

AN OUTLINE FOR A TENTATIVE PAYROLL PROCEDURE WHICH
UTILIZES ELECTRIC PUNCHED CARD ACCOUNTING MACHINES

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By

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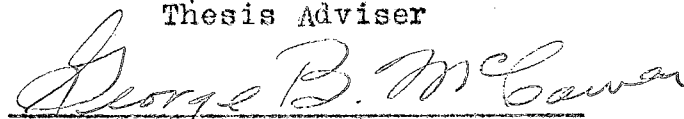
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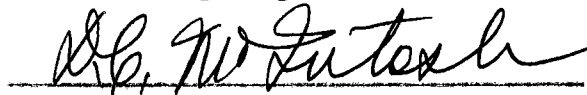
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The writer wishes to express her sincere appreciation to Professor C. L. Mc Cammon, under whose supervision this study was made; and to the Accounting Department Faculty, for their counsel and assistance.

STRATHMORE PARCHMENT

100% RAG U.S.A.

Dedication

This study is dedicated to my mother
and father whose encouragement and forbearance
have made this work possible.

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Chapter I

INTRODUCTION

Generally accepted accounting practice has been the result of a compromise between fundamental principles and present day economic expediency. The enactment of new statutes and the changing attitudes of the accounting profession affecting payroll preparation and related records makes it imperative to make a review of labor accounting.

I. THE PROBLEM

Statement of the problem. The ideal payroll accounting system is one which will result in the quick, accurate, and economic compilation of the essential accounting, management, and auditing data from employees' time records. Since many operations are entailed in the preparation of these important accounting records, it is important that each phase of the routine be analyzed and reviewed. The relation of the major factors will be presented.

Importance of the study. The passage of the federal Wage and Hour Bill and the enactment of social security laws by federal and state governments have added many new tasks to the everyday routines of the payroll accounting departments. The regulatory rulings set forth by the administrative boards makes new reports and additional figure-facts mandatory. The combination of these new factors and the earlier essentials which were deemed generally accepted

accounting practices and principles has caused a search for a more expeditious method of payroll accounting.

Accounting records and analyses are the tools which are used to increase the effectiveness of management control. The evolution of fully adequate accounting and statistical techniques has been hampered by the limitations set forth by the inadequacy of the available data. There has been an all-too-frequent restriction of accounting to the functions of preparing financial statements and the corresponding limited records regarding the auditing and operational routines. No valuable basic operating data should be sacrificed by management because of the inadequacy of antiquated accounting procedures.

The inherent flexibility of the punched-card method is so great that any degree of detail may be incorporated into the payroll to satisfy the law and at the same time satisfy the varying inclinations of managers of the industrial organizations.

The electric machine method of accounting possesses a unique characteristic - that is, its emphasis on the importance of extracting vital management figure-facts from the maze of details in which they may be hidden.

It is a recorded fact that more than one thousand separate and distinct reports may be obtained from cards containing only a dozen fields. This fact supports the

contention that the scope of subject matter and the variety of details thus obtained is practically unlimited. Each valuable report is an improvement of a link in the chain of accounting procedures, thus increasing the scientific control of operations and an effective cost reduction.

II. DEFINITIONS OF TERMS USED

Attendance Card. A card showing the time that an employee spent at his place of employment is so named. The employee's pay is usually computed from this card except under piecework and/or incentive plans. This card may be a record of only one day or for the entire pay period. IBM "in" and "out" Time Recorders should be used to record attendance time on this card.

Attendance Time. The time an employee at his place of employment as recorded by an IBM Recorder. The IBM Time Recorders are recognized as the most accurate and efficient means of obtaining this information.

Bedaux Plan. A wage incentive plan in which a standard is established for each job or operation in terms of the amount of work that may be finished in one minute by an average worker, operating at normal speed. It is customary to express the time factor in "B's" and one minute is called one B. An employee's regular hourly rate would be paid if he finished during an 8-hour day jobs or operations on which the total time allowed (standard) was 480

minute (8 hours x 60 minutes) or less, would be paid at his regular hourly rate. However, if he finished jobs or operations on which the total allowed time was in excess of 480 minutes, he would receive a premium of seventy-five percent of the excess minutes at his regular hourly rate.

Bonus Plan - Group. The earnings of each employee are increased when the production by the group of several employees with whom he works is in excess of a set standard.

Bonus Plan - Individual. The earnings of an employee are increased when his individual production is in excess of a set standard.

Burden. In cost accounting, it is synonymous with "overhead". Therefore, it is that part of the cost of manufacturing which is not directly productive. It is usually composed of items of cost that do not change with variations in production; such as - rent, factory office expenses, and telephone.

Clock Card. This term is synonymous with the term "attendance card".

Clock Number. A serial number assigned to an employee for identification purposes and to simplify the accounting for his attendance time and resultant earnings.

Continuous Job Card. The pertinent facts concerning the work of one employee on one order number, process,

department, operation, etc., during successive days within a pay period are recorded on this type of card.

Control. In payroll and labor distribution, the totals of hours, amounts, etc., set up from attendance cards or other source documents, as figures with which all subsequent reports must balance.

Cost System. A systematic record of all financial transactions pertaining to factory work, and the relation of these transactions to production factors. The reports properly interpreted discloses the cost of performing any given task.

Daily Time Card. A card containing all pertinent facts concerning every order number, process, department, operation, etc., on which one employee worked on one day.

Deduction Card. A card containing all pertinent facts concerning an amount to be deducted from an employee's pay for such items as charity contributions, insurance premiums, or War Bond purchases, etc.

Deduction Register. A listing of the amounts deducted from each employee's earnings as well as the reason for the deduction. The lists are usually prepared by type of deduction.

Denominating Cash Payroll. It is the determination of the total number of bills and coins of each denomination

required to make up each employee's pay with the minimum number of bills and coins.

Direct Labor. The work which is applied directly to the product being manufactured or processed.

Dual Card. The data are recorded in writing as well as by means of punched holes.

Earnings Record - Employee. A record containing the earnings data of an employee for all pay periods.

Earnings Statement - Employee. A report which is usually given an employee at the time he is paid, showing the factors pertinent to calculating his gross earnings, deductions, and resultant net pay.

Form SS-1 b. A report submitted quarterly to the Federal Government listing each employee's Social Security Number, name, and earnings for the quarter.

Form W-1. The U. S. Treasury Department requires that each employer submits this form quarterly wherein a summary of the taxes withheld from employees is reported.

Form W-2. The U. S. Treasury Department requires that each employer submits a listing annually in quadruplicate for each employee from whom a tax has been withheld. The original and first copy are furnished to the employee. The second copy (Form W-2a) is forwarded to the U. S. Treasury Department with the employer's return of income tax which

has been withheld on wages, Form W-1. for the fourth quarter of the year. The third copy (Form W-2b) is retained by the employer in his files.

Form W-3. The U. S. Treasury requires that each employer submits this form at the end of the year to reconcile any differences in the total amount of taxes withheld as reported quarterly (Form W-1) and the total reported yearly (Form W-2).

Form W-4. Each employee is required to fill out this form and submit it to this employer as the basis of calculating the withholding tax deduction. Form W-4 is another requirement of the U. S. Treasury Department.

Gang Job Card. This card contains all the pertinent facts concerning the work of several employees working as a unit on one order number, process, department, operation, etc., during one day.

Gross Earnings. An employee's earnings before considering deductions which are made in determining the net pay.

Incentives - Wage. Money inducements, other than regular time or overtime wages, for the accomplishment of definite standards.

Indirect Labor. The work which contributes to the manufacture of a product, but not physically applied directly to it.

Individual Job Card. A card containing all pertinent facts concerning the work of one employee within one day on one order number, process, departments or operations which were worked on. A separate card is prepared on each.

Job Number. This is a serial number which is assigned to a manufacturing in order to simplify the accumulation of the cost applicable to that particular order.

Job Order Cost System. The labor costs are classified and accumulated by job numbers.

Job Time. The productive time spent working on a job number, process, or operation. This is another instance whereby the IBM Job Recorders are recognized as the most accurate and efficient means of recording job time.

Labor Cost - Direct. The charges which are directly applicable to an order number, process, department, operation, etc.

Labor Cost - Indirect. The charges other than direct charges that are incurred in the production of a product.

Labor Distribution. The classifying and accumulating of labor costs by order numbers, processes, department, operations, etc.

Labor Turnover. The ratio of separations to the average number of employees per period, usually for a period of a month or year.

Man-Hours. The total number of hours worked by all employees.

Man Number. This serial number is assigned to an employee for identification purposes to simplify accounting for his time and earnings.

Master Payroll Card. This card contains all constant or semi-constant data concerning an employee, such as name, clock number, Social Security Number, occupation, rate, etc. It is used to print these factors automatically as needed on the payroll, check, payroll register, government reports, etc., as well as for any other purposes that may be necessary.

Net Pay. This is the money actually paid to the employee after deductions, such as taxes, contributions, and other deductions, have been made from the gross earnings.

Notification of Employment. A form which is prepared at the time of employment notifying all interested parties of the employment. It usually contains all pertinent information pertaining to the individual employed. This form may be called an "Engagement Notice".

Non-Productive Labor. The work which contributes to the manufacture of a product, but is not physically applied directly thereto.

Overhead. The expenses of direction and administration necessary to conduct a business. In cost accounting,

it is synonymous with "burden". It includes such items as rent, telephone, factory office salaries, etc.

Overtime. This is the time that an employee works in excess of the normally established work schedule. It is usually less than the employee's regular earnings.

Parallel Balance. This is a means of verifying the accuracy by adding in separate counters the same information from two types of cards, when the procedure calls for the punching of two types of cards from the common source. The errors may be easily located simply by comparing the two columns of resulting totals. Example: In payroll and labor distribution parallel balancing could be used to balance job time with attendance time by adding job time in one counter from the labor distribution and adding the attendance time in another counter from the daily time cards. The resulting totals would then be compared to verify the fact that they are the same.

Pay Envelope. The face of this envelope gives the pertinent factors necessary to calculate the employee's earnings, deductions, and net pay, and into which is placed the net pay in cash.

Pay Period. It may be one week, two weeks, semi-monthly, or monthly. In other words, it is the number of days established for the accumulation of the payroll.

Payroll Register. This report is prepared for each

pay period containing the employee's name, man number, hours worked, gross earnings, deductions, net pay, and any other details required by the employer.

Personnel Card. A card containing all the pertinent facts concerning an employee such as date of employment, sex, marital status, age, and other information deemed necessary.

Piece Work - Group. The earnings of each employee are based on the number of units which are produced by the group of several employees with whom he works.

Piece Work - Individual. The basis of computation of earnings is the number of units produced by the single individual instead of the units produced by a group.

Premium. This is the money inducement, other than regular or overtime earnings for the accomplishment of definite standards. Also, it may refer to any additional money offered to induce employees to work on less desirable shifts, perform more hazardous tasks, etc.

Process Cost System. In this system the labor costs are classified and accumulated by departments, operation, or any other similar units rather than by order number.

Productive Labor. The work which is applied directly to the product being manufactured.

Standard Cost System. This term is applied to the cost

systems in which the standard labor costs are established by determining the time it should take and the money value of the labor skill required to perform an operation. This standard is used as a measuring stick and analyzing tool for computing the variance of the actual costs from standard costs.

Taylor Differential Plan. It is a wage incentive plan whereby a quota in terms of units of production per hour is established for each job or operation, and in which an employee is paid at a rate from 25 percent to 50 percent greater than his standard rate for equaling or exceeding the quota.

Trailer Card. The pertinent data concerning one order number, department, operation, etc., is transcribed on a card by means of punched holes. For example, the several cards punched from the daily time card to distribute the job time reported thereon would be called trailer cards.

Union Check-Off. As per agreement with the union, the employer deducts the employees' union dues from the employees' gross earnings.

Variance Analysis. This is the method used to classify the difference between the actual and the standard (predicted) cost, by their causes.

Work-in-Process. The costs which have been accumulated on a product which is in a partially completed condition of

manufacture.

Zero Balancing. A means of verifying accuracy by subtracting one type of card from another, when the procedure calls for the punching of two types of cards from a common source. By scanning the results, one quickly locates any errors because the balance will be zero (blank) unless there is an error. For example: In payroll and labor distribution, zero balancing could be used to balance job time with attendance time by setting one counter to add attendance time from the daily time card and subtract job time from the trailer cards. One would scan the resulting report for balances other than zero.

Chapter II

SYSTEM DESIGN

The formulation of scientific standards, budgets, and statistical analyses of labor costs has brought about tremendous strides in the development of management control of manufacturing. The results have reflected the coordination between accounting and management achievement.

Even though the functions of payroll preparation and labor cost analysis may be allocated to different divisions of the accounting department, they should be considered a single unit because of the close association of the original documents from which both reports are compiled. The analysis of payroll costs (the labor distribution) is parallel in importance to the payroll (record of earnings and disbursements) function.

The ultimate aim of an accounting system is to develop a single coordinated routine which will bring about the desired results economically. When the procedure is designed to provide for payroll preparation and labor cost analysis, its scope will include some or all of the following objectives:

1. Insurance of the completeness, accuracy, and legibility of the recorded data by supervising the preparation of the documents.
2. Establishment of a system of accounting control.

3. The creation of documents such as job tickets and operational records to become an integral part of the production planning thus simplifying the recording of costs.
4. A higher percentage of accuracy of recording attendance time and job time will be brought about by a daily or periodic balancing of the totals from the original.
5. The rating of time records and confirming the amounts which were applied or extended in other departments than the accounting division.
6. All the calculations made mechanically.
7. Preparation of the payroll and labor distribution register.
8. The weekly or periodic summary of earnings for payroll purposes prepared.
9. Deduction lists are prepared from the deductions actually made from the gross earnings on the payroll register.
10. The posting of the employees' earnings in order that the summaries of earnings may be readily obtained for tax or other reports.
11. The cash envelopes or pay checks readily prepared.

12. The Federal Social Security records, such as Form SS - 1 b, and the State Unemployment Insurance accounting and statistical reports easily prepared.
13. The individual listing of the employee's earnings and deduction statements made.
14. The preparation of the labor distribution summary to support the payroll voucher entry.
15. The labor charges distributed to order numbers or accounts covering the manufacturing, maintenance, and other operating costs.
16. Analysis of the labor by departments or other units in order to compare the actual with the budgets or standards.
17. The analysis of production ascertaining the comparison of good pieces produced to items spoiled, wasted, or scrapped.
18. The maintenance and preparation of book records of the labor charges to work-in-process.
19. The distribution of burden on a basis of direct labor hours, direct labor cost, machine hours, or any other applicable bases.
20. Establishment of records and reports sufficiently

to facilitate the conducting of periodic external and internal audits.

21. Compilation of the total cost reports of completed jobs.
22. Preparation of the essential management statistics.

I. ORGANIZATION

Because of the relatively large sum of money involved and the opportunities for irregularities associated with payroll records, the responsibility usually rests on the shoulders of the Comptroller or Treasurer of a business.

It is desirable to develop some bases of assurance that the records are accurate. There are many safeguards which may be incorporated into the procedure; however, the following is a few that have been deemed essential:

1. Maintenance of detailed printed records which presents tangible evidence of individuals.
2. The original ratings, extensions, accumulations, and cross-footings carefully calculated.
3. Adoption of the most approved and tested types of timekeeping devices.
4. Frequent statistical comparisons prepared in order that any irregularities will be revealed immediately.

5. The actual disbursements scrupulously supervised through the use of receipts.

A provision for the control of collusion and fraud must be considered. The manipulation of payrolls is a fertile field for the criminally inclined. Fraud may be perpetrated through this source by: (1) padding the earnings of employees; (2) keeping unclaimed wages; (3) overfooting the payroll sheets; (4) padding the payroll with fictitious employees, and (5) failing to record deductions from employees' wages. There are a multitude of other possibilities, but each seem to stem from one of the ones given above.

The best way to control fraud is to place the possibility of the act beyond the reach of every person who may be tempted. In establishing proper internal control over payrolls, the duties of everyone involved in the hiring, time-keeping, payroll computation, and payment of the employees responsible for the performance of these duties will act as a check against the other.

Personnel. Employees should be hired by the personnel department on the basis of written requests from operating departments. The personnel department keeps a complete record covering each individual which was made at the time of engagement and to which additional data is added. This active file should be used periodically as a medium to which the payrolls may be checked to determine existence

of fictitious names or duplicate payroll disbursements.

When possible, the payroll clerk, cashier, or the paymaster should not have access to the personnel file.

Timekeeping. This department is responsible for the accuracy of recording attendance time and the notation of the proper allocation of this time to the work-in-process or expense accounts.

In keeping the time record of an employee, a punch-clock system is best, but the punching of the cards must be supervised to see that the cards of absentees are not punched by fellow workers or by time clerks and foremen. Jurisdiction is generally vested in the chief accounting officer, and should not be the production executives.

The reports turned in daily by the foremen should be checked against the time cards by the payroll clerks. The accuracy of the subsequent accounting entries originates with the entries made in this department.

Payroll. The primary purpose of the payroll department is the accumulation of earnings and assembling of these data with the related records, such as the deductions register.

The record-keeping routine should be so established that the procedure will:

1. Account for the accuracy of individual employee earnings.

2. Furnish periodic earnings summaries for payroll disbursements.
3. Record unclaimed wages.
4. Provide management with current facts concerning overtime, piecework, daywork earnings, and budget comparisons.
5. Maintenance of the employees' earnings records in accordance with state and federal laws and regulations.
6. Preparation and supervision of the payroll checks or cash envelopes.
7. Making of the deduction lists such as OAB, UI, union dues, community chest, savings, charity, etc.
8. Preparation of the essential voucher distribution records concerning payroll expenditures.

Cost Accounting. The principle objective of maintaining records for the control of cost to fix the responsibility for efficient utilization of available resources should be striven for in every procedure. A secondary objective is the determination of unit costs and to study the methods by which a more efficient method of controlling cost may be attained by profitably coordinating sales and manufacturing programs.

In view of the above mentioned objectives, the cost department's function is to:

1. Rate and extend piecework, daywork, and other types of job tickets.
2. Also, rate and extend the overhead or burden applied to work-in-process.
3. Record all charges to the individual cost sheets.
4. When standard costs are used, calculate same for each job.
5. Preparation of journal entries for labor usage, overhead distribution, and value of finished goods.
6. Account for idle time.
7. Analyze departmental and individual efficiency.
8. Account for labor cost of spoiled or scrapped production.
9. Budget variances and labor charges analyzed and summarized.
10. Files of unit cost of production is maintained.

Paymaster. The actual payroll disbursements by either cash or check is usually made by the paymaster or cashier.

Whenever possible, it is advantageous to rotate the personnel making the actual distribution in order to reduce the hazards of fraud and collusion.

The paymaster should not be a member of the accounting department or the employee who originally computed the payroll. His work should be checked by an accompanying employee. Each employee is identified as he is paid and, if paid in cash, should sign a receipt stating that he has received a certain sum. If checks are used, the endorsement is evidence of receiving payment. Also, a statement of his gross earnings, deductions, and resultant net pay received must be given regardless of whether paid in cash or by check.

The payroll department should compare the signatures on the receipts by the signatures which were originally obtained for that purpose. Also, unclaimed envelopes and unclaimed checks are returned to the accounting department, and the paymaster or the payroll clerk retains the unsigned receipts until the wages are claimed or are returned to general cash.

Auditing. The Treasurer's staff usually performs the function of internal auditing or checking the payroll. If the system of internal control is adequate, spot checking is sufficient unless such an audit reveals such irregularities that a detailed audit is deemed advisable.

The routine of spot checking includes:

1. Confirm rating and extension of employee

earnings.

2. Establish the accuracy of all crossfootings.
3. Examine and reconcile the returned checks to establish the accuracy of paid and unclaimed wages.
4. Check the payroll totals with the work-in-process and expense controls.
5. Verify the disbursements against personnel records.

Miscellaneous. Special analyses are often made by the accounting machine department to aid such specialized departments as time study, process engineering, estimating, inspection, and planning in the completion of their reports.

Conclusion. It should be remembered that the system designed for one organization may not fill the needs of another industry. However, there are certain procedures that must be followed in order that a satisfactory routine will result.

Accounting and statistical reports do not result in the automatic correction of wrong conditions or the formulation of sound future policies. Management must make the decisions after the detailed scrutiny of the analyses which are made to focus attention on the extremes of performance.

The advantages of the intelligent use of accounting records and reports directs management toward the development of remedial measures to correct extremely adverse conditions, and toward the discovery of favorable elements which are conducive to profitable operation.

The maintenance and intelligent use of records implies both measurement and critical review of performance which will cause the individual to exert their best efforts. In order to stimulate this type of psychological self-supervision, management must be furnished with essential and up-to-date reports of the performance details. This in turn brings about a necessity for an efficient and fast system which can present this data when needed. Punched-card system is the best solution to this problem.

