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A COSTING METHODOLOGY FOR FREIGHT CARS

THE CONCEPTUAL DESIGN OF A COST INFORMATION SYSTEM



**An Interim Report
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16. Abstract The cost information system discussed in this report to the Federal Railroad Administration employs the concept of standard cost accounting. The system is designed to collect and analyze all categories of freight car repairs and provide sufficient information to management to support pricing decisions (discussed in Volume I). Because each railroad's operations are unique, the cost information system was designed to be flexible so it may be tailored to specific applications. Flexible budgets are discussed in the context of standard costs and their application to the repair shop environment. Additional chapters provide discussion in the areas of job cost estimating and implementation of the cost information system.					
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TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
I	INTRODUCTION	I.1
	Standard Costs	I.1
	The Systems Characteristics	I.3
	Implementing the System for a Selected Railroad	I.4
	System Benefits	I.4
II	COST INFORMATION SYSTEM CONCEPT	II.1
	Fundamental Principle	II.1
	Basic Assumptions	II.1
	Cost Collection	II.2
	Cost Elements	II.2
	Overall System Operation	II.4
	Integration with Estimating System	II.6
	Integration with Accounting	II.7
	Controls	II.7
III	SYSTEM OUTPUT REPORTS	III.1
	System Overview	III.1
	Information Output	III.1
	Labor Report	III.2
	Cost Statement	III.8
	Departmental Expense Statement	III.13
	Billed Items Performance Report	III.16
	Margin Contribution Report	III.20
IV	BUDGETING PROCEDURES	IV.1
	Flexible Budgets	IV.1
	Fixed Budgets	IV.2
	Treatment of Overhead Items	IV.6
	Final Step After Distribution of Overhead	IV.12
	Labor Reporting	IV.14

TABLE OF CONTENTS (continued)

<u>Section</u>		<u>Page</u>
V	JOB COST ESTIMATING	V.1
	Source Document	V.1
	Operating Procedures	V.4
VI	FINANCIAL ACCOUNTING PROCEDURES	VI.1
	General Ledger	VI.1
	Cost Code Accounting	VI.1
	Coding	VI.3
	Payroll	VI.4
	Corporate Charges	VI.4
	Profit Center Accounting	VI.4
	Accrued Personnel Costs	VI.5
	Monthly Closing Procedures	VI.5
	Inventory Valuation	VI.6
	Control Review	VI.6
VII	IMPLEMENTATION	VII.1
	Tasks for the Shop	VII.1
	Recommended Sequence for Implementation	VII.5
 <u>Appendix</u>		
A	Labor Reporting Procedures	A.1
B	Job Cost Estimating Procedures	B.1
C	Direct and Indirect Labor Activities	C.1
D	Departments and Cost Centers	D.1
E	Material Classifications	E.1
F	Chart of Accounts	F.1

LIST OF EXHIBITS

<u>Exhibit</u>		<u>Page</u>
II-1	Flowchart of the Cost Information System Concept	II.5
III-1	Example of Labor Report	III.4
III-2	Conceptual Flow of Labor Report	III.7
III-3	Example of Cost Statement	III.9
III-4	Conceptual Flow of Cost Reports	III.12
III-5	Example of Departmental Expense Statement	III.15
III-6	Conceptual Flow of Departmental Expense Statement	III.17
III-7	Example of Billed Performance Report	III.18
III-8	Conceptual Flow of Billed Performance Report	III.21
III-9	Example of Margin Contribution Report	III.22
III-10	Conceptual Flow of Margin Contribution Report	III.24
V-1	Job Cost Request Document	V.2
V-2	Job Cost Request Document	V.3
VI-1	Journal Entry System	VI.2
VII-1	Implementation Schedule	VII.7

I. INTRODUCTION

In an effort to provide the railroad industry with an effective method of maintaining information about the cost of repairing both owned and foreign freight cars, the Federal Railroad Administration (FRA) engaged Peat, Marwick, Mitchell & Co. (PMM&Co.) to develop a standard repair cost information system. During Phase I of this research effort, PMM&Co. defined the areas in which the industry would benefit from new costing research and worked with FRA to develop the conceptual framework of the needed system. The system concept is the subject of this report.

The Cost Information System described here is designed to capture all categories of freight car repair costs and report those costs to railroad managers in the detail necessary to support their cost and pricing decisions. Because each railroad's operation is unique in terms of repair volume, mix of foreign and own cars, and contractual agreements, the System is structured in such a way that its features can be tailored to a road's particular requirements. In a later phase of this project, PMM&Co. will carry out such modifications to implement the System for a particular railroad selected by FRA.

STANDARD COSTS

To implement the Cost Information System, a railroad's management will have to establish standard costs. Simply stated, a standard cost is a forecast of what the cost should be for an individual product or service under specified conditions. These costs are generally determined through detailed engineering studies, time and motion studies, and other analyses of cost and production relationships. Using such standards, organizations usually control costs through three basic steps:

1. Establish standards for each element of cost--material, labor, and overhead.
2. Compare actual costs with the established standards.
3. When necessary, take investigative or corrective action.

When the actual cost incurred for material, labor, or overhead differs from the standard amount allowed, the difference is known as a variance. If the actual cost is less than the standard cost, the variance is said to be favorable. Although variances may be stated in terms of physical units, it is customary to emphasize their economic significance by expressing them in dollar amounts.

Standard Material Costs

Cost standards for materials are derived from two factors: the quantity of material that should be used to produce an end product, and the price that should be paid for the material used. Thus, two types of variance may occur, one in the quantity of material used and the other in the price paid for the material.

This variance is translated into dollar terms by finding the difference between actual quantity used and the standard quantity allowed for the task, then multiplying that difference by the standard price. The standard price is used rather than actual price to screen out the effect of price changes which, as a rule, are beyond the influence of the manager who is responsible for quantity variance.

Standard Labor Costs

Cost standards for labor, like those for materials, are composed of two factors: the amount of labor that should be used in producing the end product in question and the price that should be paid for the labor. Variations may occur in either of these factors.

