENDING	PAGE / OF
W2	X4Z		4/4/65	1 / 1

GROUP NAME: KEYPUNCH

SUPERVISOR'S APPROVAL: JOHN DOE

EMPLOYEE NAME: BETTY DOE

OPERATION NUMBER	PRODUCTION COUNT						TOTAL PRODUCTION	HOURS EARNED
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY		
P1	75						75	.150
V1		942	775				1717	.429
P2	150				350		500	1.500
V2	331		15		1045		1091	2.410
P3		50					50	.115
P4		615			16		631	1.388
V4		225			313		538	1.289
V5		11		H			11	.026
P6	36			O	72		108	.281
V6			16	L	34		50	.140
P7		40	19	I			59	.177
V7	29			D			29	.093
P8			210	A			210	.588
V8			30	Y			30	.090
P9	260						260	1.040
								10.716
#S/J	9	11	13	—	14		47	1.040
HOURS WORKED								11.756

	1	2	3	4	5	6	7	8
WEEKLY TOTAL	GROSS HOURS	REWORK	NON-PROD.	LEAD TIME	NON-MEAS.	MEAS.	STD. HOURS PROD.	EMPLOYEE PERF.
→	26.0	2.1	—	—	—	23.9	11.8	49.9

ACTIVITY REPORT—MTM PROGRAM

WEEK ENDING 4/4/65 SECTION KEYPUNCH DEPARTMENT A SUPERVISOR J. DOE

COLUMN	1	2	3	4	5	6	7	8
EMPLOYEE	GROSS HOURS	REWORK	NON-PROD.	LEAD TIME	NON-MEAS.	MEAS.	STD. HOURS PROD.	EMPLOYEE PERF.
BETTY	26	2.1	-	-	-	23.9	11.8	49.9
JANE	30.2	-	4.0	-	20.9	5.3	1.9	35.8
MARY	30.0	-	-	-	22.7	7.3	2.3	31.5
JUNE	31.3	-	4.8	-	-	26.5	6.8	25.7
ALICE	21.8	1.5	0.3	-	16.5	3.5	0.4	11.4
TOTALS								
				COLUMN 11 COVERAGE		COLUMN 10 RATING		COLUMN 9 PERF.
			60 OPERATORS→	85.1		59.0		74.0

- ETC. FOR TOTAL OF 60 OPERATORS

EXHIBIT 3

Adequate control of keypunch operations—or of any other clerical task—hinges on the installation and maintenance of a proven work measurement program on an individual basis. The resulting information can give control reports for all levels of management.

form such as that shown in Exhibit 3. This form would show the performance figures for all operators on each shift ranked by performance from highest to lowest. A similar sheet could be provided to show a combination of all three shifts and hence departmental performance.

Then the first-line supervisor would have a visual picture of the productive capacity of each individual and of the entire department. He could see at a glance which of his operators were performing productively, which were spending too much time on nonproductive work, which were taking too much rework time, etc. He could identify his low performers and take corrective action to improve their performance. He could job load his department more effectively, for example, by assigning high-priority tasks to his high performers and long-lead-time tasks to the low performers. No longer would he need to be alarmed by jobs that had never been run before, for a standard could be applied in a matter of minutes before the start of the run and the job then could easily be scheduled accordingly.

In short, the department supervisor then would have adequate measurement and control. Tighter overall control also would be provided, for this information could be compiled in the form of a cost and performance summary report suitable for top management review.

Conclusion

In the final analysis, adequate control of keypunch operations or of any other clerical task hinges on the installation and maintenance of a proven work measurement program on an individual basis. From the resulting information, control reports can be provided for all levels of management.

Basically, the first-line supervisor should be interested only in a report dealing with the weekly performance of his operators and how they are spending their time. Higher management, on the other hand, should be concerned only with the efficiency of the department and the total cost of department operation.

With such controls, management at all levels will be in a position to plan and schedule work loads systematically, to evaluate employee performance fairly, to improve quality as well as quantity of production, and—last but by no means least—to improve overall profits (or, in a government agency, to reduce or stabilize taxes).