Chapter III

ADVANTAGES OF THE IBM ACCOUNTING METHOD

Utility is the criterion by which the value of payroll and labor costs reports may be measured. The advantages that can be derived from the adoption of the IBM method of accounting are distinctively far-reaching in scope. It is imperative to remember that IBM is not a substitute procedure which merely replaces an outmoded design for producing the desired or necessary reports, but is definitely a new speedy highway to the solution of present day accounting problems.

1. DISTINCTIVE FEATURES OF THE PUNCHED-CARD METHOD

The value of installing punched-card methods to maintain payroll and labor cost records is directly associated with the unique features which are only connected with the use of Electric Accounting Machines. There are innumerable features that could be discussed; however, five are especially worthy of specific consideration.

Ease of recording all the related effects of one transaction. The punched cards which contain the basic transaction data are highly mobile; therefore, it is possible to use these same figure-facts to prepare all records which are affected by the transactions. The IBM method is not limited to the preparation of payment records, but covers all phases of payroll accounting, including the preparation of operating and management reports essential for the control of costs.

In highly departmentalized routines, the following list gives an example of the functions of record keeping in a manufacturing plant which are affected by the data appearing on each original time ticket:

1. Payroll Records.
2. Paymaster's Disbursement Records.
3. Social Security Records for Old Age Benefits.
4. State Unemployment Insurance Records.
5. Machine Operating Records.
6. Direct Labor Cost Records.
7. Indirect Labor and Expense Budgets.
8. Overhead Applied Records.
9. Trade Association Statistics.
10. Time Study and Standards.
11. Production Planning and Scheduling.
12. Wage Rate Studies and Personnel Statistics.
13. Scrap Cost Control.

Economical effects of rearranging the basic facts. By using only one set of cards, labor cost and any related information may be automatically arranged in a dozen different sequences in order to produce significant reports from any point of view.

Illustration No. 1 shows the details and summaries which can be produced from the payroll and labor distribution punched cards affecting the accounting routine.

OVERHEAD BUDGET REPORT						
					PERIOD ENDING	19
DEPT.	DESCRIPTION		EXPENSE AMOUNT	BUDGET AMOUNT	VARIANCE THIS WEEK	VARIANCE CUMULATIVE
1	CUTTING	1	4677	4919	242-	39-
2	PRESS ROOM	2	28341	30370	2029-	5000
4	TUBE	4				
5	STOCK ROOM	5				
5	SHIPPING	6				
7	FITTING	7				
9	PACKING	9				

PIECE WORK ANALYSIS							
						WEEK	19
PART NUMBER	OPERATION	OPERATION TOTALS			PART TOTALS		
		PIECES	HOURS	AMOUNT	HOURS	AMOUNT	
1327	143	2	8719	423	4360		
1327	143	3	8642	832	8815		
			8594	430	4469		
			8754	442	4689		
			8256			2127*	
			7986	417	5691		
			8918	456	6380		
						22333*	

LABOR ANALYSIS							
WEEK ENDING							19
DEPT.	DIRECT LABOR		INDIRECT LABOR		DEPARTMENT TOTALS		
	HOURS	AMOUNT	HOURS	AMOUNT	HOURS	AMOUNT	
67	7564	84396	2417	19436	9981*	103832*	
68	6457	74568	1978	13476	8435*	88044*	
69	8356	97896	3754				
70	6968	79571	4016				
71	9017	102785	3915				
72	8796	96842	1023				
73	5864	61927	2467				

REGISTER OF PAYROLL DEDUCTIONS													
												WEEK OF	19
DEPT.	CLOCK NUMBER	EMPLOYEE NAME	GROUP INSURANCE	HOSPITAL	MERCH-ANDISE	CLUB	SAVINGS	ADVANCE	MISC.	TOTAL			
	1436	WILLIAM FENN		80		50				130			
	1437	GEORGE BROWN	48	165		50				263			
						50			12	142			
						50	300			478			
						200		1000		1330			
						500			76	626			

MACHINE HOUR REPORT								
WEEK								19
MACHINE NO.	OPERATION NO.	PART NO.	NUMBER OF PIECES	HOURS PER OPERATION		HOURS PER MACHINE		
				STANDARD	ACTUAL	STANDARD	ACTUAL	
14	6	143 60799	276	55	62			
14	6	143 60803	459	92	107			
14	2	32 10461	14					
14	5	176 80627	6					
16	2	143 60891	9					
16	6	32 60967	3					
16	5	32 60341	8					
16	4	143 60967	1					

PRODUCTION REPORT								
PLANT NO.						DATE		19
PART NUMBER	DESCRIPTION	UNIT	QUANTITY	LABOR				
				STANDARD	ACTUAL			
40 317	STANDARD IGNITION WIRE	FT	110	1210	1295			
40 318	WIRE MANIFOLD CLAMP TUBE ASSY	EA	60	2400	2280			
40 330	SPARK PLUG GROUND ASSEMBLY	EA	31	2790	2855			
			54	1970	2025			
			83	1760	1540			
			75	2845	1940			
			124	3085	2795			
			24	1210	1150			
			45	1525	1312			

PAYROLL REGISTER											
PLANT NO.										WEEK ENDING	19
EMPLOYEE NAME	SOCIAL SECURITY NUMBER	CLOCK NUMBER	RAYS	HOURS WORKED	GROSS EARNINGS	SOC. SEC. DED.			OTHER DEDUCTIONS	NET PAY	
						STATE	U. C.	FED. O. A. B.			
F MARTINSON	283042467	126	5	400	5000	50		50		4900	
J IRVINGTON	350044673	128	5	400	4400	44		44	100	4212	
R DONALDSON	780062468	129	4	320	3200	32		32		3136	

Illustration No. 1

Details and Summaries Which Can Be Produced From A Single Set of Punched Cards.

Sequential preparation of reports convenient. There is often a managerial need of getting first things first, and the first thing may be getting the final figures before the details are obtained. Ordinarily the facts will flow from the many varied sources through organized channels of entries and postings into the final figures last. Punched-cards give the reports in any order desired.

Printing cumulative and comparative reports is simple. The Electric Bookkeeping and Accounting Machines provide for the computation of such data as year-to-date totals, budgets, standards, variances, calculated ratios or percentages, and previous period comparisons. The wide use of comparative figures as an index of performance necessitates the correlation of data between the separate reports. The facts are marked directly on IBM cards and then are translated electronically at high speed into the punched holes, and finally into the tabulated reports.

Records of related transactions are economically and directly coordinated into comprehensive summaries. A commonplace requirement of accounting is the need to have one comprehensive recapitulation of related totals. It is possible for management to speedily review and act upon the employees' performance records only if the related data are presented in a comprehensive summary which presents the necessary figure-facts.

II. BASIC ADVANTAGES OF THE PUNCHED-CARD METHOD

The Electric Accounting Machine Method has simplified the techniques of the day-to-day routine work of the accounting department to such a degree to be unique.

Advantages of the punched hole principle. The elimination of numerous manual repetitive operations is the outstanding advantage. Specialized machines have been developed which makes it possible to automatically perform the tedious operations connected with the accounting procedure. Each of the special machines is actuated by the punched holes appearing in tabulating card records. Also, each operation, actuated by the punched card, is accomplished with uniform speed and mechanical accuracy.

Accounting control in large volume jobs has been attained through the use of unit records. One of the most outstanding factors in this connection is the simplicity with which any discrepancies may be detected and traced to relatively small classification of items.

The classification and summarization of all data which must be compiled for essential accounting reports and auxiliary analyses can be done speedily and accurately through the use of automatic sorting and tabulating machines. It should be noted at this time that these auxiliary reports may be easily performed without disrupting the regular routine.

When the periodic reports are made, total cards are

punched which will permit frequent intermediate summarizations. The tabulation of the total cards not only helps to reduce peak loads, but will place the essential operating data in the hands of management as needed instead of monthly or longer.

The preservation of a simple effective routine is attained because the Electric Accounting Machine Method acts as a deterrent which will eliminate the many variations of procedure which customarily develops in purely manual routines.

Advantages of the punched card. A record that may be classified and reclassified by physical sorting into any desired sequence eliminates the necessity for the intermediate posting of individual items prior to the time of report preparation. Punched holes recording the data transcribed from the original documents are capable of actuating fully automatic machines.

By use of punched cards, the transcription of data is always accurate; thus, the accidental errors arising from the posting of amounts to the wrong columns or sheets of intermediate posting records are eliminated. An additional element of accuracy is derived from the fact that the transcription of the original data may be mechanically verified. There is no other method of verification as reliable as that done by machines.

The punched tabulating card constitutes the only form

of record which is capable of reproducing data automatically in printed form on reports or in punched form in other tabulating cards.

The uniformity of size of all the tabulating cards facilitates the handling of the punched cards in the filing and subsequent referral thereto.

Advantages of the machines. The primary cause of decreased production and increased errors has been traced to operator fatigue. The Electric Accounting Machine Method has eliminated this problem.

Various types of key-driven machines have been developed for both alphabetic and numerical recording. Because of the electrical operation, it is possible to depress a key with between two and four ounces of pressure through a distance much less than that required on most mechanically-operated devices. It is possible to duplicate automatically the common data to each card after which the variable data can be recorded manually. The speed of duplication is approximately ten to twelve holes a second.

There are other punched-card records, which do not involve manual key-punching, which may be prepared on fully automatic auxiliary machines. The payroll and labor distribution cards generally contain certain basic figure-facts, such as hours worked and pay rates, or quantity produced and piece rates, which necessitates the calculation of extended amounts. The

Automatic Multiplying Punch is ideally adaptable to these routines. Its speed of operation permits the extension of the amounts and the transcription of the products to the detail records at rates varying between 720 and 1500 an hour. Common multipliers are automatically introduced for each group of cards to which the factor applied.

Card-operated sorting machines can be used to arrange the punched unit records according to numerical sequence, or any other desired arrangement, at a speed of 400 cards a minute for each digit position classified.

The Collator is an auxiliary machine which is especially adaptable to the classification routines encountered in the many phases of the payroll and cost accounting procedures. This unit may be used to feed and compare two sets of cards in order to merge or match them in a single operation. While engaged in this operation, the machine can separate these cards which match from those which do not - thus making it possible to pull as well as to file cards automatically. Some of its uses in conjunction with payroll and labor accounting are the filing of current transaction cards with previous transactions and old balances; combining master or name cards with detail cards and later extracting them; eliminating single cards or the last cards of groups; and checking the sequence of filed cards.

The accumulation of totals and the transcription of data

to finished reports are accomplished automatically on various types of accounting machines. Final reports may be printed containing numerical data only, or containing both numerical and alphabetic descriptive data.

The machines are so designed that each change of the classification is sensed, and results in the transcription of the totals for that group automatically. Other automatic features such as class selection, controlled counter operation, total transfer, and related devices, afford complete machine flexibility to adapt them directly to specific circumstances characteristic of report and document preparation of individual businesses.

Several totals may be accumulated simultaneously. The number of counters varies from 2 to 16 depending upon the type of machine used. Complete flexibility of counter coupling or splitting is provided so that practically any desired report can be tabulated.

The machines are so designed to furnish reports containing major, intermediate, minor, and grand totals. Changes of classifications result in the automatic transcription of each class of total.

All these features combined with the high speed of listing and adding - 75 and 150 cards a minute, respectively - make the accounting machines ideal all-purpose units for the efficient preparation of reports and documents that will assist

management in more effective and economical conduct of the enterprise.

The success of many Electric Accounting Machine procedures is enhanced by the availability of fully automatic auxiliary machines, such as the Interpreter, which prints the data contained in punched form across the top of each card to facilitate filing and reference; the Reproducer for preparing additional sets of cards which contain some or all of the data appearing in the regular files; and the Summary Punch, which prepares total or balance cards automatically as a by-product of any tabulation.

Many devices are also available for attachment to standard machine units for the fully automatic performance of special operations. A representative device of this type is the Automatic Carriage for positioning documents and reports for printing.

III. ADVANTAGES OF THE PUNCHED-CARD METHOD FOR THE INDIVIDUALS BENEFITED

From the viewpoint of individuals benefits, the advantages to be derived from the use of Electric Accounting Machines can best be discussed by departments served.

Advantages for executives. The most effective base of formulating sound decisions and exercising control is the frequent use of figure-facts of current operations. The major function of the administrative officials is to correct

any unprofitable company policies and protect assets from accidental or fraudulent dissipation.

The Electric Accounting Machine methods speedily and accurately presents a comparison of the results achieved by operating sub-divisions without duplicating or expanding record-keeping routines as is necessary under manual or semi-automatic routines. Also, additional intermediate records need not be prepared before comprehensive summaries are made.

The punched-card system may be utilized to give reports daily or weekly rather than occasionally or annually. The trend is definitely towards semi-annual, quarterly, and monthly reports so that management may adjust any company policies before it is too late. The simplicity with which reports containing to-date totals, figures or previous period, and quotas or standards may be compiled to facilitate the exercise of close budgetary control.

Any summary data which is regularly provide management may be quickly reanalyzed to prepare similar reports for each division of authority and responsibility within the business without disrupting the regular routine. It is most important that each operating unit be informed of its individual weaknesses by frequent analysis of accounting reports. The cumulative effect of a long series of minor losses rather than to a single major managerial mistake is usually the cause of a business failure.

The punched-card method is unique in its ability to compile reports which may be used directly by minor or subordinate operating executives - the only individuals capable of making decisions at the point at which immediate corrective measures may be initiated.

Advantages for the accounting department. The objective of the accounting department is to develop a routine which is economical in operation and at the same time can be readily understood by all the personnel of the department. The solution to this problem must take into consideration the production of an even work load, and does not entail wide fluctuating load peaks.

The social security and wages and hours legislation has widened the scope of accounting activity to such an extent that the costs of accounting when peak-loads are encountered have affected the costs.

The month-end peak-loads may be reduced to a minimum through the practice of intermediate summarization and other automatic machine operations. Overtime and extra work on the part of the clerical staff can be dispensed with because special reports and additional statements can be prepared without causing undue pressure on the accounting staff.

Through the use of a single group of automatic machines for all phases of the accounting system reduces the problems of training employees individually in the operation of special

machines and peculiar methods; promotes greater mobility in the departmental personnel to permit substitution of individuals on any job which may arise in an emergency; and simplifies the problems of supervision by providing the means of obtaining a maximum of production from a limited number of employees through the elimination of routine drudgery and fatiguing operations.

There is also the advantage of the automatic preparation of the general ledger entries in the form of printed journals and punched ledger cards as by-products of the associated record-keeping routines.

The flexibility of the machines permits the preparation of the reports to present the data in any sequence, horizontal arrangements, or variations in content, to conform with the desires and needs of other departments.

Advantages for the auditing staff. Every accounting system should be so arranged that a speedy conduct of internal and external audits with a minimum of disturbance to the regular accounting routine. The punched-card procedure furnishes a completely cross-indexed register of all source data as well as full internal accounting control which can be verified periodically by simple spot-checking.

Because of the elimination of all intermediate postings through the use of a single unit card record, many of the customary manual detailed checking routines are rendered non-essential. The accuracy can be established by a single

verification of the original transcription of data to the punched-card, and checking the report totals against the accounting totals.

The automatic sorting machine simplifies the spot-checking by segregating the detail transaction cards for the specific classifications to be checked. The accuracy of pricing and extending of detail transactions may be readily established by group-checking methods. The sorter arranges the cards according to those classifications for which the same rate applies. The cards are then tabulated to furnish totals of production units and wages recorded in each group of cards. A single calculation for each basic group then establishes the accuracy of each group. Only those groups that are in error need to have a detailed checking.

The reconciliation of the outstanding payroll checks to the bank statement is also performed by an automatic machine. A printed record of all returned checks and outstanding checks is always available for review by the auditors.

Advantages for the personnel department. The trend is toward better employer-employee relationship; therefore, a natural expansion of the personnel department has come about. The personnel department acts as a buffer between management and workers.

Group statistics concerning employees' earnings, occupation, marital status, education background, previous

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experience, health, age, nativity, accidents, and similar elements makes it possible for management to formulate broad general policies to improve personnel goodwill.

Accuracy of the statistical analyses is a natural consequence because the results are produced from the same records and in the same general way as the entries to the general ledger and accounting reports are made.

Advantages for the budget department. The fundamental purpose of business budgeting is to find the most profitable course through which the efforts of the business may be directed and to aid management in holding to that course.

The Electric Accounting Machine Method easily furnishes the essential data pertaining to past performance required to construct the initial budget; and then compiles the budget variation reports which present totals of budget, actual performance, and variations from budget estimates.

The use of summary cards facilitates the compilation of cumulative-to-date and comparative reports containing both budgeted and actual totals. Not only are the budgetary reports available for the use of the administrative staff, but each operating supervisor is quickly informed of the operations within his department.

Advantages for the operating departments. With the development of an improved accounting procedure, there has also been a reduction of the amount of original recording

and paper work in the operating departments.

Prepunched printed tabulating card job tickets are prepared automatically by the Electric Accounting Machines thus decreasing the amount of writing to be done by shop workers. The work of the departmental supervision is facilitated by furnishing a medium for planning "work ahead".

The speed with which the job tickets are processed by the accounting department reveals both unfavorable and favorable conditions and trends in time to correct the operational methods before the monetary loss is too great.

The operating executives can study analyses of men, machines, products, etc., which are failing to meet the established standards. These analyses can be made without disturbing the regular accounting routine.

Advantages for the scheduling department. Planning and scheduling of manufacturing routines have become imperative because of the pressure of competition, changing method of manufacture, and rising cost of taxation, wages, etc. In order to meet the rising problems as economical as possible, available manpower and machine time must be utilized to their fullest.

The development of new International Accounting Machines - such as the Reproducing Punch, the Automatic Multiplying Punch, the Interpreter, the Collator, and various types of devices which permit the automatic writing of word descriptions as

well as numerical symbols - have revolutionized the methods at the disposal of planning departments for the simplification of their "paper work".

Routine manual or semi-automatic posting of schedules and performance is eliminated through the use of listed and summary reports that are compiled in final printed form by Alphabetic Accounting Machines.

The Electric Accounting Machines make it possible to prepare automatically numerous documents such as job tickets, operation records, rework tickets, and work schedules. The performance of these functions are so coordinated with the regular accounting procedure as to make the over-all operation extremely economical.

The possibility for improved planning based upon the additional data presented are practically unlimited. The work completed, work-in-process, and work ahead may be analyzed by departments, machine group, product or part, manufacturing period, reasons for delays, and countless other classifications.

Another major advantage is the reduction of the amount of "stock-chasing". Finger-tip control over the processing of every order is possible through the use of a system of centralized records.

Advantages for other departments. Practically every department in the organization may be assisted to some degree by the special records prepared from punched-cards.

Assembly and parts cost lists may be speedily prepared from master files of standard or actual costs for the use of the engineering and estimating departments.

The reports of variations from standard or estimated costs are made available to the engineering department to plan how to reduce the cost of the processes.

The sales department will be in a better position to handle competitive deals more profitably because accurate detailed costs will furnish bases for establishing selling prices more intelligently.

Conclusion. The foregoing by no means exhaust the numerous advantages which may be attained. No reference has been made to the facility with which original documentary records are created and subsequently handled by automatic machinery, the adaptability of the method to changing conditions so that new requirements may be met with the minimum disruption of the established routines, or any of the similar factors which might be considered here.

Chapter IV

METHODS OF TIME MEASUREMENT

In order to measure anything - temperature, speed, pressure, distance, weight, or time, there are two very simple conceptions which govern this principle. Primarily, there must be a point of origin from which a definite marking off may be made in order to make the measurement. Next, an instrument to measure must be provided.

It is undisputed fact that the only accurate, convenient, and tangible evidence of time measure is a printed record of the day, hour, minute or any fraction thereof that any event or operation originated or finished. Today mechanical time records are in almost universal use. By using such a device, an automatic and independent of human aid or supervision will give an accurate time measurement when so desired.

The original documents from which the payroll records and labor cost distribution are prepared are of two basic types: (1) attendance time records, and (2) job time records. There are also numerous other types of wage incentive types and piecework which are supplementary to these basic time records.

I. ATTENDANCE TIME RECORDS

Attendance time is the time paid for or purchased which the employee spent at his place of employment. The Federal

Fair Labor Standards Act (Wages and Hours Bill) makes it imperative to maintain attendance time records in nearly all industries. It should be remembered that the attendance records are definite proof that the letter of the law has been followed. Also, they afford the only legally acceptable evidence in litigation in compensation cases.