The dollar value of a labor quantity variance is determined by finding the difference between the actual time spent in producing the product and the standard time allowed, then multiplying the difference by the standard price.

Standard Overhead Costs

Separate standards must be developed for each element of overhead expense. In this category, the standards must represent what costs should be under specified conditions, not what they were in the past or are expected to be in the future.

Management must decide at what level of production the standards should be set and define normal capacity at that level. The standards may be expressed in direct labor hours per month or year, or in units produced. Normal capacity may be called normal or average volume, normal or average activity, or simply standard production for the production level concerned. When defining normal capacity, managers must allow for a normal amount of unavoidable work stoppage due to delays in delivery of materials, equipment breakdown, absenteeism, and similar factors.

THE SYSTEM'S CHARACTERISTICS

The distinguishing feature of the Cost Information System for freight car repairs is its fundamental principle: that the cost of repairing a car consists of the cost of what goes on the car rather than the cost of reworking the components that are taken off the car.

This System has been designed to parallel the Car Repair Billing (CRB) system of the Association of American Railroads (AAR). CRB provides the standard bill of materials, while the System described here supplies the labor and overhead components.

The Cost Information System may be integrated into a railroad's existing corporate accounting system and will report either fully absorbed or direct costs. It has been designed to be incorporated into a responsibility accounting system or to parallel such a system as a management information tool.

All shop costs are assigned to either direct or indirect charges by means of a defined repair format. These costs are segregated by direct materials, direct labor, and overhead. Cost variances that affect these three categories can be identified in the reporting process.

The System will produce five basic reports, which are interrelated because they originate from the same data source. These reports are as follows:

- Labor Report - identifies labor elements by activity and reports the efficiency and use of direct labor;
- Cost Statement - accumulates costs for foreign car repairs and billings and for contract repairs;
- Departmental Expense Statement - documents departmental performance using flexible budgets with standard costs;
- Billed Items Performance Report - documents the repair shop's efforts to minimize deficits in foreign car billings or the shop's contributions on contract repairs; and
- Margin Contribution Report - measures and evaluates performance by type of repair and aids in evaluating shop efficiency.

IMPLEMENTING THE SYSTEM FOR A SELECTED RAILROAD

In addition to a conceptual Cost Information System, PMM&Co. has prepared a preliminary implementation plan describing the basic tasks necessary to put the System into operation for a specific railroad. A phased approach is recommended so that the System's benefits can begin at the earliest possible point in the implementation process.

Implementing the System will require an estimated 60 to 90 days. Based on previous experience, we believe that the participating carrier will need to commit the services of an accountant and an industrial engineer in the mechanical department, both for 60 to 70 percent of their time, during the implementation period.

We anticipate that the participating carrier will provide the necessary data processing software for the System. It should be noted here that our assignment did not include programming and computer operations or accounting manuals.

After the Cost Information System is put into operation, FRA will expect the participating railroad to maintain it, on a fully operational basis, for a minimum of 6 months. During this period, FRA and PMM&Co. will monitor the System's performance and discuss any operating problems with the carrier's management.

SYSTEM BENEFITS

The Cost Information System has been designed to benefit repair shop management by providing:

- . improved cost data to facilitate the estimating process;
- . improved cost data by type of work performed (component rework, running repairs, etc);
- . improved information on profit contributions;
- . improved cost reports for more effective management control;
- . improved profit planning and budgeting techniques;
- . productivity comparisons between locations;
- . information for capital investment decisions;

- long- and short-range planning capabilities; and
- ability to integrate the System with profit center accounting in the future.

Implied in these benefits is the ability to separate costs as they relate to productive activity. The System separates costs into two types:

- the costs of doing business (direct costs) that are product-related and that vary in direct proportion to production.
- the costs of maintaining the capacity to do business (capacity costs) that remain constant over a relatively narrow range of production activity but vary with significant changes in the level of production volume.

II. COST INFORMATION SYSTEM CONCEPT

The Cost Information System for freight car shops generates improved cost data that can measurably enhance the planning, coordination, and evaluation functions of shop management. The data that the System provides will improve the estimating process for repairing foreign, domestic, and contract freight cars, as well as the control of shop costs. The System, which must be tailored to the needs of an individual carrier, is designed to meet current information requirements within the context of each carrier's existing shop operations.

FUNDAMENTAL PRINCIPLE

The Cost Information System is based on the principle that the cost of repairing a freight car equals the cost of what goes on the unit rather than the cost of reworking the components that are taken off the unit. For those carriers engaged in the repair or remanufacture of components, the System's reporting process allows for the determination of rebuild costs. These repair costs consist of:

- direct costs charged to the car repair bill or work order (materials and labor); and
- overhead assigned on a full-absorption basis.

It is important to note, however, that the System collects the actual cost of repairing freight cars only when the component's specific work order identity is captured at the time the car repair bill is prepared. The System ultimately assigns all shop costs to repair activities, thus providing the information needed for making estimates.

BASIC ASSUMPTIONS

The System's development was based on certain key assumptions about shop activities and management requirements:

- The average shop experiences a constant level of inventory in two respects. First, the quantity of repair parts or components on the production floor remains unchanged at any point in time. Therefore, these materials are charged to a cost center when they leave the storeroom. Second, the quantity of work-in-process at each

component cost center remains constant. Therefore, the costs incurred and the production output should be directly related. The carrier should take periodic or year-end physical inventories to verify the accuracy of this assumption.

- Unless a particular component has been identified for cost tracking, components are normally considered homogenous items for a given type of car. Therefore, the System does not distinguish components according to the railroad company which owns them.
- The carrier will use the standard bill of material developed by the Association of American Railroads (AAR) for the Car Repair Billing (CRB) system.

COST COLLECTION

In the Cost Information System, all shop costs are assigned to cost centers that are classified as either production or nonproduction. Actual cost centers will not be defined until the participating carrier is selected.

COSTS ELEMENTS

The cost elements that have been defined within the context of the System are discussed below.

Direct Costs

Direct costs are the material and labor costs that are charged to the production cost center for a specific type of repair.