An employer should never minimize the importance of attendance records even though he uses the piecework plan of time measurements. The attendance record will furnish a basis of checking the setting of the piece rates in addition to the advantages given in the foregoing paragraph.

The recording of the attendance time may be effected in several ways. Many methods are still being used today such as the brass-check system and the hand-written roll, but the coming of the present machine era has made these systems outmoded and antiquated.

Today the payroll routines generally provide for as much mechanical recording as possible. The major types of attendance time records which serve as a basis for Electric Accounting Machine routines are:

1. Daily time tickets.
2. Daily, weekly or quadri-monthly dial clock sheets.
3. Weekly or semi-monthly time cards.
4. Salary payroll registers.
5. Roll books or gang sheets.

The layout of the plant will be the deciding factor as to the location of the attendance records - main gate installation or separate departments. The clock house is an improvement over the old complex "time clock". With the advent of automatic supervision, direct cost reduction have been effected.

The departmentalization of recorders has made it possible to eliminate the burden of non-productive walking time, loose supervision of employees, and the tendency of fellow workers detaining each other from arriving at their place of work.

Undetected lateness due to faulty clocks that have gathered dust and dirt can become an appreciable amount. Also, a docking penalty loses its effect when it can be and is frequently vacated. If docking penalties are to be respected, there must be utmost faith in the accuracy of the time recorders by both management and employees. A less direct loss and yet more severe in effect, is in the case where an employee who is not late punches IN on a fast clock. He will naturally request permission to go to the timekeeper to argue his case, and in most instances the foreman will accompany the disturbed employee. As a result, productive time is wasted to correct an error that has caused ill feeling, whether the error has been corrected or not.

Much money for employer-employee relationship has been wasted, as well as efforts to maintain organization spirit,

because of destructive situations arising from arguments over the most sensitive place in which an employee can be affected - namely, in his pay.

Types of attendance time recorders. The Automatic Payroll Machine provides a record sheet on which are combined the daily registrations for all employees and payroll extensions for an entire pay period. This sheet remains inside the machine until the end of the period, then it is removed and filed as an original page in the payroll binder. Computations are made along side the registrations. Not only is this method speedy and convenient, this record is always available for income tax or other legal references.

International Card Type Attendance Recorders are widely used by many business organizations throughout the world. It provides an accurate, indisputable, unchangeable attendance record on a card for each person for any pay period. It automatically selects the proper registering position for all arrivals and departures. Two two-color ribbon automatically indicates all late arrivals and early departures in red.

The Autograph Time Register is a mechanical attendance recorder that combines the printed time record with personal signatures. Its operation resembles the simple signing of a book. The recorder is a dignified, absolutely dependable means of supervising attendance. One person cannot register for another without detection. Because of its flexibility, it finds ready application in places where full time effort

is essential to profitable operation. The uses are varied. It could serve as watchman's station; as a register for office boys, messengers, or delivery men; to record entrances to and departures from bank vaults, tool or supply rooms, office buildings after hours, etc.

II. JOB TIME RECORDERS

The recording of job time is to allocate the productive time of employees to various work-in-process or expense accounts so that management may exercise scientific and effective control over both direct and indirect costs of production. In contrast with attendance time, productive time is that time "sold" or which becomes available for sale in the finished product.

Proper incentives and supervision should be exercised to insure accurate recording. If the records of the labor costs are to be significant, it is important that idle time is accounted for. Some foremen are reluctant to admit that idle time exists or fails to report that a job is finished until the next job is begun thus making it difficult to make the proper accounting.

If the chief cause of idle time is associated with the set-up time of machines or repairs of machines assigned to a given job, the idle time may be charged to the specific jobs. However, management should be informed of any loss of productive time because of no material, no work, power failure, etc.

Idle time reports which gives the reason for the non-productive time as well as its duration and cost will serve as a bases on which management can setup effective controls.

Productive time is measured by job or operation for each productive worker through one or more International Job Time Recorders, sometimes referred to as Cost Recorders. In many installations, employees themselves register their job time. This is particularly true where there is a single machine. In other installations with more than one recorder, the recorders are placed at either the foreman's desk or at the desk of his clerk or assistant from which the jobs are routed or distributed to the men. It is not unusual for a dispatch station to serve two or more departments.

A distortion of cost records will come about unless a perfect synchronization exists between all job recorders. Any successive group of operations in the fabricating of a product which requires treatment by several departments will not be accurately accounted for if the recording devices are out of step with each other. The value of automatic supervision is outstanding in this particular part of industrial time control.

Type of job time recorder. There are several different types of job time recorders, but all operate on the same principle. The purpose of an International Job Time Recorder is to furnish accurate, printed recorders of the start and finish of every job or operation. The complete labor cost story, in clear, legible, indisputable figures, showing to the minute

actual time spent, can be printed on any kind of job ticket or slip. These records reveal time lost on and between jobs, render cost information immediately available, and permit a constant, day-by-day closeup of time purchases and expenditures.

Conclusion. Even with the availability of time recorders the old attitude still persists in treating the value of time lightly. It cannot be justified because, whether wage rates are low or high, whether the working day is short or long, the magnitude of the money value of labor time demands its accurate measurement and control.

When their workings are analyzed, other methods than mechanical attendance recording, are found to be discriminatory, paternalistic, and without competent standing as a basis of accounting.

Chapter V

WAGE PAYMENT PLANS

Labor costs constitute such a large portion of the controllable costs of production that many systems of compensation have been devised in striving to attain the greatest productivity for each dollar of payroll. Each of these systems has altered to some extent the basis of labor cost distribution and analysis.

A description of each of the common methods of wage payment is given so that the variety of methods may be more fully recognized.

Daywork. Daywork constitutes one of the common forms of wage payment. Each employee is paid at an hourly or daily rate for the time spent in the plant. The jobs or work-in-process accounts are charged at the worker's hourly rate for the labor time actually used.

The daywork system has frequently been superseded by various types of incentive systems during the recent decades. It is interesting to note, however, that the trend of the last few years has been toward the reestablishment of the daywork plan.

Daywork is widely used in small businesses and in larger plants whose work is highly diversified or built to order. The inference is that any manufacturing operations which cannot

be standardized on a continuous, repetitive basis will be found to use the hourly rate of labor compensation.

The weaknesses of the daywork system are:

1. Employees are not interested in the cutting down of delays to production, breakdown of machinery, lack of material, or other tieups.
2. It is unfair to the employee who works harder than others.
3. It is unfair to the employer when an employee falls behind what he is expected to do.
4. It results in unstable costs - fluctuating sometimes with no apparent reason.

The reasons that the trend has been back to daywork plan of payment is as follows:

1. Simplicity and low expense of payroll calculation.
2. Adaptability to all types and classes of shop operations regardless of the industry.

Many industries find conditions for the daywork wage plan ideal and in fact unsuitable for any other method. Time is the only factor in determining earnings; hence, a recorder for measuring both attendance and production time is absolutely essential.

Piecework. The payment of employees based upon the number of units of work performed has resulted in the development of a wide range of specialized systems. Among them are two broad types:

1. Those which are based upon recording production of varying quantities upon which each operation was performed, and subsequently pricing and checking the work claims.
2. Those systems based upon prepriced coupon records that cover standard quantity lots and operations.

In industrial plants in which a limited number of operations are to be performed, a wide range of rates are established, and non-standard size lots are frequently encountered, the former type is most widely used.

In most industrial plants, the piecework data are noted on either the employee's daily time ticket or individual job ticket. If the coupon system is used, it is customary for the employee to compile a daily or Weekly worker's statement to which the coupons are attached.

The rate paid for making a given piece or operating a unit is determined by time study and analysis of motion and method of work. This is usually done by a specially trained Clerk who carefully watches the motions of some employee doing the work to be "timed". He times the motions by a stop watch or camera under various conditions and over a

period of time and notes every element which might affect an average of "time allowed" for performing the operation. In smaller plants, time studies are seldom made, and rate setting is little more than guess work.

The price per piece is then set according to requirements governed by local wage levels, the selling price available for the article, and the estimated incentive limit. The fact that there is usually no scientifically fixed basis of valuation in setting straight piecework rates creates a general tendency to juggle them.

This is encourage by the wide variation in productive ability between employees. No employer is sure of his rates as fitting conditions in his business beyond the immediate outlook. The tendency, therefore, when a few workers earn excessively, is to cut rates. Such unreasonable action breeds disloyalty, antagonism, and soldiering. The employee who is conscientiously trying to work hard must work that much harder to make the same amount of money that he made before. He becomes dissatisfied, and in time intimidates and often spoils a new and conscientious employee.

Straight piecework encourages early departure and disregard of organization or disciplinary measures because no guarantee is given him during delays for which he is not responsible. Situations such as this, or news of a proposed cut in rates will cause speeding up to the point of damage to machinery, spoilage of parts, and perhaps personal injury.

Straight piecework, to yield its best results, must be scientific and based on competent time study. Piecework rate experience cannot be analyzed nor can proper verification against changes in method of operation or design be obtained without time-recording. It is particularly necessary for distribution of overhead cost to a piecework job.

One of the outstanding advantages of the piecework system of wage payment is the facility with which predetermined labor costs are established for productive work. The chief difficulty associated with the method is the uneconomical auditing routine. The procedure for checking against fraud is usually so expensive that generally it is limited to a perfunctory analysis. The inclusion in the costs of "adjusted pay" authorized by foremen is also frequently overlooked.

Straight piecework is becoming less used because its tendencies are so vicious with respect to the spirit and goodwill of a factory organization that its losses outweigh its gains.

An attendance recorder is absolutely essential if control of production is to be based on auditable factors.

Contract work. The system of contract work is rapidly passing out of existence in most industrial organizations. Under this plan, the workers are employees of individuals other than the manufacturer. The manufacturer furnishes

the materials to be processed to the contractor - who in turn hires, supervises, and pays the workers. Therefore, no detailed payroll or labor distributions are maintained by the manufacturer.

Salaried work. Supervisors, office staffs, and other "white collar" workers usually are employed on a weekly salary basis. The distribution of their time to functional expense accounts is effected on a fixed percentage basis which is determined periodically.

In some organizations, the "white collar" workers may also be included with directly productive employees under incentive systems.

Commission. The commission basis of compensation for selling activities is widely used. It is very similar in principle to piecework incentives in manufacturing.

Weekly or monthly summaries of the salespersons' activities are compiled, which serve as a basis of computing commission payments. The most common types of compensation are based upon:

1. Value of shipments.
2. Value of orders.
3. Amounts collected.
4. Profit produced.
5. Merchandise classes.
6. Point plans.

Premium or Bonus systems. Before explaining the several special plans of wage incentives, it would be well to give some general characterizations. They have, in contrast to daywork and straight piecework, several general disadvantages:

1. Complicated and expensive clerical effort required to extend and calculate earnings and check with the rate standards.
2. Difficulty for the worker in quickly understanding and figuring his earnings.

The common forms of wage incentive plans, when properly installed and geared into a plant organization do produce remarkable results both in increased production and decreased costs. They are worth the extra clerical effort, particularly since speedy calculating devices have been made available. They justify their soundness because they basically recognize the real factor in production, namely - TIME.

One important thought to bear in mind is that in most plants the work is diversified, and that interruptions, delays, disagreements, accidents, changes, labor turnover, and other factors all militate against the smooth functioning of any plan to standardize activity.

Many types of premium, bonus, and wage incentive systems have been developed in the last half-century from the principles originally formulated by Taylor. In practice these

plans are usually modified somewhat to fit peculiar or unusual conditions encountered in individual plants. As a result, it is often difficult to find two organizations in any community which have identical wage payment plans. Therefore, only a few basic incentive systems are briefly outlined in the following discussion.

Taylor Differential Plan. This plan is used in the manufacture of steel specialities and other metal products where expensive machinery is operated, and is one of the oldest wage incentive plans devised.

The plan has been opposed by some employers because it appeared to be dangerously expensive or because the low piece rate for slow workers penalized those individuals too severely. In this plan, employees push management to keep all equipment in perfect working order so that they will not be made to suffer loss of pay for conditions beyond their control.

Briefly, each worker is placed on a quota or "task" for a particular job or operation. The quota is set after a careful time study has been made. If the worker goes below his quota, he is paid a standard price. If he equals or exceeds it, he is paid a higher rate which may be from 25% to 50% greater.

An example of this plan can be illustrated by outlining the pay received by an employee. William Morris was given a task or quota for his job of finishing operation No. 12,

cutting roller bearings, at a quota of 1,500 an hour at 5¢ a hundred with a standard rate of 4¢. He worked $1\frac{1}{2}$ hours and cut 2,160 pieces thus receiving \$.864. It is evident that if he had speeded up just a little more, he would have earned \$1.08 and yet obtained a corresponding decrease in burden cost.

The negative feature of this plan is that it sets a definite mark for a rate which is retroactive and tends to cause disappointment, as illustrated above. It does, however, do away with the fear of rate-cutting and penalized the inefficient worker.

Halsey Premium Plan. The original Halsey Premium Plan contemplated paying the worker a percentage of the time saved over and above a set standard for a job, at his regularly hourly rate. The time standard for the job was taken from past experience.

Of later years, the latter has been replaced by scientific time studies, and an accurate time standard set up for each operation. This is deliberately increased from 40% to 100% for the sole purpose of giving the employee a mark to shoot at.

The bonus or premium is then based on a percentage, from 50% to 75%, of the difference between actual time taken and time allowed. This plan requires an accurate time record of each job, and is a very effective stimulant to production. It is quite easily understood by employees, and

is not too complicated or expensive to install.

Gantt Bonus System. This plan is based on a sliding scale of bonuses using the worker's efficiency as a measure. This measure is simply the "time allowed" for a job divided by the "time taken", and the first being a set standard from time studies and the second a job recorder record.

This sliding scale is posted in the shop and varies from 10% to 50% above a base rate of pay which is set at about 65% of what the "time allowed" rate would be for the job.

This incentive plan was devised to utilize the strong incentive of the Taylor plan and eliminate the drastic effect of the low piece rate for low production.

The special feature of this plan is that it does not yield readily to change in type of operations going through the plant. It is, however, easy for the men to understand and quick to produce efficient results.

Bedaux Plan. This system is based on a standard setup of "points" representing the amount of work that may be finished in one minute, allowed for a fair measure of interruptions and lost motion. It is essentially a wage payment and incentive plan and can be applied to both direct and indirect labor.

This plan and similar ones operating on the point or

"standard minute" system are widely applied and very successful.

Rate standards for operations in both direct and indirect labor classifications must be developed completely in order to reduce all activity to a common point basis. This means elaborate time studies which are subject to changes with each improved method. Although it is a costly system to install and is confined on that account to the larger industries, it is quick to produce results.

Some claims have been made that with the point or Bedaux system the value of a job time recorder is greatly reduced. There is a temptation to accept this because of the ingeniousness of the plan itself. The assumption is that the count of pieces on any job completed constitutes sufficient measure of individual title to earnings. This is true considering any one job by itself, but a glance at a daily time or premium card for any productive operator under the Bedaux system will show that any isolated operation is not auditable with relation to a full day's work unless mechanically identified with a definite train of events. Anyone who knows the hazards of routing and dispatching production can appreciate the force of this claim. That alone is sufficient reason for any practical works auditor to demand the employment of mechanical recording.

A "point", as in any sales or other quota, is a measure of results. In the Bedaux system it equals the amount of

productive work which may be done by the average worker, operating at normal speed, within one minute of time. This amount of work is, of course, reduced by a fair allowance for rest and delays. This allowance varies with the nature of the job, being greater for jobs requiring heavy physical exertion and conversely, less for lighter work.

The fundamental number of points per hour, naturally 60, or 480 in an 8-hour day is set up as a base figure against which to match actual performance.

A "point standard" is the number of points set up or allowed for a given operation. This is done by time study and is not changed when once determined unless a change occurs in the operation itself or the method required to perform it. Concerns are very careful to guarantee their point standards for the obvious reason that a point is of abstract value to the worker and any changes very quickly spread distrust and dissatisfaction. The burden on competent time study is great and, in plants using this system, a high degree of standardization, stabilized methods, and infrequent design changes in product, should be maintained if the system is not to become top-heavy. In many plants yielding high standardized volume, the Bedaux or Point system has been outstandingly successful.

Each operator, as he receives a job, is given the point standard allowed for the operation, and therefore knows at the end of the day the number of points obtained in excess

of his day's par, or 480 (8-hour day). His premium would be, usually 75% of the excess - the remaining 25% being distributed to the foremen, shop clerk, material handlers, etc., on the correct assumption that the teamwork and help of indirect labor is a rewardable factor in direct labor production.

To cite a simple example:

A man is given a buffing operation on which the rate standard is .8 a piece. His day rate is 60 cents an hour. Suppose he completes 800 perfect pieces in his 8-hour day.

1. His IN and OUT clock record for eight hours
@ \$.60 = \$4.80
2. His earned points are 640
3. His standard points are 480
4. His premium points are 160
5. His portion 75% = 120 = 2 hours @ \$.60 = \$1.20
6. Pooled portion 25% = 40 = 2/3 hours @ \$.60 = \$.40
7. His total day's wages will then be \$6.00.

Previous day's premiums are posted in each department. It is the practice, in order to preserve the incentive value in the premium, to list it separately in the pay check or time card received by the man showing his earnings over the regular pay period. This is also followed in other premium or bonus plans.

Manit System. This is a variation of the point system

that was devised by the Haynes Corporation. Its basic difference lies in the fact that a man-minute or manit is a unit of measure which is not derived from the special conditions surrounding a given class work, but is simply the mathematical product of a man working for one minute with a fixed allowance of 20% off as a margin for increased effort.

With this distinction in mind, it is easy to see that the time study of an operation must not be directed toward what a man may do in a given time, but rather toward the maximum, or what he should do. To evaluate a premium system, the logical par value of a day's work is based on 60 manits per hour which he should do, and a mark is set at a 25% increase for a maximum full day's work of 75 manits per hour which he can do if he tries. This conforms to the stated allowances of 20% mentioned above, since 20% from 75 manits would leave 60 manits.

Each productive worker is given a wage rate per 100 manits, which is similar to a piecework rate except that it applies to everything he does regardless of the work being performed. His rate depends on his ability, length of service, and other factors which control wages in general. It will be seen that when a worker reaches a production rate of 75 manits an hour, he will be earning 25% more than at a rate of 60 manits. This is distinguished from straight piecework since a man is paid, in effect, an increased rate on all he produces for speeding up instead of just getting paid so much a piece for extra pieces. The force of the incentive

is brought out by this comparison.

Accurate time studies are made to apply the number of manit credits to be given for each operation. A worker then can work on one thing all day or any number of different operations and his flat total credit of manits will determine his earnings.

Indirect labor is given manit standards in a great many cases and the same basis is worked out for them. In other instances, these people are paid a bonus not exceeding 5% of the combined earnings of all those productive workers who maintain a daily rate above the standard of 60 manits an hour.

Job recorders are equally essential in this sytem for total-costing, time analysis, recording idle time, and production control.

Chapter VI

SALARY PAYROLLS

It is desirable to handle salaries - as opposed to ordinary wages - separately, because of the greater simplicity in preparing salary payments due to the relatively stable amount involved per person, the relatively fixed list of names, the fact that salaries are usually paid by check, and the fact that salaried employees are usually so well known that precautions as to identification are less needed than in the case of nonsalaried employees. Also, separate records for salaries under the control of a special clerk, on the score of relatively confidential aspect of salary rates.

On this type of payroll, employees are hired at a fixed rate per week, month, or year. The Salary Payroll Accounting Method has a series of specific objectives among which are to provide each employee with his periodic wages and to report his compensation to the employees, to the owners and managers of a business, and to the government. Since the amount paid each pay period seldom varies, the IBM method of pre-punched cards can be setup and used to reproduce automatically the current pay period cards. The derived advantages from the use of Electric Accounting Machines for Salary Payroll routines are as follows:

1. The reduction of payroll operations to a simple

machine routine is the result of an automatic preparation of all payroll reports and records from one original recording.

2. The verification of the original recording by machine controls establishes the accuracy of reports and records.
3. Because the payroll information is pre-calculated and processed automatically, the reports and records are available at an early date.
4. Through the use of the original punched IBM cards, the control of payroll expenditures is easily provided.
5. By analyses of tardiness, absence, and overtime, an attendance control is established quarterly and annually.
6. The required quarterly and annual government reports of earnings and taxes can be prepared by fast, automatic machines thereby minimizing the peak loads.
7. By using IBM checks, reconciliation of bank statements can be mechanized.
8. By comprehensive management reports and analyses of personnel matter simplifies

the formulation of policies.

Original documents. Each particular organization will use their own particular variation of the source documents; however, certain basic documents are used for most salary payroll accounting procedures: (1) Employment notices, (2) Attendance time records, (3) Employee salary adjustment or classification changes, (4) Deduction authorizations.

The following is certain basic information which is deemed an essential integral part of the original documents:

1. Employee's name.
2. Employee number.
3. Social Security number.
4. Address.
5. Sex, age, and marital status.
6. Number of dependents.
7. Date started.
8. Occupation.
9. Account charged.
10. Operation charged.
11. Department assigned.
12. Operation performed.
13. Overtime hours.
14. Kinds of deduction.
15. Frequency and duration of deduction.
16. Salary rate.
17. Any other miscellaneous data.

Payroll control. The policies of each organization will differ as to the conditions involved in the payment of supervisors, office staffs, and other "white collar" workers. However, the following generalizations can be made:

1. The employee is paid a fixed amount for a specific pay period, based on a weekly, monthly, or per annum rate.
2. The employee is not penalized for normal absences or latenesses.
3. The employee may or may not be paid for overtime. In general, employees in supervisory capacities or earning over a specified amount are exempted from payment for overtime.
4. The principal exception from a standard pay period payment results from additional overtime earnings.
5. The time of each employee is generally charged to only one expense or clearing account.

This results in a high percentage of earnings, tax deduction and accounting factors which remain constant from pay period to pay period. Advantage can be taken of this condition to effect considerable simplification and economy of operation through the repetitive use of payroll master cards for preparing payroll records or the payroll cards required for

each successive pay period.

Master payroll cards. The file of master payroll cards contains a precalculated and prepunched master payroll card (Figure 1) for each employee. The cards is so designed as to include those factors which are required for preparing the payroll and developing statistical and personnel information.

H R ADAMS										6	1	1	1602	25000	250	250	2980	21520	
NAME OF EMPLOYEE										STATE	OFFICE	DEPT.	EMPLOYEE NO.	TAX CL.	SALARY	O.A.S.I.	S.U.I.	WITHHOLDING	NET EARNINGS AFTER TAXES
										TAX DEDUCTIONS									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
NAME OF EMPLOYEE										STATE	OFFICE	DEPT.	EMPLOYEE NO.	ACCOUNT NO.	RATE	OVERTIME	GROSS EARNINGS	PAYROLL TAXES	NET EARNINGS AFTER TAXES
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

Figure 1. Master Payroll Card

These cards should contain employee identification, the authorized salary amount, tax deductions, and net payment amount after taxes for a standard pay period.

The Master Payroll Card File is used for:

1. Preparation of attendance records.
2. Reproduction of special cards for statistical and personnel studies.

3. Reproduction of information which remains unchanged when changes are made in the card.
4. The preparation of payroll records each pay period or the reproduction of a set of pay period payroll cards to be used for payroll accounting purposes.

This method of preparing a master payroll card reduces payroll calculations and manual recordings to a minimum. Speed and accuracy are increased through the establishment of predetermined controls and pre-audits in advance of payroll preparation, and the entire payroll accounting routine is greatly simplified.

Attendance cards. Even though attendance time is not required to determine employees' regular earnings, it is necessary to record IN and OUT time in order to have a basis on which overtime earnings may be computed. This record is necessary in compensation cases, control of excessive tardiness and absenteeism, and compliance with the Federal Wages and Hour Law. The IBM Attendance Time Recorders are the means by which an accurate and legible recording may be obtained.

At the end of each pay period, or in time for the distribution of attendance cards to each clock station for use the first morning of the succeeding pay period, the master payroll cards are used to prepare attendance cards (Figure 2).

The attendance cards are prepared automatically from the master payroll cards by the Electric Document-Originating

machine. Department and employee numbers are printed simultaneously in large figures on the ends of the cards to facilitate reference when filed in card racks. Other punched information in any sequence may be printed along the top edges of the cards by the Electric Punched Card Interpreter.

DEPARTMENT		EMPLOYEE NO.		HOURS										DAYS ABSENT BY REASON					TIMES LATE	WEEK ENDING 6-30					MON.	TUE.	WED.	THU.	FRI.	SAT.	SUN.
1		160		WORKED		OVERTIME				ILLNESS OR ACCIDENT	PERSONAL REASONS	AUTHORIZED LEAVE OF ABSENCE	JURY DUTY	MILITARY SERVICE	TIME OFF FOR EXTRA TIME WORKED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1		160		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2		2		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3		3		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4		4		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5		5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6		6		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7		7		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8		8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9		9		9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Σ		Σ		17.02	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	17.05	
Σ		Σ		12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	12.98	
Σ		Σ		12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	12.02	
Σ		Σ		8.96	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	8.95	
7		7		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
6.8		6.8		6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	
7		7		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	

Figure 2. Attendance Card

Hours worked, overtime hours, days absent by reason, and times late are recorded on the Attendance Cards by pencil marks which are translated electronically into punched holes. The punched Attendance Cards then are used for recording overtime earnings and for preparing attendance and overtime analyses.

Control of master files. Control totals and pre-audit of payroll are established in advance of the preparation of current payroll records by use of a duplicate copy of the

Payroll Register for the previous pay period.

The basic accounting control of payroll payments and records is established by maintaining a control of the authorized salary amounts represented by the master payroll cards. All changes and overtime are posted to the duplicate payroll register and control totals are adjusted as required.

Changes in the master payroll card file originate in the form of payroll advices containing the required authorization and approvals. All changes are made currently as they occur, by withdrawing the cards affected and substituting new cards reflecting the changes. These changes will include such things as new employees, terminations, salary increases and decreases, transfers, tax changes (\$3,000.00 limitation), and any other factors which might affect the cards.

In case the change occurs in the middle of the pay period, or is retroactive, an exception card is prepared in addition to the new master payroll card. The exception card serves the same purpose as would the regular payroll card during the pay period affected.

When an employee has overtime, the master payroll card is pulled and the exception card is prepared stating the basic information and salary rate. The exception card then is punched with overtime hours, overtime earnings, and gross earnings. The payroll tax deductions may be extended by the Calculating Punch, gang punched from tax extension cards, or manually calculated depending on the volume or other conditions.

The number of employees working overtime is usually small and the range of overtime hours limited, tax deduction rate charts may be employed to advantage to determine tax amounts. Under this plan, tax deductions and net pay after taxes are calculated manually and posted on the control sheet. Exception cards are punched directly from this record. After master payroll cards for changes and additions have been filed in proper place and exception cards are substituted for the corresponding master payroll cards, all cards are totaled for balancing with control figures.

The preparation of payroll records and reports is accomplished through the use of various types of card records:

1. Master payroll cards or pay period payroll cards.
2. Exception cards.
3. Deduction cards.
4. Miscellaneous payment cards.
5. Accumulative record cards.

The first two cards have been discussed in the foregoing paragraphs.

Deduction cards. IBM Deduction Cards are used to record each type of voluntary deduction. If the deduction is recurrent, the same card is used for each pay period affected.

During the recent year the advent of various types of social benefits paid for by employees through payroll deductions has made this phase of payroll accounting a major

record-keeping operation.

There are numerous types of voluntary deductions in the nature of payments or deposits for specific purposes that require registers for reference or remittance purposes. In addition to the voluntary deductions, there are the federal, state, and city payroll tax deductions and their related report requirements. The maintenance of ledger accounts for the individual employee is also required for some types of deductions such as those for savings accounts, savings bonds, credit union, life insurance, retirement fund, or building and loan association. Even though the fundamental requirements for payroll purposes is the same for all types of deductions, the cards should be so designed as to provide for the subsequent use in meeting of each type of deduction. One of several different types of deduction cards may be used:

1. Individual deduction cards - All the voluntary deductions are made by means of a set of deduction cards for each employee and type of deduction. These cards are filed according to the pay period, or at the end of a pay period are sorted to select cards for deductions to be made during the current pay period.
2. Group deduction cards - In case that there is a high percentage of recurring voluntary deductions which are made consistently each pay period, a group or spread deduction card is often used. This

employee sequence is accomplished automatically by the Electric Punched Card Sorting Machine.

This record may be summary punched during the preparation of the payroll registers or checks, or as a subsequent operation.

An example of an accumulative record card is:

27219		217	188014692	047.73	03075.16	0334.69	.	06041.50	019.38	028.35					
CLOCK NO.		P.P.	S.S. ACCOUNT NUMBER	PERIOD WAGES	WAGES YR. TO DATE	WAGES QTR. TO DATE	O.A.B. DED.	DAYS	HOURS	TOTAL DED.	NET EARNINGS				
SUB-TOTAL DEDUCTIONS	INGIT OR ASSIGNMENTS	NET PAY	CARD	CLOCK NO.	PAY PERIOD	LIMIT CODE	EXEMP.	SOCIAL SECURITY ACCOUNT NUMBER	GROSS EARNINGS			TOTAL TIME		TOTAL DEDUCTIONS	(FEDERAL) O.A.B. DEDUCTION (PERIOD)
									PERIOD WAGES	YEAR TO DATE	O.A.B. CONTROL	QUARTER TO DATE	DAYS		
00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111	11111
22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222	22222
33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333	33333
44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444	44444
55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555	55555
66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666	66666
77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777	77777
QUARTERLY SUMMARY OF EARNINGS FOR SOCIAL SECURITY REPORTING												88888	88888		
YEAR TO DATE CURRENT QUARTER YEAR TO DATE BEGINNING OF PERIOD												88888	88888		
99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999

Figure 5. Payroll Summary Card for Social Security Records

Payment records. After all the controls have been established, all card are combined and arranged in proper sequence (Figure 6) in order to prepare the payroll registers, payroll checks, and employee earnings statements.

The Collator simultaneously feeds and compares two sets of cards in order to merge or match them. Therefore, the master payroll card, deduction card, and accumulative record card can quickly accomplish the merging process.

DUPLICATE PAYROLL REGISTER

PAYROLL REGISTER

TAX CLASS	YEAR TO DATE		DEPT. EMPLOYEE NO.	REGULAR EARNINGS	OVERTIME - ADJUSTMENTS			GROSS EARNINGS	DEDUCTIONS				CHECK AMOUNT
	WITH TAX	EARNINGS			HOURLY RATE	HOURS	AMOUNT		TAX DEDUCTIONS				
									S.U.I.	O.A.S.I.	WITHHOLDING	MISCELLANEOUS	
H R ADAMS			1	250.00				250.00	25.0	25.0	29.80		
2	339.60	290.00	160									10.25	204.95
H B BAKER			1	95.00	1.64			95.00	9.5	9.5	5.90		
2	70.80	114.00	403									3.20	84.00
L F BILLINGS			1	77.50	1.34			77.50	7.8	7.8	7.40		
1	88.80	93.00	483									3.75	64.79
E J BRACKETT			1	102.50	1.77			102.50	10.3	10.3	11.20		
1	143.40	123.00	526									7.20	82.04
A F CASPER			1	115.00	1.99			115.00	11.5	11.5	13.00		
1	156.00	138.00	890									5.00	94.70
E C COLLINS			1	142.50	2.47			142.50	14.3	14.3	12.90		
2	154.80	171.00	950									6.10	120.64
L F CUNNINGHAM			1	157.50	2.72			157.50	15.8	15.8	11.20		
3	134.40	189.00	990									8.50	134.64
(FOR THE PURPOSE OF THIS EXHIBIT, ONLY A FEW EMPLOYEES ARE ILLUSTRATED.)								94.00	9.42	9.42	9.40	4.40	785.76

Figure 7. Payroll Register.

PAYROLL DEDUCTION REGISTER

TYPE		WHEN MADE														
1—SINGLE PERIOD	2—SPECIFIC PERIOD	3—STANDING	1—FIRST HALF	2—SECOND HALF	3—EACH PERIOD											
EMPLOYEE DEPT.	NUMBER	NAME OF EMPLOYEE	TYPE	WHEN MADE	TOTAL DEDUCTIONS	SAVINGS BOND	HOSPITAL INSURANCE	GROUP LIFE INSURANCE	CREDIT UNION	RETIREMENT ANNUITY	WELFARE DONATION	PURCHASES	PAY ADVANCE	MISCELLANEOUS		
1	160	H R ADAMS	3	3	317.5	317.5										
1	160	H R ADAMS	3	3	115.0		1.50									
1	160	H R ADAMS	3	3	5.00					5.00						
1	403	H B BAKER	3	3	1.20		1.20									
1	403	H B BAKER	3	3	2.00			2.00								
1	483	L F BILLINGS	3	2	317.5	317.5										
1	526	E J BRACKETT	3	3	1.50	1.50										
1	526	E J BRACKETT	3	2	2.20		2.20									
1	526	E J BRACKETT	3	3	1.50			1.50								
1	526	E J BRACKETT	3	3	2.00				2.00							
1	890	A F CASPER	3	3	1.50	1.50										
1	890	A F CASPER	3	3	1.50		1.50									
1	890	A F CASPER	3	3	2.00				2.00							
1	950	E C COLLINS	3	3	3.75	3.75										
1	950	E C COLLINS	1	2	2.35							2.35				
1	990	L F CUNNINGHAM	3	3	1.50	1.50										
1	990	L F CUNNINGHAM	3	3	1.50		1.50									
1	990	L F CUNNINGHAM	3	3	1.50				1.50							
1	990	L F CUNNINGHAM	3	2	4.00					4.00						
(FOR THE PURPOSE OF THIS EXHIBIT, ONLY A FEW EMPLOYEES ARE ILLUSTRATED.)					44.00	157.5	7.90	3.50	5.50	9.00		2.35				

Figure 8. Payroll Deduction Register.

deduction are furnished by the deduction register (Figure 7). In order to meet the various internal or external requirements, separate registers may be prepared for each kind of deduction.

Checks and Earnings Statements. After the payroll and check register is prepared, the same cards are used to produce the paycheck and statement of earnings (Figure 9). The complete earnings statements can be prepared automatically, which contains not only the record of earnings and all the deductions for the current pay period, but also the cumulative totals of earnings and taxes withheld.

Issuance, totaling, and reconciliation are facilitated through the use of IBM checks. This permits the automatic machine processing of checks for balancing bank charges, listing outstanding checks, and reconciliation of the bank statements.

IBM checks are summary punched with check number and amount during the preparation of the payroll register. The drawee bank number and date are gang punched during this operation. Check duplicate cards are reproduced from the final check, and held pending return of the cancelled checks. The returned checks are totaled for balancing bank charges, sorted to check number, and matched against the duplicate cards. Unmatched duplicates are listed for outstanding check totals.

REPRESENTATIVE COMPANY

**BUY
SAVINGS BONDS
REGULARLY**

H R ADAMS			SOCIAL SECURITY NO. 1 1 0 1 5 1 4 3 6		
REGULAR EARNINGS	OVERTIME		GROSS EARNINGS	PAY PERIOD ENDING	
	HOURS	AMOUNT		EMPLOYEE NUMBER	
2 5 0 0 0			2 5 0 0 0	6 3 0	
SAVINGS BOND			3 7 5 -	1 1 6 0	
HOSPITAL INS			1 5 0 -	STATEMENT OF EARNINGS AND DEDUCTIONS	
RET ANNUITY			5 0 0 -		
2 9 8 0	2 5 0	2 5 0	2 0 4 9 5	3 3 9 6 0	2 9 0 0 0 0
WITHHOLDING	S. U. I.	O. A. S. I.	CHECK AMOUNT	WITH. TAX	EARNINGS
TAX DEDUCTIONS				YEAR TO DATE	

2161

CHECK NUMBER

REPRESENTATIVE COMPANY

ANY CITY, STATE

12-122
1256

TO THE ORDER OF

H R ADAMS

MO.	DAY	YEAR
6	3 0	

PAY \$ 2 0 4 9 5

DOLLARS	CENTS
2 0 4	9 5

PAYROLL ACCOUNT

STANDARD BANK & TRUST COMPANY

ANY CITY, STATE

REPRESENTATIVE COMPANY

Signature

AUTHORIZED SIGNATURE

Figure 9. Check and Earnings Statement.

Government reports. The accumulative record cards which contain period-to-date totals of earnings, taxes withheld, bond account balances, annuity contributions or other factors requiring accumulative figures are summary punched during the preparation of the payroll checks. Thus Old Age Benefit Reports, Withholding Statements, and State Unemployment Insurance Reports are prepared promptly and accurately from

the accumulative earnings records which are in balance with the payroll control.

Social Security Report (Form SS-1 b) of the employee's gross taxable earnings each quarter is due within thirty days after the end of each calendar quarter (Figure 10).

Income tax report (Form W-2) of the employee's gross earnings and withholding tax deductions is prepared annually or upon the termination of the employee's employment with the company (Figure 10).

Form SS-1 b TREASURY DEPARTMENT INTERNAL REVENUE SERVICE (Revised Nov. 1940)		SCHEDULE A—EMPLOYER'S REPORT OF TAXABLE WAGES PAID TO EACH EMPLOYEE CONTINUATION SHEET		PAGE No. _____	
REPRESENTATIVE COMPANY STREET ADDRESS CITY, STATE 13-0871985		Date Quarter Ended 6-30		A SUMMARY SHEET MUST ACCOMPANY THIS FORM READ INSTRUCTIONS CAREFULLY	
<small>Type or print in this space employer's name, address of principal place of business, and identification number exactly as shown in Items 10 and 13 on Form SS-1 a</small>					
↓	EMPLOYER'S ACCOUNT NUMBER (17)	NAME OF EMPLOYEE (Type or print) (18)	TAXABLE WAGES PAID UNDER FEDERAL INSURANCE CONTRIBUTIONS ACT (19)	STATE (20)	
	1 1 0 1 5 1 4 3 6	H R ADAMS	1 5 0 0 0 0		
	1 2 6 1 1 1 1 5 0	H B BAKER	5 7 0 0 0 0		
	1 1 7 1 5 3 6 1 9	L F BILLINGS	4 6 5 0 0 0		
	2 7 1 1 0 2 1 4 0	E J BRACKETT	6 1 5 0 0 0		
	1 2 6 3 0 1 5 7 5	A F CASPER	6 9 0 0 0 0		
	1 3 0 1 5 2 3 1 6	E C COLLINS	8 8 5 0 0 0		
	1 2 6 1 0 1 7 9 0				
	1 2 6 2 1 2 8 5 6				
	1 2 6 3 6 1 1 7 6				
	1 2 6 1 4 3 9 2 0				
	1 1 5 2 3 1 6 4 0				
	1 3 0 1 9 1 3 2 6				
	1 1 6 4 0 1 5 9 9				
	1 2 5 1 9 4 6 7 3				
	1 2 4 1 7 9 6 2 0				
	1 2 6 1 0 2 1 1 0				
	1 2 0 1 5 1 9 7 3				
	1 0 0 3 6 2 6 1 3				
	0 8 0 2 0 4 9 4 0				
	1 2 5 1 5 3 3 8 0				
	1 2 5 1 0 1 6 7 3				
	1 1 3 7 1 2 9 3 1				
	1 1 8 1 5 4 2 6 0				
	1 8 6 7 5 3 2 2 0				
	1 2 0 3 1 1 1 6 3				
	1 2 6 1 0 4 2 6 2				
	1 2 0 5 1 1 7 8 3				
	1 2 6 1 6 1 9 2 4				
	1 2 6 7 2 3 6 1 8				

Form W-2 U. S. Treasury Department Internal Revenue Service		WITHHOLDING STATEMENT Wages Paid and Income Tax Withheld		ORIGINAL Do Not Lose This Statement	
Employee No. and Employee to whom paid (name and full address)	MARITAL STATUS (SINGLE / MARRIED)	Social Security No.	TOTAL WAGES (BEFORE PAYROLL DEDUCTIONS) PAID	Federal Income Tax Withheld, If Any	
1 1 6 0 H R ADAMS STREET ADDRESS CITY STATE		2 1 1 0 1 5 1 4 3 6	5 9 0 0 0 0	6 9 7 2 0	
EMPLOYER BY WHOM PAID (Name, address, and Social Security Identification Number)					
REPRESENTATIVE COMPANY STREET ADDRESS CITY, STATE 13-0871985					

NOTICE TO EMPLOYEE

This statement is important!

It must be attached to your U. S.
income tax return

See Instructions on other side

Figure 10. Government Reports.

States which have income tax laws require that a report of the employee's gross earnings be prepared annually and submitted to them.

The Unemployment Compensation Employee Wage Report and the reporting period varies in different states. Therefore, the statutes of the state govern the type of report.

Management reports. IBM method of accounting gives management informative reports by describing each item completely and arranging data in a manner corresponding to the accounting requirements of any business.

Accounting distribution. In general, salaried employees' expense is of a non-productive or indirect nature and is charged to expense or clearing accounts rather than to the specific jobs or products. Usually each employee's salary is charged to only one account; however, it is possible that multiple accounts are involved. If that be the case, it is generally apportioned on an estimated basis.