Intra-Cost-Center Unassigned Direct Costs

These are costs that can be assigned to production cost centers but not to work orders or components. At month end, these costs are allocated to work orders and components on the basis of direct labor hours for unassigned labor costs and direct material costs for unassigned material costs. This allocation process takes place only within the cost center, after the variances discussed below have been calculated.

Inter-Cost-Center Overhead Costs

These are costs assigned to nonproduction cost centers. At month end, these costs are allocated to work orders and components after the intra-cost-center overhead is allocated. The allocation basis is the same as that for intra-cost-center unassigned costs. The inter-cost-center overhead is distributed after the variances are calculated.

Variances

A limited number of carriers use modified versions of flexible budgeting. The reported month's production in number of units is multiplied by the standard costs for those units to produce an expected total direct cost for that period. This result is compared to actual costs for each unit and, if the difference, or variance, is insignificant, production is considered to be under control.

As a result of the flexible budgeting procedure, the following direct cost variances can be identified:

- . Total Hours Variance - This factor is calculated by subtracting the actual hour inputs from the earned units of output.
- . Total Dollar Variance - This amount is calculated by subtracting the actual dollars expended from the earned through repair contracts.
- . Efficiency/Usage Variance - This variance is a dollar extension of the hour/quantity variances and is obtained by multiplying the input differential, earned less actual, by the standard cost rates. This reflects the dollar impact of efficient or inefficient usage of the resource inputs.
- . Rate Variance - This variance is obtained by multiplying the difference between the standard and actual cost rates by the actual units of input. It reveals the dollar impact caused by the cost rate differential of resource inputs.
- . Volume/Spending Variance - This variance applies to overhead items. Since actual overhead costs are not defined in terms of a cost rate for a unit of output, this variance is calculated by subtracting the efficiency and rate variances from the total variance.

These variances are always related to the actual level of repair work being done and are reported for all cost centers. Nonproduction cost centers do not use flexible budgeting since their activity does not relate directly to production levels. These cost centers have fixed budgets against which actual costs are reported to generate an overhead variance.

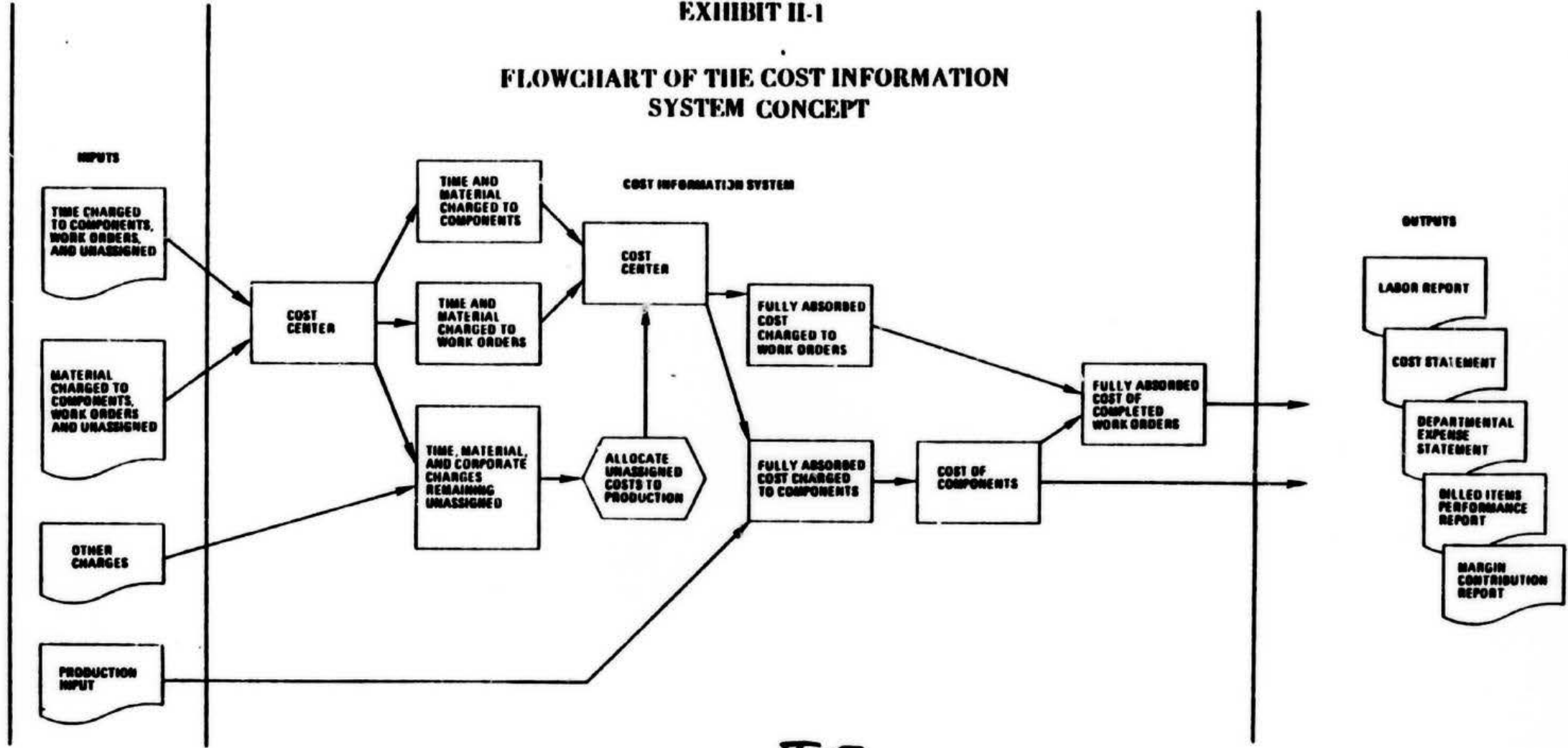
OVERALL SYSTEM OPERATION

Exhibit II-1 illustrates the monthly sequence of operations in the System. The following steps make up this sequence:

1. Labor time is reported through the payroll system and charged to the cost center in which the labor was incurred. At the time labor is reported to a cost center, it may also be reported against specific components and specific work orders.
2. Repair parts are charged to cost centers as they are disbursed from the storehouse. They may also be charged to components or work orders, or through the CRB standard bill of materials.
3. Cost reports are generated to compare the actual material, labor, and overhead charges to component standards, work order estimates, and unassigned cost (overhead) budgets.
4. The fully absorbed costs in each cost center may be charged to the components produced and the work orders in process in that cost center.
5. Using the component production input documents, component production reports are generated that compare the actual costs of production to component standards.
6. The moving average cost of components is calculated as described in the CRB system.
7. The average cost of types of components is charged to the appropriate completed work orders. Since railroads currently maintain their inventories at average cost for AAR billing purposes, the moving average will enable the carrier to avoid the effort and cost of maintaining a duplicate inventory valuation procedure.