If only one clearing account is used, the account number is recorded in the master payroll card and reproduced into the pay period payroll cards. These cards will then serve for the preparation of the account distribution summary reports (Figure 11).

If the employee's time is apportioned on an estimated basis over multiple accounts, a file of master distribution cards should be maintained in addition to the master payroll

cards. A card with the apportionment of each employee's regular salary is filed. The exceptions from standard are provided for by substituting exception cards corresponding to the payroll exception cards.

Summary cards, automatically punched as these reports are run, may be combined with master budget cards to prepare the departmental expense budget reports. Also, these same summary cards may be used for resummarization and preparation of general ledger entries.

ACCOUNT DISTRIBUTION SUMMARY										
STATE	OFF.	DEPT.	ACCOUNT NO.	EMPLOYEE NO.	NAME OF EMPLOYEE	OFFICE OR DEPARTMENT TOTALS		ACCOUNT TOTALS		
						SALARY	OVERTIME	SALARY	OVERTIME	
6	1	1	110	1	BALANCE FORWARD	697	00			
6	1	1	110	1	160 H R ADAMS	250	00			
6	1	1	110	1	890 A F CASPER	115	00			
6	1	1	110	1	2415 L B GREGG	130	00			
6	1	1	110	1	2872 A J HENDERSON	102	50			
6	1	1	110	1	3702 L S JOHNSON	97	50			
						1392	00*			
9	1	1	110	1	BALANCE FORWARD	770	00	25	95	
9	1	1	110	1	75 P T ABERS	240	00			
9	1	1	110	1	602 G S BUCKLEY	155	00	16	08	
9	1	1	110	1	2232 R T FORSYTHE	122	50	12	72	
9	1	1	110	1	4215 W L KIRK	107	50			
9	1	1	110	1	5083 B C MONTGOMERY	130	00			
9	1	1	110	1	6095 G S PATTERSON	115	00			
						1640	00*	54	75*	
10	1	1	110	1	BALANCE FORWARD	437	50			
10	1	1	110	1	580 N P BROWN	240	00			
10	1	1	110	1	830 S S CAMERON	92	50			
10	1	1	110	1	1309 T P DENNIS	130	00			
10	1	1	110	1	1720 O F ENGSTROM	115	00			
						1015	00*			
6	1	1	110	2	BALANCE FORWARD	477	50	410	47	
6	1	1	110	2	1010 R T CUTLER	122	50			
6	1	1	110	2	1283 K W DAUGHERTY	117	50			
6	1	1	110	2	1780 V P ENRIGHT	140	00			
6	1	1	110	2	2210 S W FORD	97	50			
						955	00*			

Figure 11. Account Distribution Summary

Control of attendance. A control over absenteeism, tardiness, and overtime is provided by reports obtained from the IBM Attendance Cards. Analyses by department, occupation or individual facilitate management control of personnel matters.

At the end of the week, the time clerks review the registration of time on the attendance cards and mark the cards to show the hours worked, overtime hours, number of times late, and the number of days absent by reason. The marked cards which have been approved by the department supervisor, are sent to the payroll department where the attendance records are completed by the automatic sensing and punching into the cards of overtime hours, times late, and absence data according to the markings by the time clerks.

Chapter VII

HOURLY PAYROLL AND LABOR ACCOUNTING

Formal recognition of payroll liabilities is required at least when making up the rolls for the purpose of effecting payment and at, or as of, the close of each fiscal or accounting period. For cost accounting purposes it may be desirable to carry the recognition of payrolls further, perhaps to the point of a daily summarizing and recording. The original data are in the form of time tickets, mechanical records, or schedules of names and rates coupled with reports of absences or overtime.

Cost reduction and cost control are continuing problems of management. Modern accounting machine developments make possible finger-tip control of labor cost. Every detail of operations may be exposed in a series of reports which reflect varying points of view. As the range of analysis becomes wider, the ease of detection of adverse and favorable elements increases. Thus, management is in position to coordinate the desirable elements of the hourly payroll procedure and discard the undesirable parts.

It is also possible to effectively control costs at the point at which they are incurred, and by the individual responsible, and at the time of occurrence.

I. HOURLY PAYROLL

Payroll and labor accounting is reporting to the employee,

to governmental agencies, and to the owners of a business, the amount of money paid for services rendered the employer by the employee. It includes the recording of the time the employee worked, the computation of his earnings and taxes, and the deduction from earnings of taxes and other deductible items to establish the net pay.

The objectives of the payroll and labor application are as follows:

1. Establishment of the source documents, such as attendance and job records, which can also be used for payroll, cost, and production records.
2. Complete, timely, accurate, and legible source records are made available.
3. Attendance time and job time are balanced.
4. Good accounting control over payroll expenditures is established.
5. The accuracy of rates and extensions are easily and speedily verified.
6. Summarization of earnings to compute withholding taxes.
7. Preparation of the payroll register.
8. Preparation of the individual pay checks or envelopes.

9. Preparation of earnings and deduction statements for each employee.
10. Preparation of the deduction registers.
11. Preparation of Federal Social Security records, withholding tax and annual income tax figures.
12. Produce State Unemployment Insurance and statistical reports.
13. Production of cost accounting records.

Engagement Notice. When an individual is employed, a "notification of employment" (Figure 12) is prepared for the purpose of providing the interested departments with the data which is needed to establish employment and personnel records.

SOCIAL SECURITY NUMBER 077 05 2831		NAME Gerald Driscoll		BIRTH DATE 8 07 07	
WORK CODE 25		ADDRESS 126 Lukas Road		CITY STATE Endicott N. Y.	
NEW-1 X	REHIRE-2	KIND OF WORK 25		DEPARTMENT	
CLOCK NUMBER 01145	ADDITIONAL REPLACE	FOREMAN <i>J. Smith</i>		MARITAL STATUS M	
DATE 5-12	STARTED A.M. P.M.	EMPLOYMENT DEPT. <i>D. Morris</i>		HOME	
RATE 1.15	X PER HOUR PER WEEK			PERMANENT TEMPORARY	
				PERMANENT <input checked="" type="checkbox"/> TEMPORARY <input type="checkbox"/>	
ENGAGEMENT NOTICE					
ORIGINAL - EMPLOYMENT DEPT. DUPLICATE - PAYROLL DEPT. TRIPLICATE - EMPLOYEE		- BLUE INK - BLACK INK - GREEN INK		SOCIAL SECURITY 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64	
		WORK CODE		N R CLOCK NUMBER MO. DAY YR. RATE 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	

Figure 12. Engagement Notice.

Master Payroll card. The master payroll card is prepared from the engagement notice which provides the data needed to process the payroll records (Figure 13).

W V ASTUR		1,375	400	5500	55	55	4,35	4,955	2	2	107	345	126	19	1483	
MACH OPER		12	HOURLY RATE	HOURS	EARNINGS	O. A. S. I.	S. U. I.	WITHHOLDING	NET PAY AFTER TAXES	TAX CLASS	SEX - M. S.	YEAR OF BIRTH	DATE EMPLOYED	SOCIAL SECURITY NO.		
NAME OF EMPLOYEE - POSITION - CODE		STANDARD WEEKLY SCHEDULE AND EARNINGS														
		MO	DAY	YEAR	REAS. DATE OF RATE CHANGE	DEPT. NO.	EMPLOYEE NO.									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Figure 13. Master Personnel Card.

The basic personnel information, earnings, and tax deductions for a standard pay period are punched by the Electric Card Punching Machine into a set of master personnel cards.

The Electric Punched Hole Verifier is used to verify the accuracy of the punching before the cards are used for any accounting purpose. The automatic notching of each card provides permanent, visible proof that the accuracy of the transcribing operation has been verified. Thereafter, this information is reproduced and verified automatically.

These cards serve as the basic control record and to actuate IBM machines to prepare various Reports of Personnel.

For payroll purposes, a duplicate of the master personnel card is used as a master payroll card to prepare automatically attendance cards, pay period earnings cards, job cards, and tax exemption certificates.

Deduction Cards. U. S. Treasury Department Form W-4 must be filled out and signed by the employee in order that the employer will have the information necessary to correctly compute the withholding tax on the employee's earnings. The regulation form which is furnished by the Department of Internal Revenue can be printed on IBM cards thus facilitating the accounting procedure through the Electric Accounting Machines.

The employee must sign authorization covering deductions which are to be made from earnings, such as War Bonds, insurance, charitable donations, etc.

There are two major types of deductions which the employer must deduct from gross earnings to determine the employee's net pay:

1. Compulsory types are:
 - a. Withholding tax.
 - b. Old Age Benefit Insurance.
 - c. State Unemployment Compensation Insurance.
2. Optional types are:
 - a. War Bond purchases.
 - b. Insurance.

the payroll and the labor distribution reports is transferred into the IBM cards in the form of punched holes. Whenever the man number and rate, or the job number, can be predetermined and prepunched, the time required for the punching operation can be reduced.

Job time cards. The preparation of job cards is mechanized completely by the automatic prepunching of employee's identification and rate, the electronic translation of job facts (recorded by pencil marks) into punched holes, and the automatic calculation of labor charges, burden, production standards, and efficiency ratings.

An alternate method is the prepunching of job cards from production planning records, with job and operation description, machine group, time standards, and quantity required. The card is completed by marking employee identification, elapsed time, and pieces finished.

DEPT NO 25		MAN NO 123		NAME <i>James Wilson</i>	
ORDER OR ACCT NO 465		OPER NO 33		REMARKS	
OPERATION NAME <i>Assembling Clutch</i>					
START	STOP	HOURS			
DEC 22 9.9		0.8			
GOOD PIECES	RATE	AMOUNT		IND	DIR
4		.40		1	2

INDIVIDUAL JOB TICKET												
DATE		DEPT	MAN NO	ORDER OR ACCT	OPER NO	HRS	PIECES	AMT	CODE	1000		
MO	DAY											
0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7

LICENSED FOR USE UNDER PATENT 1772 492

THIS PART OF THE CARD CAN BE DIVIDED INTO FIELDS FOR ADDITIONAL INFORMATION

IND CODE NO 150

Figure 15. Job Time Card.

Job cards may be of many designs:

1. Individual Daily Job Tickets provide for only two time registrations - START and STOP. This type of recording results in the preparation of a separate card for each individual job performed by one operator in one day.
2. Continuous Job Tickets provide for multiple time registrations pertaining to a single job. Work performed by the same employee on successive days is recorded on the same card - until the job is finished or until the termination of the pay period.
3. Gang Job Tickets are used when a job requires the services of more than a single workman. Although they contain the same information as individual job tickets, they differ from individual job tickets in that they contain also the employee number, hours, and amounts for each operator participating in the work. From the gang job tickets, supplementary cards are punched, one for each employee. The latter cards are used to tabulate the payroll, and the gang job tickets for distribution and cost purposes.

Gross earnings cards. Attendance time is multiplied by the hourly rate to determine the amount of gross earnings. Other factors which may be involved in computing the gross earnings are shift and overtime premiums and production

Payroll and Labor Distribution Register. In some cases the distribution cards are sorted with the payroll cards by man number and listed on a report generally called the Payroll and Labor Distribution Register. In other cases, the payroll cards and the distribution cards are separated after balancing and the Registers are listed separately. In this case, the register are usually prepared for each pay period.

Payroll Register. It is necessary to prepare for each pay period a report called a Payroll Register showing the name, social security number, clock number, hours worked, earnings, deductions, and net pay of each employee (Figure 17).

The master card, the gross earnings card, and the deduction cards automatically compute and print this report on the IBM Accounting Machine.

Thus, complete audit and reference records of payments, deductions, and year-to-date totals of earnings and taxes withheld are provided by the Payroll Register. Complete flexibility of machines and methods permits the design of a record to meet individual preferences.

Payroll checks. Card checks serve a two-fold purpose - as tabulating cards and as checks. As checks, they contain in written form all the elements legally necessary to establish them as authentic media of payment. As tabulating cards, they are available for the preparation by automatic machines of records associated with disbursements by check.

PAYROLL REGISTER

SOCIAL SECURITY NUMBER	T. C.	YEAR TO DATE		DEPT.	EMPLOYEE	NAME OF EMPLOYEE	HOURLY RATE	HOURS		GROSS EARNINGS	DEDUCTIONS				NET PAY
		GROSS EARNINGS	WITHHOLDING TAX					WORKED	OVERTIME PREMIUM		PAYROLL TAXES			MISCELLANEOUS	
											S.U.I.	O.A.S.L.	WITH.		
1 2 6 1 9 1 4 8 3	2	2 9 6 2 1 3	2 4 5 8 6	1	2 0 6	W V ASTUR	1 3 7 5	4 4 0	2 0 0	6 3 2 5	6 3	6 3	5 5 5	1 0 1 7	4 6 2 7
1 2 6 1 1 1 1 5 0	1	2 1 1 5 4 3	1 9 8 7 3	1	3 4 2	F A ATCHISON	1 0 0	4 0 0		4 0 0 0	4 0	4 0	4 0 5	3 2 5	3 1 9 0
1 1 7 1 5 3 6 1 9	2	1 8 1 0 4 5	1 7 9 0 2	1	5 1 8	H B BAKER	1 3 2 5	4 0 0		5 3 0 0	5 3	5 3	4 0 5	4 5 0	4 3 3 9
2 7 1 1 0 2 1 4 0	1	2 4 0 6 7 5	2 5 0 4 4	1	6 1 5	L F BILLINGS	1 1 5	4 0 0		4 6 0 0	4 6	4 6	4 9 5	3 5 0	3 6 6 3
1 2 6 3 0 1 5 7 5	3	2 0 9 6 8 6	6 2 9 3	1	7 0 3	E J BRACKETT	1 0 0	4 0 0		4 0 0 0	4 0	4 0	1 1 5	2 5 0	3 5 5 5
1 3 0 1 5 2 3 1 6	2	3 2 2 4 1 7	3 1 9 1 5	1	8 9 3	A F CASPER	1 4 0	4 4 0	2 0 0	6 4 4 0			5 7 0	3 7 5	5 4 9 5
1 2 6 1 0 1 7 9 0	2	2 6 1 7 3 1	2 0 7 5 2	1	1 0 7 5	E C COLLINS	1 2 5	4 0 0		5 0 0 0	5 0	5 0	3 6 0	2 5 0	4 2 9 0
1 2 6 2 1 2 8 5 6	1	2 5 8 1 1 5	2 6 8 2 2	1	1 1 0 3	L F CUNNINGHAM	1 1 7 5	4 0 0		4 7 0 0	4 7	4 7	5 1 0		4 0 9 6
1 2 6 3 6 1 1 7 6	5	2 6 1 5 4 3			1 1 2 1 9	F A DAVENPORT	1 2 0	4 0 0		4 8 0 0	4 8	4 8		3 7 5	4 3 2 9
1 2 6 1 4 3 9 2 0	2	2 3 4 6 7 2	1 9 7 3 6	1	1 3 0 2	H F DENNIS	1 1 0	3 2 0		3 5 2 0	3 5	3 5	1 3 5		3 3 1 5
1 1 5 2 3 1 6 4 0	1	1 8 7 2 3 3	1 8 0 3 7	1	1 7 4 1	B A ENGELS	9 0	4 0 0		3 6 0 0	3 6	3 6	3 4 5	1 0 0	3 0 8 3
1 3 0 1 9 1 3 2 6	3	2 9 9 3 1 0	1 0 8 0 9	1	2 0 9 2	A B FARRELL	1 3 0	4 0 0		5 2 0 0	5 2	5 2	1 9 5		4 9 0 1
1 1 6 4 0 1 5 9 9	2	2 5 1 0 4 9	2 0 1 7 5	1	2 1 8 3	M J FOSTER	1 1 5	4 4 0	2 0 0	5 2 9 0	5 3	5 3	3 9 0	5 2 5	4 2 6 9
1 2 5 1 9 4 6 7 3	1	2 8 0 8 3 9	3 1 9 7 0	1	2 4 7 0	B J GRAHAM	1 3 5	4 0 0		5 4 0 0	5 4	5 4	6 1 5	3 0 0	4 3 7 7
1 2 4 1 7 9 6 2 0	3	2 2 0 3 1 0	6 0 1 6	1	2 4 9 2	E L GRESHAM	1 0 0	4 0 0		4 0 0 0	4 0	4 0	1 1 5	5 0 0	3 3 0 5
1 3 9 2 0 7 2 1 8	2	2 8 3 3 1 6	2 1 0 0 2	1	2 8 9 6	L B HENDERSON	1 3 2 5	4 0 0		5 3 0 0	5 3	5 3	4 0 5	6 7 5	4 1 1 4
1 3 2 1 5 2 6 1 2	2	2 6 2 0 4 0	1 9 0 1 0	1	3 7 2 0	R J JOHNSON	1 2 5	4 0 0		5 0 0 0	5 0	5 0	3 6 0	1 1 5 0	3 3 9 0
		4 2 6 1 7 3 7	3 1 9 9 4 2			FOR THE PURPOSE OF THIS EXHIBIT, ONLY A FEW EMPLOYEES ARE ILLUSTRATED.		6 8 4 0	6 0 0	8 2 4 7 5	7 6 0	7 6 0	5 9 7 5	6 6 4 2	6 8 3 3 8

Figure 17. Payroll Register.

Card checks may be obtained as by-products of both Numerical and Alphanumeric Accounting Machine procedures. When the Numerical Accounting Machine is used, the checks are automatically summary punched simultaneously with the printing of each man's earnings on the payroll and then interpreted to print on the check the numerical data such as: date, employee number, check number, O.A.B. deduction, and amount payable. Employee name, address, and other descriptive data are customarily transcribed by some form of available addressing equipment.

If an Alphanumeric Accounting Machine is available, it is possible to print both numerical and descriptive data on the face of the checks that were summary punched while the payroll was being printed. Such card checks may be fed manually when only a small number are to be prepared. For larger volume, it is possible to effect fully automatic handling of the checks through the use of the Bill Feed device.

The availability of a high-speed listing mechanism such as the Electric Accounting Machine facilitates the preparation, for use by the paymaster and cashier, of original and duplicate listings of checks issued. It also simplifies the task of balancing returned checks to the total appearing on the bank statement and later preparing a printed list of returned and outstanding checks for the auditor's use.

Card checks are frequently reproduced at the rate of

one hundred a minute by the Reproducing Punch to create a set of punched duplicates. This second set of regular tabulating cards is then available for the preparation of the Check Register and the subsequent reconciliation of returned and outstanding checks with the bank statement.

PAYROLL ACCOUNT	REPRESENTATIVE COMPANY		12-123
	ANY CITY, STATE		1234
	TO THE ORDER OF	DATE	CHECK NUMBER
	W V ASTUR	1 2 2 4	2 0 6
	VOID AFTER 60 DAYS		
		DOLLARS	CENTS
		PAY \$* 4 6	2 7
		REPRESENTATIVE COMPANY	
		<i>Signature</i> AUTHORIZED SIGNATURE	
STANDARD BANK & TRUST COMPANY			
ANY CITY, STATE			

Figure 18. Card Check.

Payroll Envelopes. Persistence of the custom of paying wages in cash may make it necessary for accounting departments to prepare either the cash envelopes for each worker's earnings or some substitute record.

In some instances, employees' statements are prepared and enclosed in window envelopes with the cash. In other cases, the earnings and deduction information is printed directly on the envelopes.

In addition to the preparation of the envelope, it is customary to imprint a receipt which is signed by the employee and returned to the paymaster as evidence that the cash has been paid to the worker.