EXHIBIT II-1

FLOWCHART OF THE COST INFORMATION SYSTEM CONCEPT



II.5

8. Work order reports compare the costs incurred to the costs estimated for the work order.
9. Repair contract reports show the progress on each contract and the projected time or dollar margins for each.

At the conclusion of each of these steps, journal entries are made in the general ledger, providing an audit trail and a trial balance at the end of each month.

INTEGRATION WITH ESTIMATING SYSTEM

One of the major uses of the cost data produced by the System is the development of repair contract proposals for foreign and private line railroads. It is important that the data used for this purpose be accurate and current. The System supports the proposal process in two phases:

- . Phase I: providing costs to develop the original proposal; and
- . Phase II: monitoring the cost status of each contract through its completion for use in preparing future proposals.

In essence, the Phase I costs are developed by extending the appropriate bill of material and required labor functions by their most recent direct material and direct labor costs. This process provides a summary of the current direct costs; although it assists in developing estimates, it does not, of course, provide a complete estimating system. Overhead components are budgeted as either flexible or fixed, depending on shop activity. Section III discusses the treatment of overhead items. Estimates must also reflect market conditions, anticipated changes in union contracts, anticipated changes in shop capacity, overhead allocation, and contingencies.

Through Phase II, management will also be provided with up-to-date projections of costs at contract completion. This phase involves the following steps:

1. Calculate the expected costs for repair units yet to be completed by using the most recent direct material and direct labor costs and applying these to the material and labor quantity requirements of the uncompleted work.
2. Add to the total from Step 1 necessary additional cost factors, such as labor rate increases and overhead allocation. This will provide a total of expected costs yet to be incurred.

3. Add the Step 2 total to the total costs already incurred on the contract to produce a total completion cost.
4. Compare the total in Step 3 to the original estimate to identify changes in marginal income.

INTEGRATION WITH ACCOUNTING

The corporate accounting systems of most railroads currently collect all costs for the repair shop, and will continue to do so. However, to ensure proper systems integration, all data should flow through the Cost Information System into the corporate accounting system.

Labor data collected in the shop are normally input to the payroll system. These data will at the same time enter the Cost Information System which, in turn, provides input to the corporate system. Thus, the shop's labor expense will be reflected in the corporate accounts.

Current coding procedures may require modification. Personnel who are best able to identify items such as cost center, component number, work order number, or cost element (i.e., shop management) should be responsible for the coding for the System. Therefore, vendor invoices and other input data will require cycling through shops for coding before processing in the corporate accounts payable system.

Profit center accounting capability has been included in the Cost Information System, to be used at the carrier's option. Implementing this capability will require certain policy decisions at the corporate level. These policies concern transfer pricing, billing procedures, budget adjustments, and general accounting.

CONTROLS

Management information is useful only to the extent that it is accurate and timely. For this reason, controls over the data gathering, processing, and reporting processes are critical to ensuring the accuracy of the information. These controls must be developed within the System's framework and within the operating environment in which it functions.

Data Input

All data input to the Cost Information System require the processing of some form or document. These input devices require control procedures which will be defined when the participating carrier is selected.

The accuracy of the information recorded on these data input instruments is a separate matter of concern. Furthermore, it is particularly difficult to thoroughly control certain costs at the shop level--such as floor inventory--because there is no inventory control system available that provides a total reconciliation of inventory and cost. The design of a production and inventory control system will address these control matters. However, other techniques are currently available to confirm that all shop costs are included in the system:

- Labor can be monitored by verifying that the total payroll paid equals the labor in the Cost Information System. This requires a daily comparison of the hours entered into the System for each employee to the hours on that person's time card for the day.
- The amount of material from the storeroom charged to the shop can be verified by taking a physical inventory of the storeroom provided there is an inventory control system over these materials. The quantities physically on hand should be compared to the quantities on the storeroom records.
- The costs of other miscellaneous materials and contract services (e.g., special equipment rental) can be controlled using two devices:
 - a receiving log - a record of goods received which can verify the proper recording of cost; and
 - an expense control list - a checklist of expected costs for services, such as electricity, maintenance, and corporate charges. This checklist is reviewed before accounts are closed each month.

Accurate Throughput

Critical to the Cost Information System is the reporting of throughput for a given period; if throughput reporting is inaccurate, cost information will not be valid. If, for instance, throughput for a given component is reported as 1,000 units when it was actually only 100 units, the reported average cost per component would be one-tenth of the actual cost. Even a few of these errors can throw the decision-making process awry and diminish management confidence in the information provided.

Control over throughput reporting is difficult, however, because most carriers have no control system with which to verify work in process. It was to serve this purpose that flexible budgeting was developed. Using this approach, management can project total direct costs and compare them to actual costs for each component. If the variance is small, the throughput reported can be considered accurate. To ensure that consistently large variances are brought to management's attention, cost exception reports will be integrated into the Cost Information System's software.

III. SYSTEM OUTPUT REPORTS

SYSTEM OVERVIEW

As described in detail in previous sections, PMM&Co. has developed a conceptual Cost Information System for freight car repairs. The System is designed to use the CRB standard bill of materials, while supplying its own labor and overhead components. The System may be integrated into a carrier's corporate accounting system, producing reports using either fully absorbed or direct costs. It can also be merged with a responsibility accounting system or operated separately as a management tool.

The System is expected to improve cost data for estimating, profit contribution information, cost reports, profit planning and budgeting techniques, and information for capital investment decisions. It is designed for future integration with profit center accounting, and will provide for productivity comparisons between locations as well as long- and short-range planning. Through these improvements, the System will be able to separate costs into the costs of doing business and the costs of maintaining the capacity to do business.

INFORMATION OUTPUT

Having developed the conceptual System, the project team next established broad definitions of System outputs. Specifically, the team designed the five major System reports mentioned earlier: a labor report, a cost statement, a departmental expense statement, a billed items performance report, and a margin contribution report.

In this section, each report is described, with particular attention given to the following:

- Applicability - defines the organizational unit (division, region, cost center) or the job for which the report will be produced.
- Format - focuses on the type of information the report will provide and the way in which it will be displayed.
- Conceptual Flow - describes the content of the report, with emphasis on the relationship between the information contained in the report and the required inputs.

- Summary Report - identifies the planned summary version of the report. The summaries use the same information contained in the major report but display or organize it in a different fashion.

Examples of each basic report are provided, excluding the summary versions. The exhibits illustrate the relationships among System components, the sources of required data, and the way the data are used to produce the reports. Source data (obtained directly from System components) are identified with a circle, and input data (derived from calculations using source data) are identified with a triangle.

LABOR REPORT

This document identifies, by activity, the time spent by shop personnel in particular activities. Its basic purpose is to report the use and efficiency of direct labor; the resulting data are contributed to other reports. Labor utilization is the relationship between an employee's total time and the time spent in direct labor activities (i.e., repairing cars). This relationship is significant because the greater the utilization, the greater is the productive output. Efficiency occurs when the actual time to complete a given repair is equal to or less than the standard or estimated time. While labor efficiency and utilization are important individual concepts, they should be viewed collectively; the greatest benefit is achieved when both are optimized and the proper action by management can be taken only after analyzing both.

Applicability

Labor reports will be provided for the following cost centers:

- administrative center;
- light repair shop;
- heavy repair shop;
- air valve shop;
- blacksmith shop;
- machine shops;
- RIP track;

- . wheel shop; and
- . others required by the participating carrier.

Due to the variety of organizational structures in the industry, most cost centers will have more than one functional area.

Format

The labor report contains labor performance data on a current and year-to-date basis. In the current portion, direct labor hours will be displayed by employee, job, and activity. Indirect hours will be presented by employee and activity. This level of detail is not required in the year-to-date portion, since the usefulness of this format is essentially limited to the current period. Therefore, both direct and indirect labor hours will be summarized by employee and activity in the year-to-date portion. A listing of the various direct and indirect labor functions will be defined in Appendix C when a carrier is selected.

The following explanations refer to the numbered captions on the labor report (Exhibit III-1):

1. Division - The division or region in which the cost center is located.
2. Cost Center - The specific cost center (spot shop, back shop, etc.) that the report concerns.
3. Current - The date the period ended.
4. Year-to-Date - The amounts applicable from the beginning of the year.
5. Employee - The employee's name.
6. Car Number - The identification number of the car repaired (both foreign and domestic).
7. Function - The numeric code and name of the direct and indirect labor activity an employee performed during the period. Direct labor activities will be further identified by an asterisk to distinguish those operations that have been defined with an applicable standard. This distinction is required for a meaningful analysis of the variances.

III. 4

EXHIBIT III-1

EXAMPLE OF LABOR REPORT

DIVISION 1		LABOR REPORT																		
COST CENTER 2				CURRENT 3												YEAR-TO-DATE 4				
EMPLOYEE	CAR NO	FUNCTION 7		STD HRS	DIRECT LABOR 9				INDIRECT LABOR 10				TOT HRS	ERN HRS	EFFICIENCY		UTILIZATION			RATE VARIANCE PER JOB
		NO	DESCR		RT	OT	DT	TOT	RT	OT	DT	TOT			%	HRS	ACT %	PLAN %	VAR %	
5	8			8	11	12	13	14	11	12	13	14	14	15	16	17	18	19	20	21

8. Standard Hours - Estimated time to complete the specific job.
9. Direct Labor - The amount of time spent in activities charged to each job.
10. Indirect Labor - The amount of time that is not charged to jobs.
11. Regular Time - The actual hours of nonpremium time devoted to a particular activity. These hours as well as all other types of hours will be vertically summed to furnish an employee total.
12. Overtime - The actual time devoted to a particular activity requiring a wage rate of one and one-half times the employee's regular rate.
13. Double Time - The actual time devoted to a particular activity requiring a wage rate of twice the employee's regular rate.
14. Total Time - Total time is displayed for both direct and indirect labor hours and then summed to provide total hours for each employee.
15. Earned Hours - Earned hours are calculated using only direct labor hours. They are the amount of time that should have been necessary to produce the required number of repairs. Earned hours are calculated from either a standard rate or an amount which has been defined in a job estimation procedure. When direct labor activities have not been defined, earned hours will equal actual hours and be identified with an asterisk.
16. Percent Efficiency - This factor is shown for each direct labor activity on a total employee basis. It is equal to the earned hours divided by the actual direct labor hours. When an activity has not been estimated, efficiency will not be computed. This event will occur infrequently and will therefore have only a minor effect on the resulting data. However, if this condition does occur often, it will reduce the intended effectiveness of this report.
17. Hours Efficient - This factor is also calculated for each direct labor activity on a total employee basis. It is calculated by subtracting total charged time from total earned time. A negative result indicates that an employee is performing at less than standard; a positive result indicates above-standard performance.

18. Actual Utilization - This factor is shown on an employee basis. It is the relative amount of time that the employee devoted to direct labor activities and is calculated by dividing the total direct labor hours by the total time.
19. Planned Utilization - The estimated yearly utilization of a particular employee.
20. Utilization Variance - This amount is determined by subtracting planned from actual utilization. It may have significant fluctuations in the current portion of the report. However, it will possess greater stability in the year-to-date portion, and on this basis it will be an effective means of evaluating the utilization of the labor force.
21. Rate Variance Per Job - This factor will be presented by employee for each direct labor task. It is the difference between the employee's actual hourly cost and the standard hourly cost. In a conceptual sense, a positive value indicates that a cost savings has been realized, while a negative value indicates the reverse.