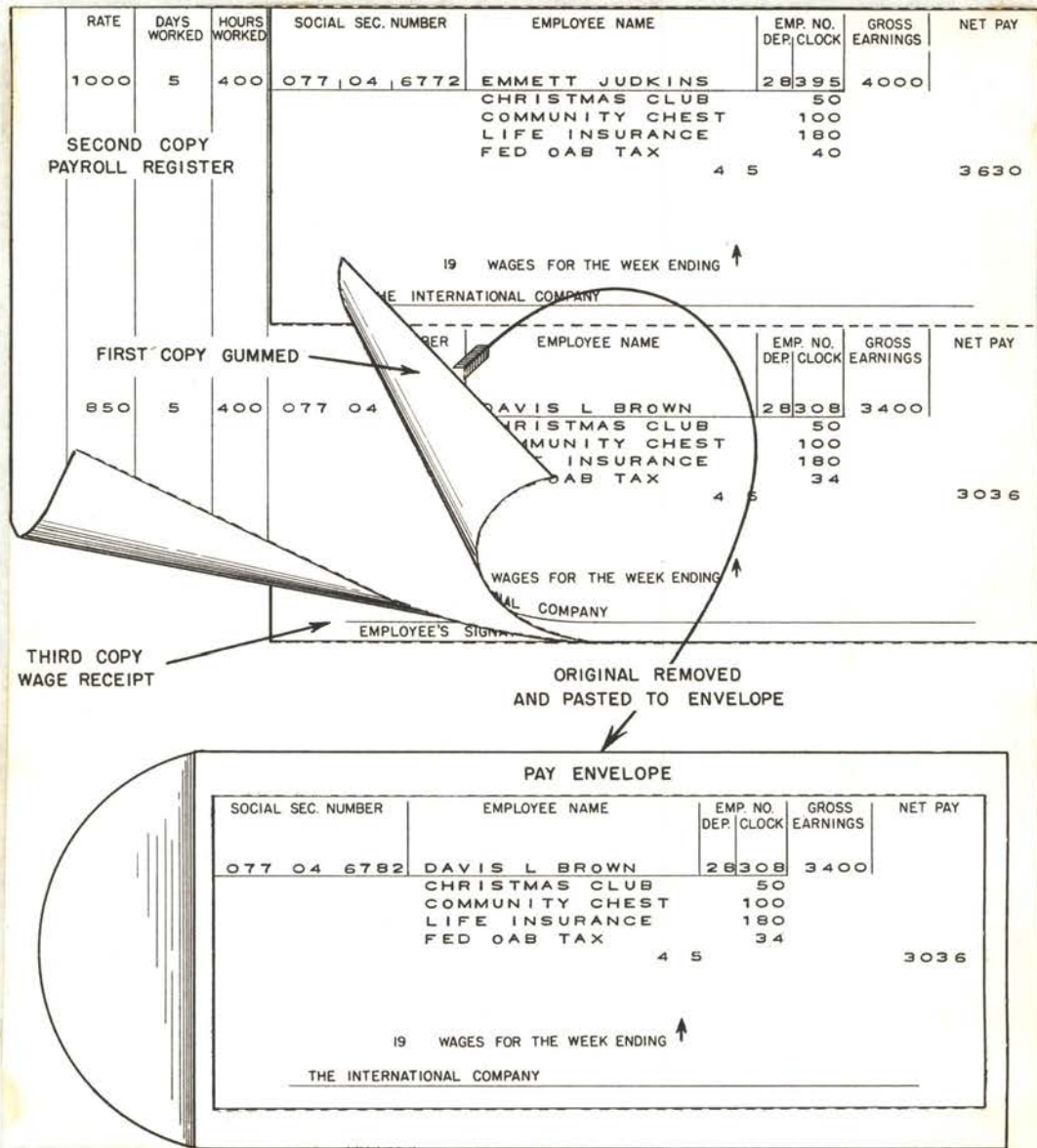


Illustration No. 2

Payroll Register, Wage Receipt, and Pay Envelope.

The payroll register, wage receipt, and pay envelope is prepared in one operation by an Alphabetic Accounting Machine.

These three records are prepared simultaneously on a three-part continuous form, the first copy being the earnings statement, the second copy is a payroll sheet, and the third copy the company's receipt for wages paid to each employee. It is unnecessary to check one record with another since they are all written at the same time.

Gummed paper is used for the first copy or earnings statement. It is perforated at intervals of two and one-sixth inches so that it can be conveniently torn into individual statements for each employee. The statements contain the employee's name and number, the gross earnings, a description and the amount of every deduction, and the net earnings. These individual statements are pasted to the pay envelopes, a simple operation since they are printed on gummed paper.

The second copy of the form is perforated at intervals equal to three (or more if desired) earnings statements. The second copy is separated into sheets which are filed in a book as a permanent payroll register. This copy is a carbon copy of the earnings statements and, in addition, it contains the hours worked and other desired payroll information.

The third copy is similar to the first copy except that it is not gummed. Also, the individual receipt has a line for employee's signature and address. The paymaster obtains the signature of each employee on the proper receipt when the employee is given his pay.

Payroll denomination. In order to obtain the correct quantities of coins and bills required for filling cash pay envelopes, it is necessary to analyze or denominate the earnings of all employees. Under manual methods, this procedure first involves breaking the net earned amount for each employee into its component parts of ten, five, and one dollar bills; and halves, quarters, dimes, nickels, and cents. The second step is to summarize the currency of each denomination to determine the quantities that will be required.

Three distinctive routines have been evolved to accomplish payroll denomination by Electric Accounting Machine Methods. The first uses machines to perform the same general functions performed in the manual procedure; but greater speed and accuracy are achieved.

Two variations of this method are illustrated in this study. In each instance the employee earnings summary cards are sorted according to earning amounts along with denomination master cards. The procedures differ since:

1. Illustration No. 3 is that of a company which has no miscellaneous payroll deductions. Therefore, the cards are sorted to gross pay amount and then gang-punched to record all of the fixed factors: - Unemployment Insurance and Old Age Benefits deductions, net pay, and the payroll denomination. The cards are then sorted back to payroll order and tabulated to obtain the desired results.

12101037	027038369	2544
EMPLOYER NAME	SOCIAL SECURITY ACCOUNT NUMBER	WEEK ENDING

PAYROLL TOTALS AND DENOMINATIONS

PAYROLL NO	PAYROLL DENOMINATIONS										PAYROLL TOTALS							NO. OF EMPLOYEES	
	DOLLARS					CENTS					DAYS	HOURS	AMT. EARNED	OLD AGE	UNEMP.	NET. AMT. PAID	MALE	FEMALE	
	20	10	5	2	1	50	25	10	5	1									
5	26	220	50	70	56	130	63	181	53	287	792	6231	333632	3269	3326	327037	121	43	
6	25	95	76	94	32	76	66	101	59	235	506	4042	216304	2157	2157	211990	31	81	
7	28	331	93	79	169	91	145	220	36	388	1151	9020	486826	4802	4881	477143	67	167	
8	41	301	138	245	103	135	147	225	106	542	1261	10205	535719	5316	5356	525047	54	227	
10	5	119	32	22	10	69	14	107	12	94	411	3048	158592	1584	1584	155424	38	46	
TOTAL	4820	21840	4070	2214	778	464.00	235.50	165.00	27.40	32.86	8436	66224	35,351.45	351.14	353.55	34,646.76	532	1254	

Illustration No. 3.

Payroll Denomination With No Miscellaneous Payroll Deductions

2. In Illustration No. 4, the presence of miscellaneous deductions makes it necessary to sort according to net pay amount the summary cards obtained from a preliminary payroll tabulation. In this

WEEK ENDING										SHEET NO.			
MAN NO.	EMPLOYEE'S NAME				HOURS	GROSS PAY	S. S. DED.		MISC. DED.	NET PAY			
							O.A.B.	U.I.					
1	3	MARTIN WILLIAM P			24:00	12:00	12	18		11:70			
2	6	GAUTHIER GEORGE			24:00	13:20	13	20		12:87			
30	56	HIMEON CHARLES E			48:67	20:40	20	31		19:89			
PAYROLL DENOMINATION													
\$10	\$5	\$2	\$1	50c	25c	10c	5c	1c					
38	11	1	50	22	13	32	7	41					
TOTAL GROSS PAY					FEDERAL TAX	STATE TAX	TOT. MISC. DED.	TOTAL NET PAY					
518:19					5:18	7:80		505:21*					

Illustration No. 4

Payroll Denomination With Miscellaneous Payroll Deductions

case, only the denomination is gang-punched. The printed payrolls are then prepared and the departmental

payroll denomination is printed at the bottom of each page.

A second distinctive routine for payroll denomination involves the use of the Card-Counting Sorter.

The third plan is adaptable to Alphabetic Accounting Machines equipped with the Digit Selector device. A single run through the machine followed by a simple recapitulation completes the denomination.

Employee Earnings Statement. A legal requirement for rendering a receipt or a statement to workers at the time of payment of wages is incorporated in the Social Security law.

The statement of earnings (Figure 19) may be a separate statement or the type that is attached to the check as a stub.

IBM 728630
LICENSED FOR USE UNDER PATENT 1,772,492

2	594	RUGG	07	12	31	04	000	04	000	03	000	03	000	07	50	50	1	000	03	567
DEPT.	SERIAL	LAST NAME	TAX CLASS	MO.	DAY	YR.	GROSS EARNINGS	O. A. S. I. WITHHOLDING TAX	BONDS	MISCELLANEOUS	WELFARE	SAVINGS	NET PAYABLE	DEDUCTIONS THIS WEEK						
<p>STATEMENT OF EARNINGS FOR WEEK ENDING ON DATE INDICATED ABOVE</p>																				

Figure 19. Statement of Earnings.

Deduction Registers. Deduction registers may be prepared for various special purposes. Multiplicity of reports does not impede the mechanization of this work; but, instead increases the value of the use of automatic accounting machines.

The maintenance of these records on punched cards generally entails so little time that this type of work is frequently overlooked as unimportant. It is necessary to recognize, nevertheless, that much of this work under manual procedures is distributed so widely that the cost of its maintenance is obscured. Centralization of the records in a comprehensive machine accounting payroll procedure, however, results in economies of operation and increased financial control which contribute to the greater success of the completely coordinated Electric Accounting Machine Method of payroll preparation.

In some instances, lists of deductions from employee's earnings may be required to furnish documentary records for outside individuals or organizations, such as savings or thrift deposits in local banks, group hospitalization contributions, union or association dues, and group insurance premiums.

Sometimes the deduction register is required to supplement a payroll which is already crowded with essential earnings data. To meet this contingency, the deduction register may be printed on the reverse side of the payroll. The total of deductions appears in one column of the payroll, which is

TYPE
 1-SINGLE PERIOD
 2-SPECIFIC PERIOD
 3-STANDING

WHEN MADE
 1-FIRST WEEK 5-1ST AND 3RD WEEK
 2-SECOND WEEK 6-2ND AND 4TH WEEK
 3-THIRD WEEK 7-EACH WEEK
 4-FOURTH WEEK

DEDUCTION REGISTER

EMPLOYEE		NAME OF EMPLOYEE	TYPE	WHEN MADE	TOTAL DEDUCTIONS	SAVINGS BOND	HOSPITAL INSURANCE	GROUP LIFE INSURANCE	CREDIT UNION	RETIREMENT ANNUITY	WELFARE DONATION	PURCHASES	PAY ADVANCE	MISCELLANEOUS
DEPT.	NUMBER													
1	206	W V ASTUR	3	4	375	375								
1	206	W V ASTUR	3	4	150		150							
1	206	W V ASTUR	3	4	492					492				
1	342	F A ATCHISON	3	4	125		125							
1	342	F A ATCHISON	3	4	200				200					
1	518	H B BAKER	3	6	200	200								
1	518	H B BAKER	3	4	250					250				
1	615	L F BILLINGS	3	4	150		150							
1	615	L F BILLINGS	3	4	200			200						
1	703	E J BRACKETT	3	4	250	250								
1	893	A F CASPER	3	4	175		175							
1	893	A F CASPER	3	4	200				200					
1	1075	E C COLLINS	3	6	125	125								
1	1075	E C COLLINS	3	4	125		125							
1	1219	F A DAVENPORT	3	4	175	175								
1	1219	F A DAVENPORT	1		200						200			
1	1741	B A ENGELS	3	4	100		100							
1	2183	M J FOSTER	3	6	200	200								
1	2183	M J FOSTER	3	4	125		125							
1	2183	M J FOSTER	3	4	200				200					
1	2470	B J GRAHAM	3	4	175	175								
1	2470	B J GRAHAM	3	4	125		125							
1	2492	E L GRESHAM	3	4	175	175								
1	2492	E L GRESHAM	3	4	150		150							
1	2492	E L GRESHAM	3	4	175			175						
1	2896	L B HENDERSON	3	4	175	175								
1	2896	L B HENDERSON	3	4	175		175							
1	2896	L B HENDERSON	3	4	125			125						
1	2896	L B HENDERSON	3	4	200				200					
1	3720	R J JOHNSON	1		1000								1000	
1	3720	R J JOHNSON	3	4	150		150							
FOR THE PURPOSE OF THIS EXHIBIT, ONLY A FEW EMPLOYEES ARE ILLUSTRATED.					6642	1850	1550	500	800	742		200	1000	

Figure 20. Deduction Register.

the left-hand page when bound. In a subsequent tabulation, the deduction amounts are spread to appropriate columns on the reverse side of the next payroll sheet. This becomes the right-hand page of the bound payroll book. Prepunched deduction cards are used so that only man number and amount need be punched manually.

Annual Earnings Statements. Treasury department regulations required that statements be forwarded to the Commissioner of Internal Revenue showing annual earnings of employees within a specified period.

Peak loads are minimized at the end of reporting periods by use of accumulative record cards for the automatic machine preparation of Quarterly and Annual Reports.

Form W-2 (Rev.) U. S. Treasury Department Internal Revenue Service		WITHHOLDING RECEIPT For Income Tax Withheld on Wages			ORIGINAL - 1	
<p>To EMPLOYEE: This Withholding Receipt may be used as your income tax return if your 1944 income meets the TEST. A married couple may make a combined return on this Withholding Receipt, if their total income meets the test. Their incomes should be combined on Lines 1, 2, and 3, and shown separately on Line 4. The Collector of Internal Revenue will figure the tax on either the combined or the separate incomes, whichever is to the taxpayers' advantage.</p> <p>LINE 1 Write total of wages shown on this and all your other 1944 Withholding Receipts (Form W-2) \$.....</p> <p>LINE 2 If you got any wages from which no tax was withheld, or any dividends or interest, write total \$.....</p> <p>LINE 3 Add Lines 1 and 2. Write total here \$.....</p>		<p>TEST: If Line 2 is not over \$100 AND Line 3 is less than \$5,000, you may use this Withholding Receipt as your return provided you had no income other than wages, dividends, and interest. If your income does not meet this test, use Form 1040.</p> <p>LINE 4 If Line 3 includes income of both husband and wife, show husband's income here \$.....; wife's income here \$.....</p> <p>LINE 5 If you filed a 1944 Declaration of Estimated Tax (Form 1040-ES), write total of estimated tax paid . . \$.....</p> <p>To EMPLOYEE: Change name and address if not correctly shown</p>				
Employee No.	EMPLOYEE TO WHOM PAID (Name and Address)	Marital Status Code 1-Single 2-Married 3-Head of Family	Social Security No.	Gross Wages Paid During the Calendar Year 1944	Federal Income Tax Withheld	
1145	MR GERALD DRISCOLL 126 LUKAS ROAD ENDICOTT NY	3	077052831	318350	42140	
EMPLOYER*BY WHOM PAID (Name and Address of Employer)		DO NOT WRITE IN THIS SPACE				
GENERAL MANUFACTURING COMPANY. ENDICOTT, NEW YORK						

Figure 21. Withholding Statement.

The data to be printed appear on summary earnings cards that are maintained on a cumulative basis throughout the

year by the use of the Automatic Summary Punch.

This statement complies with the 1939 amendments of the Social Security Act. Such a record is extremely valuable to the worker since it eliminates the inconvenience of lost weekly receipts for O.A.B. deductions and simplifies the preparation of individual income tax returns (Figure 21).

Old Age Benefits Reports. Social Security legislation has imposed upon industry, and therefore upon payroll accounting department, the function of preparing information returns concerning the payment of wages to employees. Despite changes in the form of these reports, their preparation has not involved any inconvenience or major change in the Electric Accounting Machine Method.

Form SS-1b TREASURY DEPARTMENT INTERNAL REVENUE SERVICE		SCHEDULE A—EMPLOYER'S REPORT OF TAXABLE WAGES PAID TO EACH EMPLOYEE CONTINUATION SHEET			PAGE No. _____	
REPRESENTATIVE COMPANY NEW YORK N.Y. 13-0871985			Date Quarter Ended DECEMBER 31, 19		READ INSTRUCTIONS CAREFULLY	
<small>Enter in this space employer's name, address of principal place of business, and identification number exactly as shown in Items 11 and 12 on Form SS-1a.</small>						
Do Not Use THIS SPACE	EMPLOYER'S SOCIAL SECURITY ACCOUNT NUMBER (17)	NAME OF EMPLOYEE (18)	TAXABLE WAGES PAID UNDER TITLE VIII OF FEDERAL SOCIAL SECURITY ACT (19)	SEPARATION DATE (20)	STATE (21)	
	102389567	HILDEBRAND WM	53000		NY	
	112345254	MILLER RALPH	71200		NY	
	102040583	MILLER RALPH B	42000		NY	
	102353687	HARRIS GEORGE	48000		NY	
	104253786	STATES CHARLES	39000		NY	
	100305288	MATSON LEON	81200		NY	
	105680735	MEADE JOHN L	53000		NY	
	116326809	STRIKER HAROLD	42000		NY	
	107428015	ARNOLD CHARLES	48200		NY	
	116790826	DENTON GEORGE	37600		NY	

Figure 22. Form SS-1 b.

A sample information return for Federal Old Age Benefits that has been prepared on the Alphabetic Accounting Machine is illustrated in Figure 22. This report is prepared either by summarizing the employees' weekly earnings cards for the quarter; or by listing the last week's cards, when cumulative total cards are maintained.

Reports required by States. Regulations of the various states required the following reports;

1. Unemployment Compensation Employee Wage Report.
The type of report and the reporting period vary in different states.
2. Income Tax Report of the employee's gross earnings; required annually by states having income tax laws.
3. In some states, employers furnish statistical data on employment to Federal Reserve Banks and other government agencies.
4. Many employers must furnish reports to State Labor Departments concerning employment by sex, age group, etc.

Essentially the same data are required for State Unemployment Commission returns and consequently the same tabulating cards may be used for their preparation. The forms, however, have not been standardized. In some state individual

strip forms are used; while in others, a sheet list similar to SS-1 b has been adopted.

Employee History Record. Social Security taxation is similar in principle to annuity premium payments. It differs, however, from ordinary annuity contracts, since the amount contributed varies with the employee's earnings. Inasmuch as the eventual benefit payments will be computed on the basis of contributions, it is highly important that accurate records pertaining to employee earnings be maintained.

When one considers the enormity of the task of maintaining more than 40,000,000 individual accounts in the central offices of the Social Security Board and the likelihood of the carelessness on the part of employees in preserving earnings receipts, the possibilities of errors and misunderstandings become evident. It is easy to recognize, therefore, the importance of maintaining accurate records in the offices of employers to settle disagreements concerning the amounts of benefit payments that may arise fifteen or twenty years in the future when many present employees' benefits will begin to be disbursed.

At that time, the fact that an employer has maintained accurate records which enable retired employees to obtain the exact benefit payments to which they are entitled will have a beneficial effect on general employer-employee relationships.

These records also have an important immediate need in

many states. The Unemployment Compensation Acts of the various states require the establishment of "base pay" totals for various quarters, in order to determine the amount of benefit payments to which each worker is entitled when he becomes unemployed.

To furnish these essential historical records, employee earnings may be posted quarterly to lists or cards; or, if desired, they may be recorded weekly.

Employee earning records (Figure 23) can be posed by the Automatic Bill Feed Device in conjunction with either the Numerical or Alphabetical Accounting Machines. This operation is interesting because it may employ, as the ledger record, a tabulating card which will allow posting of twenty-six weeks' earnings on each side. Thus, the card will be the earnings record for one year.

In addition to the above discussed procedures, the newly developed Transfer Posting Machine affords another economical and rapid method. The result is accomplished by transcribing data from a copy of the payroll directly to the earnings records by means of transfer ink.

II. LABOR ACCOUNTING

Labor accounting is the classifying and accumulating of labor costs by order numbers and department expense accounts. This phase of accounting reveals to management the labor cost of the finished products.

The manner in which costs are distributed varies according to the nature of the product. Most cost systems fall into one of two general classes:

1. Process Cost Systems - A company manufacturing a staple or standard product for a steady market usually operates under a process cost system. In this type of industry, the same products are being continually processed. Process cost systems are used in the manufacturing of such products as oil, chemicals, paper, flour, and textiles.
2. Job Order Cost Systems - A company manufacturing a specialty that has to conform to individual specifications would be required to quote selling prices in advance of production and would maintain job order costs to determine the profit on each job and to use as a guide in quoting prices and establishing selling prices on future orders. Job order cost systems are used by such industries as machine shops, foundries, and machine tool manufacturers.

Under either the process cost system or the job cost system, there are two classes of labor cost to be distributed:

1. Direct or production labor.
2. Indirect or non-productive labor.

Standard labor cost affords a means of determining what the labor used in producing a commodity should be. This value is

established by calculating the time it should take to perform an operation and the money evaluation of the labor skill required. This is set as standard, and costs are figured on the standard only, or on both the standard and the actual. The difference between the standard cost and the actual cost is called the variance. Standards may be used in either the process system or the job cost system.

IBM Accounting Machines, because of their flexibility, are successfully applied to the accumulation of labor cost on process or job cost systems, with or without standards.

The source records for payroll distribution, in most cases, are the job tickets which are initially used to prepare payroll records. They may be either individual job cards, daily time cards, continuous job cards, or gang job cards.

Labor Distribution Register. IBM distribution cards punched for each job are balanced with the payroll controls by departments. They are then listed by man number on a report which is generally called the Labor Distribution Register. This is used for reference and to balance to control totals.

Control Records. In addition to proving the accuracy with which original data have been punched, it is essential to establish the necessary accounting controls. These records are maintained on "control sheets" which contain the accounting totals originated by the department responsible for the

creation of the original documents.

The control sheet (Figure 24) established the predetermined totals to which all subsequent groups of accounting entries must balance. In this manner, errors that arise from lost or misplaced documents are immediately detected.

An automatic reconciliation of attendance time and job time establishes an exact balance between payroll and cost records.

Accurate, audited job cards then are available for the preparation by the accounting machine of a wide variety of cost and operating reports designed for control of each phase of plant activity.

Detailed cost statements. In addition to the general cost summaries, various forms of detailed cost statements are needed for future cost estimating, checking of standards and performance, establishing the accuracy of costs of completed jobs, and other cost reference.

Detailed cost record-keeping varies widely among the numerous types of industries engaged in manufacturing today. Two major classes, however, are quite clearly distinguishable: job order costs and process costs.

Both systems have occasion to create, for cost accounting purposes, subsidiary ledgers for each order or production unit. These ledgers furnish complete information concerning all the detailed financial transactions incurred.

PAYROLL DISTRIBUTION AUDIT REGISTER

DATE	NAME OF EMPLOYEE	DEPT. NO.	EMPLOYEE NUMBER	HOURLY RATE	PAYROLL HOURS		DISTRIBUTION HOURS		DIFFERENCE	
					WORKED	OVERTIME PREMIUM	WORKED	OVERTIME PREMIUM	WORKED	OVERTIME PREMIUM
1 2 2 4	W V ASTUR	1	2 0 6	1 3 7 5	4 4 0	2 0 0	4 4 0	2 0 0		
1 2 2 4	F A ATCHISON	1	3 4 2	1 0 0	4 0 0		4 0 0			
1 2 2 4	H B BAKER	1	5 1 8	1 3 2 5	4 0 0		4 0 0			
1 2 2 4	L F BILLINGS	1	6 1 5	1 1 5	4 0 0		4 0 0			
1 2 2 4	E J BRACKETT	1	7 0 3	1 0 0	4 0 0		4 0 0			
1 2 2 4	A F CASPER	1	8 9 3	1 4 0	4 4 0	2 0 0	4 4 0	2 0 0		
1 2 2 4	E C COLLINS	1	1 0 7 5	1 2 5	4 0 0		4 0 0			
1 2 2 4	L F CUNNINGHAM	1	1 1 0 3	1 1 7 5	4 0 0		4 0 0			
1 2 2 4	F A DAVENPORT	1	1 2 1 9	1 2 0	4 0 0		4 0 0			
1 2 2 4	H F DENNIS	1	1 3 0 2	1 1 0	3 2 0		3 2 0			
1 2 2 4	B A ENGELS	1	1 7 4 1	9 0	4 0 0		3 2 0		8 0	
1 2 2 4	A B FARRELL	1	2 0 9 2	1 3 0	4 0 0		4 0 0			
1 2 2 4	M J FOSTER	1	2 1 8 3	1 1 5	4 4 0	2 0 0	4 4 0	2 0 0		
1 2 2 4	B J GRAHAM	1	2 4 7 0	1 3 5	4 0 0		4 0 0			
1 2 2 4	E L GRESHAM	1	2 4 9 2	1 0 0	4 0 0		4 0 0			
1 2 2 4	L B HENDERSON	1	2 8 9 6	1 3 2 5	4 0 0		4 0 0			
1 2 2 4	R J JOHNSON	1	3 7 2 0	1 2 5	4 0 0		4 0 0			
1 2 2 4	P H PATTERSON	1	6 1 2 3	1 0 5	4 0 0		4 0 0			
1 2 2 4	G B PETERSON	1	6 2 1 4	1 0 0	4 4 0	2 0 0	4 4 0	2 0 0		
1 2 2 4	J L RANDOLPH	1	6 8 7 1	1 3 0	4 0 0		4 0 0			
1 2 2 4	F H ROBINSON	1	6 9 1 8	1 1 2 5	4 0 0		4 0 0			
1 2 2 4	L A RUEBEN	1	7 0 4 3	1 0 5	4 0 0		4 0 0			
					8 8 8 0	8 0 0	8 8 0 0	8 0 0	8 0	

Figure 24. Payroll Distribution Audit Register.

Job cost. In job order cost procedures, the order number reflects the unit of analysis for purposes of accounting control. The order, to which a number is assigned, must be prepared before any productive work can be performed. It serves as the medium for authorizing the issuance of the bills of material and operation records required for the job. The identification thus established constitutes an accounting classification to which all charges arising from the performance of the tasks may be applied.

It is customary in job order cost routines to maintain a file in which all current items - labor, material, direct charges, and burden applied - may be accumulated. This file, kept in job order sequence, serves as the work-in-process subsidiary ledger. When work on the order is completed, the cards are removed from the file and listed by the Accounting Machine to prepare a complete printed record similar to prepare a complete printed record.

This detailed cost statement is usually reviewed by cost clerks whose task it is to check back the actual cost figures appearing on the report to the operation records and standard bills of material. Any discrepancy due to missing tickets, fraudulent piece work claims, errors in classification and similar irregularities are detected by this operation.

Process costs. Process industries maintain cost records which reflect the continuous nature of their operations

The objective is to determine the average cost during a stated period of producing a large number of similar units, such as yards of cloth, feet of rope, gallons of gasoline, tons of coal, etc.

To accomplish this result, process cost systems provide for the accumulation of all the cost elements according to accounting classifications which will facilitate the determination of average costs on a monthly or other periodic basis. The general practice, therefore, is to summarize charges by accounts, processes, departments, production centers, products, or other groupings so that all related costs may be quickly assembled. Production quantities are summarized from delivery tickets and physical inventory records. From these totals, the average unit costs may be computed.

Generally, summary cards are created at the time the detailed labor, material, and fixed charges are independently summarized. These summary records are then assembled according to established cost classifications and listed by the Accounting Machine directly to summary cost ledger records. Reference to the detailed records is established by the journal number.

Part Cost Analysis (Figure 25) is an example of report which is possible to prepare through the use of Electric Accounting Machines.

Idle Machine Time Report. The rapidity of obsolescence of plant equipment in recent years makes the utilization of

PART COST ANALYSIS

ORDER NUMBER	PART NUMBER	PART NAME	DEPT. NO.	OPER. NO.	PIECES FINISHED	OPERATION TOTALS				PART NUMBER TOTALS			
						STANDARD HOURS	ACTUAL HOURS	LABOR COST	BURDEN COST	STANDARD HOURS	ACTUAL HOURS	LABOR COST	BURDEN COST
1501	1892	TOP MOULDING	1	1	600	60	615	813	325				
1501	1892		1	2	600	600	5815	7313	2925				
1501	1892		6	3	600	125	1010	1520	760				
1501	1892		6	4	598	150	153	2673	1336				
1501	1892		3	5	598	260	264	3917	1958				
1501	1892		3	6	597	200	198	2326	1163				
										1395	1365	18562*	8467*
1501	1893	FRONT MOULDING	1	1	1017	450	463	5596	2338				
1501	1893		1	2	1017	170	152	2015	806				
1501	1893		6	3	1017	720	755	12975	6888				
1501	1893		6	4	1015	485	461	6630	3315				
1501	1893		3	5	1015	485	509	7346	3673				
										2310	2340	34562*	17020*
1501	1894	SIDE MOULDING	1	1	236	220	210	2310	924				
1501	1894		1	2	236	185	173	1975	790				
1501	1894		6	3	236	368	368	4675	2338				
1501	1894		6	4	236	515	492	6130	3065				
1501	1894		3	5	235	100	105	1215	608				
1501	1894		3	6	235	900	863	1015	508				
1501	1894		3	7	235	162	154	2130	1278				
1501	1894		3	8	235	264	279	3672	1836				
1501	1894		4	9	230	400	384	4756	1426				
1501	1894		4	10	230	400	426	6173	3087				
1501	1894		4	11	230	320	334	4915	2458				
										3834	3788	38966*	18318*
1501	1895	BOTTOM MOULDING	1	1	490	832	860	10324	4130				
1501	1895		1	2	490	716	683	8165	3266				
1501	1895		6	3	490	430	471	5641	2822				
1501	1895		6	4	490	762	722	8632	4316				
1501	1895		3	5	488	320	305	3644	1822				
1501	1895		3	6	488	941	984	10432	5216				

Figure 26. Part Cost Analysis.

all available machine hours a major factor in economical factory operation. Non-productive machine hours constitute as great a source of economic loss to industry generally as idle man hours. They represent a more pressing financial loss to an individual manufacturing organization, however, because of their fixed nature - as contrasted with the variable size and cost of the working force.

Summarizations of machine-hours (Figure 27) according to classes of equipment, departments, types of products manufactured, and numerous other statistical analyses provide manufacturing executives with valuable figure-facts concerning foremen's efficiency in use of equipment, the relative need for additional new machines for which purchases have been requested, the availability of excess equipment for alternative processes or outside job contracts and general related elements of operating control policy formulation.

A wealth of figure-facts which would remedy this situation may readily be compiled through the simple expediency of incorporating a small amount of machine-hour operating data on the labor cost records.

Master cards for available machine-hours and summary cards for machine utilization in previous periods facilitate the preparation of comparative reports and cumulative statistics of past performance. The use pre-punched cards for production planning, however, makes it possible to determine at short notice from the Input Analysis the actual future planned hours for each type of machine. The existence

IDLE MACHINE TIME REPORT											
REASON BY DEPARTMENT											
REASON			DEPT. NO.	MACH. NO.	CURRENT WEEK			MONTH TO DATE			
					STANDARD HOURS	IDLE HOURS	BURDEN COST	STANDARD HOURS	IDLE HOURS	BURDEN COST	% IDLE TIME
1	WAITING	SET UP	1					1 4 0 8 0	5 3 5	1 0 9 2 1	3 8 0
1	WAITING	SET UP	2					1 2 3 2 0	7 1 4	1 6 4 2 2	5 8 0
1	WAITING	SET UP	3					1 5 8 4 0	3 9 2	8 2 3 2	2 4 7
1	WAITING	SET UP	4					1 9 3 6 0	6 0 5	1 2 1 0 0	3 1 3
1	WAITING	SET UP	5					1 0 5 6 0	4 5 3	1 0 1 9 3	4 2 9
1	WAITING	SET UP	6					2 1 1 2 0	8 8 6	1 1 0 7 5	4 2 0

IDLE MACHINE TIME REPORT												
DEPARTMENT BY REASON												
REASON			DEPT. NO.	MACH. NO.	CURRENT WEEK			MONTH TO DATE				
					STANDARD HOURS	IDLE HOURS	BURDEN COST	STANDARD HOURS	IDLE HOURS	BURDEN COST	% IDLE TIME	
1	WAITING	SET UP	1	9	4 0 0	2 5	6 2 5	1 7 6 0	6 2	1 5 5 0	3 5 2	3 0 6
1	WAITING	SET UP	1	10	4 0 0	1 0	2 3 0	1 7 6 0	1 0	2 3 0	5 7	2 0 5
1	WAITING	SET UP	1	11	4 0 0	6 5	1 3 6 5	1 7 6 0	1 5 5	3 2 5 5	8 8 1	8 1 0
1	WAITING	SET UP	1	15	4 0 0	1 5	3 0 0	1 7 6 0	4 6	9 2 0	2 6 1	1 9 3
1	WAITING	SET UP	1	28	4 0 0			1 7 6 0	3 2	7 2 0	1 8 2	
1	WAITING	SET UP	1	30	4 0 0	3 1	3 8 8	1 7 6 0	1 1 5	1 4 3 8	6 5 3	
1	WAITING	SET UP	1	32	4 0 0	2 0	4 8 0	1 7 6 0	6 7	1 6 0 8	3 8 1	
1	WAITING	SET UP	1	34	4 0 0			1 7 6 0	4 8	1 2 0 0	2 7 3	
					3 2 0 0 *	1 6 1 6 *	3 3 8 8 *	1 4 0 8 0 *	5 3 5 *	1 0 9 2 1 *		6 9 3
2	MACHINE	REPAIR	1	9	4 0 0			1 7 6 0				2 4 6
2	MACHINE	REPAIR	1	10	4 0 0	4 6	1 0 5 8	1 7 6 0	4 6	1 0 5 8	2 6 1	7 1 8
2	MACHINE	REPAIR	1	11	4 0 0			1 7 6 0				2 0 3
2	MACHINE	REPAIR	1	15	4 0 0			1 7 6 0				1 0 5
2	MACHINE	REPAIR	1	28	4 0 0			1 7 6 0	2 0	4 0 0	1 1 4	2 1 5
2	MACHINE	REPAIR	1	30	4 0 0			1 7 6 0	1 0 5	2 3 6 3	5 9 7	
2	MACHINE	REPAIR	1	32	4 0 0	2 5	6 0 0	1 7 6 0	8 6	2 0 6 4	4 8 9	
2	MACHINE	REPAIR	1	3.4	4 0 0			1 7 6 0				
					3 2 0 0 *	7 1 1 *	1 6 1 5 8 *	1 4 0 8 0 *	2 5 7 *	5 8 1 8 5 *		

Figure 27. Idle Machine Time Report.

of the master file also enables management to construct plans for anticipated production by compiling hypothetical machine load studies based upon various proposed manufacturing schedules.

Idle time. Idle time constitutes an element of cost which generally is not recoverable in the finished product. Labor time paid for and not used is lost forever. Efficient manufacturing therefore demands the elimination of this type of needless expense by remedying its causes.

A typical analysis of reasons for idle time (Figure 27) may be based upon:

1. No material.
2. Machine set-up time.
3. Machine breakdown or repair.
4. No tools.
5. Tool repair.
6. No work.
7. Power plant failure, etc.

The study of idle time according to reasons, departments, employees, machines, and other groupings will serve to indicate those elements which are resulting in disproportionate idle time expense.

Scrap. Records of quantities produced and scrapped at each operation may be incorporated in job cards or daily time tickets. Scrap costs may then be computed as by-product of

the labor records, if special scrap analyses based upon inspection reports are not prepared. Production totals may also be summarized.

Application of burden. Because of the peak load involved in the application and extension of burden figures on summaries of work-in-process and finished order, it is frequently more desirable to record daily the burden applied directly on the time tickets. Here, too, the Automatic Multiplying Punch and the Gang Punch afford unique advantages of accuracy and economy in the rating and extending of cost records.

Work-in-Process. The filing of material cards along with the cost cards for labor and burden applied serves to assemble all the data for the work-in-process subsidiary ledger. The accounting machine serves to summarize the details according to order or product sequence for reconciliation to general ledger controls and the analysis of the status of orders.

The details of each order are listed automatically on cost sheets at the time each order is finished. The inclusion of estimates in this summary furnishes data concerning variances which have occurred, and facilitates more accurate estimating on future jobs.

The original cards may be automatically sorted into any sequence that may be desired for analysis and thus facilitates rapid reference to source records.

Departmental indirect labor ratios. The difficulty of analyzing absolute money values of relatively large amounts has been recognized for some time. As a result, the use of index numbers and ratios on summary analyses has come into favor among executives. The use of the International Automatic Multiplying Punch has simplified these calculations and makes possible the preparation of complete final analyses similar to Figure 28. Many other factors may be substituted for the direct labor ratio.

In these reports, the absolute money values of each department's expenses appear. They are also expressed as average daily expense and as ratios of monthly direct labor to departmental expenses. These figures permit a more direct comparison of current operating results against those of previous periods, since the varying volume of business and rates of operations have been brought to a common basis for easy review by operating executives.

Daily Performance Record. Estimates on jobs are usually made before production is started and management needs to determine whether these estimates are met. Management also needs to furnish the department heads with performance reports (Figure 29), in order that they may do an effective supervisory job.

Conclusion. The numerous illustrations contained in this study are presented to show some of the wide variety of documents and reports just mentioned. They are not intended to portray a series of reports which must be prepared

DEPARTMENTAL EXPENSE RATIO REPORT

ACCOUNT BY DEPARTMENT

DEPT. NO.	ACCOUNT NUMBER	ACCOUNT NAME	CURRENT PERIOD		YEAR TO DATE	
			EXPENSE AMOUNT	% TO DIRECT LABOR	EXPENSE AMOUNT	% TO DIRECT LABOR
	1 2 0 0	INDIRECT LABOR				
1	1 2 0 1	SUPERVISION	1 5 0 0 0	5 2 2	1 8 0 0 0 0	5 1 3
2	1 2 0 1	SUPERVISION	2 0 0 0 0	5 3 9	2 4 0 0 0 0	5 3 8
3	1 2 0 1	SUPERVISION	1 7 5 0 0	4 4 7	1 8 5 0 0 0	4 4 5
4	1 2 0 1	SUPERVISION				
5	1 2 0 1	SUPERVISION				
6	1 2 0 1	SUPERVISION				
7	1 2 0 1	SUPERVISION				
8	1 2 0 1	SUPERVISION				
9	1 2 0 1	SUPERVISION				
1 0	1 2 0 1	SUPERVISION				

DEPARTMENTAL EXPENSE RATIO REPORT

DEPARTMENT BY ACCOUNT

DEPT. NO.	ACCOUNT NUMBER	ACCOUNT NAME	CURRENT PERIOD		YEAR TO DATE	
			EXPENSE AMOUNT	% TO DIRECT LABOR	EXPENSE AMOUNT	% TO DIRECT LABOR
1	1 2 0 2	INSPECTION				
2	1 2 0 2	INSPECTION				
3	1 2 0 2	INSPECTION				
4	1 2 0 2	INSPECTION				
5	1 2 0 2	INSPECTION				
6	1 2 0 2	INSPECTION				
7	1 2 0 2	INSPECTION				
8	1 2 0 2	INSPECTION				
9	1 2 0 2	INSPECTION				
1 0	1 2 0 2	INSPECTION				
1	1 2 0 3	TIMEKEEPING				
2	1 2 0 3	TIMEKEEPING				
3	1 2 0 3	TIMEKEEPING				
4	1 2 0 3	TIMEKEEPING				
5	1 2 0 3	TIMEKEEPING				
6	1 2 0 3	TIMEKEEPING				
7	1 2 0 3	TIMEKEEPING				
8	1 2 0 3	TIMEKEEPING				
9	1 2 0 3	TIMEKEEPING				
1 0	1 2 0 3	TIMEKEEPING				
1	1 2 0 0	INDIRECT LABOR	1 5 0 0 0	5 2 2	1 8 0 0 0 0	5 1 3
1	1 2 0 1	SUPERVISION				
1	1 2 0 2	INSPECTION	4 3 2 0	1 5 0	5 3 6 0 9	1 5 3
1	1 2 0 3	TIMEKEEPING	6 2 8 3	2 1 8	7 5 6 1 0	2 1 5
1	1 2 0 4	HAULING	6 5 2 4	2 2 7	7 9 2 3 5	2 2 6
1	1 2 0 5	STOREKEEPING	4 7 7 1	1 6 6	5 7 6 8 2	1 6 4
1	1 2 0 6	CLEANING	2 4 2 8	8 4	3 0 0 5 0	8 6
1	1 2 0 7	GENERAL LABOR	4 6 2 0	1 6 1	5 6 6 3 5	1 6 1
1	1 2 0 8	OVERTIME PREMIUM	3 6 1 0	1 2 6	4 1 5 1 6	1 1 8
			4 7 5 5 6 *	1 6 5 4 *	5 7 4 3 3 7 *	1 6 3 6 *
1	1 3 0 0	SUPPLIES				
1	1 3 0 1	ABRASIVES	1 0 1 5	3 5	1 2 9 1 8	3 7
1	1 3 0 2	CUTTING OILS	2 6 1 0	9 1	3 4 0 7 5	9 7
1	1 3 0 3	MACHINE LUBRICANTS	8 7 5	3 0	8 3 1 5	2 4
1	1 3 0 4	SMALL TOOLS	4 1 2 0	1 4 3	5 3 2 4 8	1 5 2
1	1 3 0 5	WASTE AND RAGS	7 5 0	2 6	1 0 3 1 0	2 9
1	1 3 0 6	STATIONERY SUPPLIES	1 2 7 5	4 4	1 6 3 7 1	4 7
1	1 3 0 7	GENERAL SUPPLIES	1 8 2 0	6 3	2 3 0 4 4	6 6
			1 2 4 6 5 *	4 3 2 *	1 5 8 2 8 1 *	4 5 2 *
1	1 4 0 0	MAINTENANCE				
1	1 4 0 1	BUILDINGS	1 2 5 2	4 4	1 7 2 2 4	4 9
1	1 4 0 2	ELEC EQUIPMENT	1 3 2 2	4 6	1 6 8 2 8	4 8

Figure 28. Departmental Expense Ratio Report.

continuously; but rather to indicate the value to management of establishing an accounting procedure which facilitates the analysis of operations from constantly shifting points of view.