Conceptual Flow

As shown in Exhibit III-2, preparing the labor report will require employee time cards, job cost estimates (for work orders, programs, and authorizations for expenditures [AFEs]), and budgeting. Time cards provide the system with a detailed classification of the actual labor inputs in hours. This information is then used in conjunction with job cost estimates and budget data to determine employee efficiency, utilization, and the job/employee cost rate variance.

Summary Reports

The summary labor report will list direct and indirect labor activities by cost center. Each direct labor function listed will be presented in terms of total charged and earned hours, while indirect labor activities will show the total charged hours. This summary will assist management in its staffing and manpower planning activities by revealing the number of hours devoted to specific activities. It will also be useful in assessing the accuracy of direct labor production standards, since a consistent difference between the earned and charged time could indicate the need to adjust the standard rate.

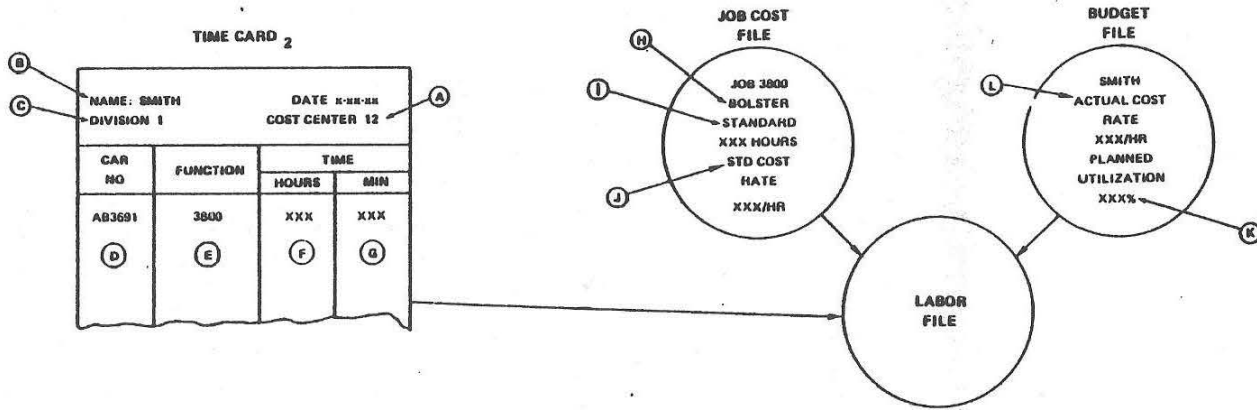
EXHIBIT III-2

CONCEPTUAL FLOW OF LABOR REPORT

DIVISION 1 ^(C)		LABOR REPORT													LABOR REPORT YEAR-TO-DATE					
COST CENTER 12 ^(A)		CURRENT																		
EMPLOYEE	CAR NO	FUNCTION		STD HRS	DIRECT LABOR				INDIRECT LABOR				TOT HRS	ERN HRS	EFFICIENCY		UTILIZATION			RATE VARIANCE PER JOB
		NO	DESCR		RT	OT	DT	TOT	RT	OT	DT	TOT			%	HRS	ACT %	PLAN %	VAR %	
SMITH ^(B)	AB 3691 ^(D)	3800 ^(E)	BOLSTER ^(H)	^(I)	^(G)					^(I)				^(I)		^(I)	^(I)	^(I)	^(K)	^(A)

^(A)-^(K) ^(J)-^(L)

III. 7



¹ Special circumstances may require indirect labor to be assigned to a specific repair.

² Other source documents may be used.

COST STATEMENT

The cost statement (Exhibit III-3) accumulates repair costs for direct labor repairs. This statement also accounts for foreign car and private car billings. This document uses a modified standard cost approach to report labor, material, and overhead costs. Its primary purpose is to assist management in evaluating production efforts against predetermined standards and to furnish the basis for estimating job profitability by comparing the amount billed for foreign cars and private fleets to standard costs and billable rate amounts.

Applicability

The System will produce reports for all defined jobs, both billable and nonbillable. The System is flexible to allow for special project reports to be developed.

Format

The cost statement will contain both current and year-to-date information in the current portion of this report. For reoccurring jobs, costs will be presented weekly on a batch or cycle basis while one-time jobs (programs or special modifications) will be reported monthly. The specific costs reflected on this report are direct labor, material, and overhead. Provisions have been made to include billable amounts which will assist in determining foreign and fleet repair profitability. The entries on this report are described below.

1. Direct Labor - This category displays direct labor by CRB code rather than by employee. Activities will be grouped by cost center to permit subtotals for each cost center. Since repairs are estimated by activity, this format for the accumulation of costs will assist in both evaluating production efforts and furnishing a better basis for determining the profitability of foreign billings.
2. Materials - This category consists of direct material costs as well as other direct expenses such as purchased services, purchased contract labor, and direct job charges. Each will be identified by a specific material code and descriptive title.
3. Overhead - Under this caption will appear the names and codes for all departments and cost centers that participate in the repair effort. A complete description of overhead categories is provided in Section IV.

EXHIBIT III-3

EXAMPLE OF COST STATEMENT

DIVISION 6 COST CENTER 7		COST STATEMENT CURRENT 8										YEAR-TO-DATE 9
COST CATAGORIES	REF	QUAN	BILLING ¹ AMOUNT	CHARGED		EARNED		VARIANCES				REF
				HRS	DLR	HRS	DLR	UNIT	DLR	EFF	RATE	
1 DIRECT LABOR BY JOB	10	11	12	13	14	15	16	17	18	19	20	
TOTAL DIRECT LABOR												
2 MATERIAL BY JOB												
TOTAL MATERIAL												
TOTAL DIRECT COSTS												
3 OVERHEAD BY COST CENTER												
TOTAL OVERHEAD												
4 TOTAL COSTS												
5 TOTAL BILLED												