DAILY PERFORMANCE RECORD						
PART No.	OPER. No.	MACHINE GROUP	PIECES FINISHED	MAN No.	STANDARD HOURS	ACTUAL HOURS
17334	5	98	95	5007	15	12
17334	900	98	1	5007	25	23
122104	5	99	300	5008	29	28
122104	900	99	1	5008	13	11
122104	900	99	1	5008	13	12
109305	5	99	150	5008	17	13
122104	10	99	205	5008	23	21
106391	5	99	230	5012	10	8
106391	900	99	1	5012	13	11
107451	900	99	1	5012	13	12
152214	5	99	250	5013	23	19
133099	5	98	500	5013	85	76
152214	900	99	1	5013	13	12
68902	5	99	525	5013	53	43
145869	5	98	400	5014	120	117
133085	10	98	50	5014	10	10
133085	900	98	1	5014	25	22
102824	10	93	256	5015	197	180
112820	5	98	117	5017	165	132
4436	5	93	98	5020	235	203
25807	5	93	37	5028	83	80
28712	15	94	222	5031	182	164
85282	10	93	27	5033	28	28
115037	5	97	146	5038	83	80
106607	15	93	35	5041	75	68
115033	5	98	216	5044	151	135
25574	900	99	1	5050	13	13
152228	900	90	1	5050	13	11
152228	5	99	150	5050	17	13
151100	15	99	89	5050	19	17
68656	5	99	525	5057	31	29
133120	10	99	300	5057	48	46

Figure 29. Daily Performance Record.

Chapter VIII

INCENTIVE PAYROLL

Only those statements and analyses which are peculiar to the incentive payroll plan will be discussed in this chapter. In Chapter V, the details of premium, bonus, and wage incentive systems for measuring wage payments were outlined. In previous chapters, basic payroll records were discussed.

The computation of the employee's earnings under the wage incentive plan is greatly facilitated through the use of the Electronic Calculating Punch.

Mechanization of earnings calculations. The Electronic Calculating Punch is a calculator designed for commercial use and engineered to perform problems of multiplication, division, cross-addition, and cross-subtraction at far greater speed than has been possible before in business.

The Calculating Punch performs all calculations electronically and punches the results in IBM cards at the rate of 100 a minute. It can be adapted readily to all types of calculations. The IBM Method thus offers an automatic machine method for making payroll calculations under the different formulas involved in various types of incentive wage plans.

These calculations include: standard time allowances, earned time, efficiency ratings, day rate guarantees, average hourly earnings rates, piecework, bonus and premium earnings, payroll taxes, cost charges, burden, variances, and percentages.

Each problem illustrated below is solved by one processing of IBM cards through the Electronic Calculating Punch.

1. Total pay:

Pieces finished X standard time per 100
pieces = allowed hours

Allowed hours - actual hours = earned hours

Actual hours X hourly rate = base earnings

Earned hours X bonus rate = bonus earnings

Base earnings + bonus earnings = total earnings.

2. Gross earnings:

Base earnings + hours worked = average hourly rate

Premium hours X average hourly rate = premium earnings

Base earnings + premium earnings = gross earnings.

3. Net pay:

Dependency class X dependency rate = exemption amount

Gross pay - exemption amount = taxable gross

Taxable gross X tax rate = withholding tax

Gross pay X tax rate = O.A.B.I. tax

Gross pay X tax rate = S.U.I. tax

Gross pay - withholding tax - O.A.B.I. tax - S.U.I.
tax - deductions = net pay.

Job time cards. The preparation of job records is mechanized completely by the automatic prepunching of job cards from production planning records, with part and operation description, piecework rates, or production standards.

An alternative method job record preparation is the

prepunching of job cards with employees' identification and rate information from the master payroll cards. The card is completed by recording job facts by means of pencil marks. Thus, original facts may be recorded in the plant by workmen, foremen, or timekeepers, and these facts translated into the punched holes automatically (Figure 30).

Job cards may be of many designs, including individual, daily, or weekly job cards. Incentive earnings may be calculated on a daily, weekly, or job basis either for individuals or groups.

2354		14396		GEAR STUD		14		1		TURN		4.00		STO. PER C																			
DEPT. NO.		PART NO.		DESCRIPTION OF PART		DEPT. NO.		OPER. NO.		DESCRIPTION OF OPER.		STO. PER C		HOURS																			
DEPT. NO.		PIECES STARTED		PIECES SPOILED		PIECES FINISHED		DEPT. NO.		EMPLOYEE NO.		MACH. NO.		PIECES FINISHED		WORKED		O.T. PREM															
EMPLOYEE NO.		50				50		00		00		00		00		00		00															
MACHINE NO.						75		00		00		00		00		00		00															
		STOP						00		00		00		00		00		00															
		START						00		00		00		00		00		00															
MAY 25-10.8		STOP						00		00		00		00		00		00															
MAY 25-8.0		START						00		00		00		00		00		00															
FOREMAN		DATE						00		00		00		00		00		00															
H. Williams								00		00		00		00		00		00															
DATE		DEPT.		EMPLOYEE		HOURS		PIECES		% EFF.		EARNINGS		ORDER		MACH		PART		OPERATION		STANDARD											
NO. DAY		NO.		NO.		STD. EARN		WORKED		O.T.		FINISHED		BASE		BONUS		TOTAL		NO.		NO.		NUMBER		DESCRIPTION		DEPT. NO.		DESCRIPTION		PER C	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80																																	

Figure 30. Job Time Card.

Performance reports. The Electric Punched Card Sorting Machine automatically arranges punched cards in numerical or alphabetical sequence according to any classification punched in them. A fast, automatic machine process thus is provided for the classification and reclassification of payroll and

SUMMARY - DAILY EFFICIENCY

DATE _____

DEPARTMENT	STANDARD HOURS	ACTUAL HOURS	% EFFICIENCY
1	4729	4701	101
3	3664	3501	105
4	2179	2182	100
5	2070	1840	112
7	8469	8484	100
10	2173	2067	105
12	3246	3244	100

LABOR COST SUMMARY BY PARTS

PART NO.	STANDARD HOURS	ACTUAL HOURS	PERCENT	STD. LAB. C.	ACT. LAB. C.	VARIANCE	
						OVER	UNDER
115027	128	122	95	870	848		22
115032	220	204	93	1632	1507		125
115038	26	26	100	254	282	28	
115062	48	47	98	482	467		15
115075	124	132	106	946	1052	106	
115092	60	50	83	462	394		68
115098	24	22	92	216	189		27
115122	53	43	81	424	380		44
115130	86	82	95	619	610		09
115132	21	18	86	193	205	12	

WEEKLY PERFORMANCE SUMMARY

WEEK ENDING _____

MAN NO.	ACTUAL HOURS	STANDARD HOURS	% EFFICIENCY
5006	400	401	100
5007	400	423	105
5008	360	385	107
5009	360	382	106
5010	360	369	102
5011	240	265	110
5012	400	423	106
5013	400	402	100
5014	400	456	114
5015	380	402	106
5016	400	437	109

Illustration No. 5. Performance Reports.

cost information in the required sequence.

By scrutinizing and studying such reports as in Illustration No. 5, management is able to maintain finger-tip control over the operating departments.

Weekly statement of bonus earnings. Employee interest is sustained and payroll complaints are minimized by furnishing employees with daily or weekly statements showing each day's performance record in detail (Figure 31).

Control of incentive plans is facilitated by these reports which reveal sub-standard performance, excessive overtime, and the extent to which the desired effects of incentives are being realized.

WEEKLY STATEMENT OF BONUS EARNINGS												
DEPT. NO.	EMPLOYEE NO.	NAME OF EMPLOYEE	HOURLY RATE									
			REGULAR	BONUS								
14	206	W V ASTUR			1200	600						
PART NUMBER	OPER. NO.	PIECES FINISHED	DATE		REGULAR		O.T. PREM. HOURS	STANDARD HOURS	EARNED HOURS	% EFFICIENCY	BONUS EARNINGS	
			MO.	DAY	HOURS	EARNINGS						
14396	1	75	5	25	28	336		30	2	107	12	
14940	3	260	5	25	52	624		64	12	123	72	
14396	1	100	5	26	30	360		40	10	133	60	
23160	6	62	5	26	25	300		31	6	124	36	
41720	7	81	5	26	25	300		30	5	120	30	
	99		5	27	10	120						
14173	1	110	5	27	40	480		55	15	138	90	
15755	2	54	5	27	30	360		39	9	130	54	
9672	5	60	5	28	25	300		30	5	120	30	
31165	1	49	5	28	45	540		55	10	122	60	
28832	7	33	5	28	50	600	20	66	16	132	96	
17755	3	78	5	29	40	480		52	12	130	72	
36362	2	55	5	29	40	480		55	15	138	90	
					440*	5280*	20*	547*	117*		702*	

OPER. 90-99 WAITING AND SET-UP TIME

Figure 31. Weekly Statement of Bonus Earnings.

Management reports. Detailed record-keeping, in the form of industrial cost accounting, developed as an adjunct to the

**ANALYSIS OF PAYROLL
BY DEPARTMENT**

DEPT. NO.	DEPARTMENT	DAY WORK					INCENTIVE					DEPARTMENT TOTAL			
		HOURS		AMOUNT			HOURS		AMOUNT						
		WORKED	O.T. PREM.	REGULAR	PREMIUM	TOTAL	WORKED	O.T. PREM.	REGULAR	PREMIUM	BONUS		TOTAL		
1	ASSEMBLY A	1 26	2 8	0 146	2 5 35	1 0 181	3 5 181	6 5 181	1 2 120	2 1 79	4 5 150	0 0 236	1 8 243	0 6 326	1 1 98

**ANALYSIS OF PAYROLL
BY EMPLOYEE**

DEPT. NO.	EMPLOYEE NO.	NAME OF EMPLOYEE	HOURS			EARNINGS				BASE HOURLY RATE	AVERAGE HOURLY EARNINGS	
			WORKED	OVERTIME PREMIUM	EARNED	REGULAR	PREMIUM	BONUS	TOTAL			
6	14 206	W V ASTUR	4 4	0 2	1 17	5 28	0 2	2 17	7 0	2 5	1 2	1 3
6	14 342	F A ATCHISON	4 0	0 0	8 0	4 60	0 0	4 60	5 0	6 0	1 1	1 2
7	14 518	H B BAKER	4 0	0 0	1 10	4 40	0 0	6 0	5 0	5 0	1 1	1 2
7	14 615	L F BILLINGS	4 2	0 1	6 0	5 25	0 0	1 3	3 7	5 9	1 2	1 3
8	14 703	E J BRACKETT	4 0	0 0	1 00	4 80	0 0	6 0	5 4	0 0	1 2	1 3
8	14 893	A F CASPER	4 4	0 2	9 2	5 50	0 0	2 7	5 7	5 1	1 2	1 3
9	14 1075	E C COLLINS	4 0	0 0	6 0	4 80	0 0	3 6	5 1	6 0	1 2	1 2
9	14 1103	L F CUNNINGHAM	4 4	0 2	5 0	5 50	0 0	2 6	6 0	7 7	1 2	1 3
10	14 1219	F A DAVENPORT	4 0	0 0	5 00	5 00	0 0	5 00	5 00	0 0	1 2	1 2
10	14 1304	H F DENNIS	4 0	0 0	4 00	4 00	0 0	4 00	4 00	0 0	1 0	1 0
11	14 1741	B A ENGELS	3 2	0 0	1 30	4 00	0 0	8 1	4 8	1 3	1 2	1 5
11	14 2092	A B FARRELL	4 0	0 0	5 20	5 20	0 0	5 20	5 20	0 0	1 3	1 3
12	14 2183	M J FOSTER	4 2	0 1	6 0	5 04	0 0	1 2	3 6	2 9	1 2	1 2
12	14 2470	B J GRAHAM	4 0	0 0	6 0	5 00	0 0	3 7	5 3	7 5	1 2	1 3
13	14 2492	E L GRESHAM	4 0	0 0	5 0	5 00	0 0	3 1	5 3	1 3	1 2	1 3
13	14 2896	L B HENDERSON	4 0	0 0	8 0	4 40	0 0	4 4	4 8	4 0	1 1	1 2
14	14 3720	R J JOHNSON	4 0	0 0	7 0	4 00	0 0	3 5	4 3	5 0	1 0	1 0
14	14 6123	P H PATTERSON	4 0	0 0	1 06	4 60	0 0	6 1	5 2	1 0	1 1	1 3
15	14 6214	G B PETERSON	4 0	0 0	8 1	4 80	0 0	4 8	5 2	8 6	1 2	1 3
14	14 6871	J L RANDOLPH	4 4	0 2	1 25	4 84	0 0	2 5	5 7	7 9	1 1	1 2
16	14 6918	F H ROBINSON	4 0	0 0	6 0	4 80	0 0	3 6	5 1	6 0	1 2	1 2
16	14 7043	L A RUEBEN	4 0	0 0	7 5	5 00	0 0	4 6	5 4	6 9	1 2	1 3
			8 9	2 0 10	1 5 6	6 105	8 10	1 3 2	6 92	5 4	1 1 6	3 90

Figure 32. Analysis of Payroll.

industrial engineering techniques originated by Taylor and his contemporaries during the closing decades of the nineteenth century. These accounting records are of such design that it is possible to obtain both the details for line supervisors and summaries for executive review - comparisons of efficiency of operating groups with each other as well as overall operating results. Records of detailed performance which may be assembled successively into various sequences reflecting lines and authority and responsibility or other related classifications, furnish the periodic review of achievement which permits detached consideration and appraisal or reappraisal of the effectiveness with which each result was achieved. They serve as fundamental factors in policy formulation and administrative control.

Condensed or detailed analysis (Figure 32) of payroll expenditures for management control purposes may be prepared readily according to any required accounting classification of labor costs.

Wage rate studies. Management's task is one of coordinating the desirable elements of each of these cost reduction techniques into a comprehensive, workable system of control. Accounting records which furnish essential figure-facts must be maintained and used to achieve this goal.

The reviewing of rates (Figure 33) for the evaluation of incentive wage rates and policy formulation is facilitated by analyses and comparisons of actual performance and earnings realized under specific incentive rates.

ANALYSIS OF INCENTIVE RATES

DATE		EMPLOYEE NO.	ORDER NO.	PART		OPERATION		DEPT. NO.	MACH. NO.	PIECES FINISHED	STANDARD PER C	HOURS			BONUS EARNINGS	% EFFICIENCY
MO.	DAY			NUMBER	DESCRIPTION	DESCRIPTION	NO.					ACTUAL	STANDARD	EARNED		
1	13	1560	1722	14936	GEAR STUD	TURN		114	6	126	400	4.2	5.0	.8	4.8	119
1	14	1560	1722	14936	GEAR STUD	TURN		114	6	174	400	6.6	7.0	.4	2.4	106
3	5	206	2016	14936	GEAR STUD	TURN		114	7	183	400	8.0	7.3			91
3	6	206	2016	14936	GEAR STUD	TURN		114	7	126	400	5.5	5.0			91
3	7	206	2016	14936	GEAR STUD	TURN		114	7	191	400	8.0	7.6			95
5	10	1132	2275	14936	GEAR STUD	TURN		114	12	96	400	3.5	3.8	.3	1.8	109
5	11	1132	2275	14936	GEAR STUD	TURN		114	12	102	400	3.5	4.1	.6	3.0	117
5	10	1412	2275	14936	GEAR STUD	TURN		114	12	73	400	2.4	2.9	.5	3.0	121
5	11	1412	2275	14936	GEAR STUD	TURN		114	12	79	400	3.0	3.2	.2	1.2	107
5	25	206	2354	14936	GEAR STUD	TURN		114	6	75	400	2.8	3.0	.2	1.2	107
5	26	206	2354	14936	GEAR STUD	TURN		114	6	100	400	3.0	4.0	1.0	6.0	133
												50.5*	52.9*	4.0*	23.4*	
1	14	893	1722	14936	GEAR STUD	MILL SLOT		4	311	208	250	4.1	5.2	1.1	7.2	127
1	16	893	1722	14936	GEAR STUD	MILL SLOT		4	311	92	250	1.9	2.3	.4	2.6	121
3	8	893	2016	14936	GEAR STUD	MILL SLOT		4	311	400	250	8.0	10.0	2.0	13.0	125
5	27	3812	2275	14936	GEAR STUD	MILL SLOT		4	316	350	250	8.0	8.8	.8	5.2	110
5	28	3812	2354	14936	GEAR STUD	MILL SLOT		4	316	25	250	.5	.6	.1	.7	120
5	29	3812	2354	14936	GEAR STUD	MILL SLOT		4	316	150	250	3.0	3.8	.8	5.2	127
												25.5*	30.7*	5.2*	33.9*	
1	15	206	1722	14936	GEAR STUD	TURN O DIAM		7	86	116	345	3.5	4.0	.5	3.3	114
1	17	206	1722	14936	GEAR STUD	TURN O DIAM		7	86	184	345	5.4	6.3	.9	5.9	117
3	12	206	2016	14936	GEAR STUD	TURN O DIAM		7	86	280	345	8.0	9.7	1.7	11.1	121
3	14	1075	2016	14936	GEAR STUD	TURN O DIAM		7	87	70	345	2.0	2.4	.4	2.6	120
5	14	1075	2275	14936	GEAR STUD	TURN O DIAM		7	87	196	345	5.8	6.8	1.0	6.5	117
5	15	1075	2275	14936	GEAR STUD	TURN O DIAM		7	87	154	345	4.6	5.3	.7	4.6	115
5	28	1075	2354	14936	GEAR STUD	TURN O DIAM		7	87	110	345	3.2	3.8	.6	3.9	119
5	30	1075	2354	14936	GEAR STUD	TURN O DIAM		7	87	65	345	1.8	2.2	.4	2.6	122
												34.3*	40.5*	6.2*	40.5*	

Figure 33. Analysis of Incentive Rates.

Chapter IX

CONCLUSION

Accounting records and analyses are implements that may be designed to increase the effectiveness of management control. The all-too-frequent restriction of accounting to the functions of preparing financial statements and a limited number of auditing and operating records, however, has hampered the evolution of fully adequate accounting and statistical techniques. Although the subject is controversial, many people sense the condition that exists today - that is, the inadequacy, of many accounting systems in use, for satisfying managerial need for figure-facts. This condition is especially true in industries which recently experienced revolutionary technological improvements.

The impediment to the development of adequate figure-facts for management that characterizes many systems of accounting has grown from a fundamental limitation inherent in routines that do not use punched cards and fully automatic machines. This limitation has arisen since the objective sought by these methods has basically been one of entering information into the books of account. The extracting of information - other than a limited number of formal, regularly recurring reports - has been of secondary importance, or ignored entirely.

In contrast to these, the Electric Accounting Machine Method possesses a unique characteristic - that is, its emphasis on the importance of extracting vital management figure

facts from the maze of details in which they may be hidden. The advantages of utilizing a punched-card unit record as a medium of statistical analysis were carefully studied more than fifty years ago. These principles of effective analysis of voluminous source records, originally, were scientifically developed to mechanize the complete cross-indexing and analysis of purely statistical data which were gathered in the Decennial Census of the United States.

The success with which the simple principles underlying the punched-card method solved the problems involved in the "world's largest job of analyzing figure-facts" points the way for modern executives to solve the varied accounting and analytical problems which hem in their activities and curtail their effectiveness.

The adaptation of these principles to payroll and labor cost routines furnishes managements with numerous bases for reviewing critically and constructively the activities and achievements of their organizations. The scope of subject matter and variety of detail which may be summarized are indicated by the fact that cards containing only a dozen fields may be analyzed to prepare more than 1,000 distinct reports - each a valuable instrument for increasing scientific control of operations and effective cost reduction.

So broad is the range of analysis that almost any report which may be required by executives or staff specialists may be compiled speedily and economically with little

interruption of the prescribed accounting routine. In addition to meeting this need for "special reports", the inherent flexibility of the method encourages the cyclical preparation of non-recurring statistical analyses which may be presented to interest individuals. Reports of this type generally reveal important facts which for years have gone undetected.

This uniqueness of the Electric Accounting Method is complemented by another equally distinctive advantage. The pattern of the punched holes in the card constitutes an implement which prints automatically in the prescribed journals or ledgers all the information concerning a transaction; and in many cases, prepares even the very document which initiates the transaction itself.

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