DIRECT LABOR → JOB CODED REPAIRS
 → WORK ORDERS
 → AFE
 → PROGRAMS
 → WRACK DAMAGE

¹ Foreign Car Billing From AAR Bids. or Contract Rates

III.9

4. Total Cost - The sum of all charges on the cost statement, for the period. Total billed costs are included in this total.
5. Total Billed - The amount the foreign road or fleet owner was billed for repairs, either running under interchange rules or contract work under negotiated rates.
6. Division - The division or region in which the cost center is located.
7. Cost Center - The specific cost center or centers the report concerns.
8. Current - The date the period ended.
9. Year-to-Date - The amounts applicable from the beginning of the year.
10. Reference - This area will only be used for materials and contract services. Items that are obtained from inventory will be indicated with a material requisition and identified with a material code and description of the specific item.¹ Material that is purchased for a specific job will be indicated by a purchase order and referenced with a material code, voucher number, and description of the item.
11. Quantity - The number of units repaired and the quantity of material used.
12. Billing Amount - This caption applies to direct labor and materials.
13. Charged Hours - The actual units of input are shown here. Units of direct labor are reported by activity, units of material are shown by items, and overhead is shown by cost center.
14. Charged Dollars - These amounts are obtained by multiplying the charged units of input by the appropriate cost rates. Direct labor dollars are based on contract wage rates. When more than one wage rate is involved, a composite rate is used. Material costs for one-time jobs are also based on their actual cost rates.

¹The final design in this area is subject to the participants' material inventory system and charge-out procedures.

15. **Earned Hours** - Earned hours are the units of input that should have been required to produce the quantity of repairs reported. These amounts are calculated from either a standard rate or an absolute amount which is defined in the cost estimation process. When the amounts are stated in absolute amounts, the earned will equal the actual amount. However, this amount will never exceed the amount stated in the cost estimate. It is recognized that not all jobs or specific activities will be estimated.
16. **Earned Dollars** - These dollars are calculated by multiplying earned hours by the appropriate standard cost rates.
17. **Total Unit Variance** - This factor is calculated by subtracting the actual hours or units of input from the earned hours or units of input.
18. **Total Dollar Variance** - This amount is calculated by subtracting the actual dollars from the earned dollars.
19. **Efficiency/Usage Variance** - This variance is a dollar extension of the hour/quantity variance and is obtained by multiplying the input differential (earned less actual) by the standard cost rates. This reflects the dollar impact resulting from the efficiency or inefficient usage of the resource inputs.
20. **Rate Variance** - This variance is obtained by multiplying the difference between standard and actual cost rates by the actual units of input. It reveals the dollar impact caused by the cost rate differential of resource inputs.

For direct labor activities which are performed by more than one employee, the rate variance is a balancing factor, reflecting the net impact of the individual rate variances. This variance is not applicable to materials used for reoccurring jobs and overhead, since these items are valued in terms of their standard cost rates. While a rate or price variance for reoccurring materials is recognized at the time of purchase, an additional rate variance could be introduced because the standard cost rates may change frequently.

Conceptual Flow

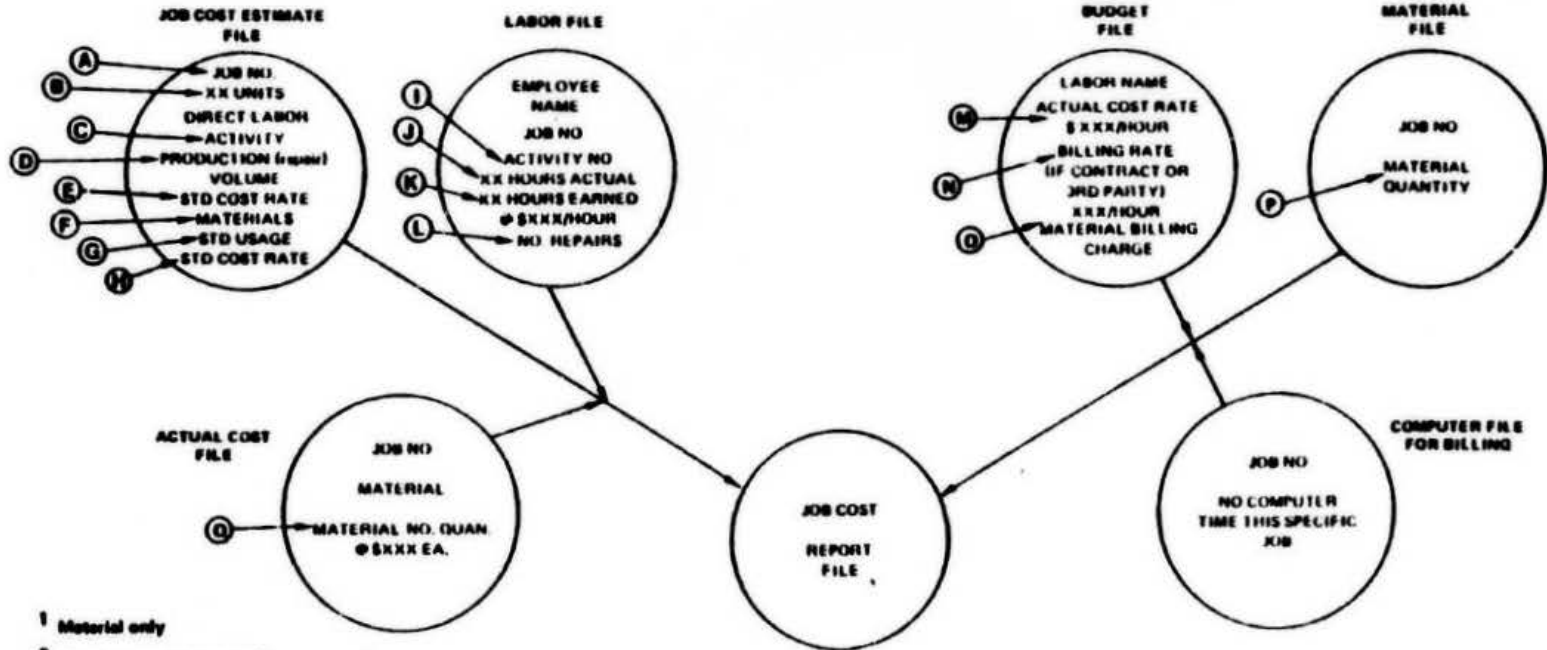
Exhibit III-4 depicts the preparation of cost reports, which involve six System components. Direct costs and overhead are obtained from the labor and material reporting components. These costs are valued with cost and

III.12

EXHIBIT III-4

CONCEPTUAL FLOW OF COST REPORTS

DIVISION		COST STATEMENT								YEAR-TO-DATE		
COST CENTER		CURRENT										
COST CATEGORIES	REFER	QUANT. PROD.	BILLING AMOUNT ²	CHARGED		EARNED		VARIANCES				
				HOURS	DOLLARS	HOURS	DOLLARS	TOTAL HOURS	TOTAL DOLLARS	EFF	RATE	
DIRECT LABOR												
• (I)		(L)	(N × J)	(J)	(M × J)	(K)	(K × E)	(K × J)	(Δ - Δ)		(E - M) [J]	
MATERIAL												
• (F)	(Q, P)		(P × Q)	(P)	(P × Q)	(G)	(H × G)	(G × P)	(Δ - Δ)		(K - J) [E] (G - P) [H] (H - Q) [P]	



¹ Material only
² Foreign or contract repairs

billing rates in the budgeting, actual cost, and cost estimate components to furnish both appropriate controls and the actual and earned costs. Any cost differential is further defined in terms of production efficiencies and cost rate variances.

Summary Reports

There are four summaries produced from the information contained in the cost statement:

- Equipment Released Not Billed - a monthly listing.
- Program and Special Work Completed - a monthly listing.
- Jobs Completed - a monthly listing of all completed jobs by car number.
- Work-in-Process - a monthly listing of jobs which are in progress. This report is designed for programs, contract work, and wreck rebuilds, and will be prepared as a separate System report. Only changed items will be shown, not earned standards.

DEPARTMENTAL EXPENSE STATEMENT

This report uses a flexible budgeting approach with standard costs to report departmental performance. Performance is measured on a line-item basis in terms of planned, actual, and earned amounts. The report focuses on the difference between earned and actual amounts, which is defined in terms of efficiency and rate or volume/spending variance.

Applicability

The reports will be provided for the following departments:

- administrative;
- heavy repair shop;
- door shop;
- wheel shop;
- light repair shop;

- . RIP track; and
- . others required by the participating carrier.

The final department distribution will depend on the organization of the test carrier.

Format

This report (Exhibit III-5) displays departmental costs on a current and year-to-date basis. Labor costs are presented by cost center total and overhead costs are presented by line item for each cost center. The following descriptions explain the information contained in the departmental expense statement:

1. Current - The date the period ended.
2. Year-to-Date - The total amounts incurred from the beginning of the year.
3. Department - The name of the department.
4. Region - The name of the region to which the department is assigned.
5. Expenses - Identifies major line items of expense. The detail will be determined by the requirements of the master budget.
6. Planned Dollars - The estimated amounts based on the monthly cost/profit plan.
7. Actual Dollars - The actual costs associated with a particular department. Actual direct labor dollars represent the product of the actual cost rate and the actual direct labor hours. These amounts are summed by cost center.
8. Earned Dollars - Earned direct labor dollars are determined by multiplying the individual employee earned hours by the appropriate standard activity cost rates and totaling these amounts by cost center.
9. Total Variance - Earned dollars less actual costs.
10. Efficiency Variance - The dollar impact caused by the efficiency or inefficiency of direct labor and materials/supplies.

EXHIBIT III-5

EXAMPLE OF DEPARTMENTAL EXPENSE STATEMENT

REGION 4 DEPARTMENT 3		DEPARTMENTAL EXPENSE STATEMENT							CURRENT 1	YEAR-TO-DATE 2
EXPENSES ⁵	PLAN DOLS	ACTUAL DOLS	EARNED DOLS	VARIANCE			PLAN DOLS			
				TOTAL	EFF	RATE			VOL. SPENDING	
	6	7	8	9	10	11	12			
DIRECT LABOR BY COST CENTER										
TOTAL DIRECT LABOR										
MATERIAL BY COST CENTER										
TOTAL MATERIAL										
INDIRECT LABOR BY COST CENTER										
TOTAL INDIRECT LABOR										
EMPLOYEE BENEFITS BY COST CENTER										
TOTAL EMPLOYEE BENEFITS										
OVERTIME										
SUPPLIES										
DEPRECIATION										
•										
•										
•										
OTHER EXPENSES										

MAY BE AS DETAILED AS MASTER BUDGET REQUIRES

III. 15

It results from the time difference between earned and direct actual labor hours and materials/supplies. The overhead variances are calculated by applying the respective standard overhead cost rates to the time difference. The efficiency variances for direct labor and materials/supplies are calculated per activity and then summed to furnish the total amount.

11. Rate Variance - This factor applies to direct labor and materials/supplies and consists of the difference between the actual and standard cost rates for employees and for materials/supplies. If required, the individual amounts are summed. These amounts are then summed to provide a total rate variance. This variance shows the dollar impact of the mix of employees and materials/supplies used at their actual cost rates and how this differs from the standard cost rates.
12. Volume/Spending Variance - This variance applies to the overhead items. Since actual overhead costs are not defined in terms of a cost rate for a unit of input, this variance is calculated by subtracting the efficiency variance from the total variance.

Conceptual Flow

As shown in Exhibit III-6, departmental expense statements are produced from the data contained in the System's budgeting, actual cost, labor reporting, and computer time reporting components. This information is used to display departmental performance by cost categories defined in terms of planned, actual, and earned dollars. The planned costs are the absolute amounts obtained directly from the budgeting process. Actual costs are also absolute amounts which typically originate from the actual cost component. Earned hours are calculated from the earned units of input stored in either the labor or computer time reporting component. Earned costs are calculated from data stored in the same two components plus the standard cost rates determined in the budgeting process.

Summary Report

The departmental expense statement will be summarized on a regional basis and then consolidated to reflect the car repair operation.

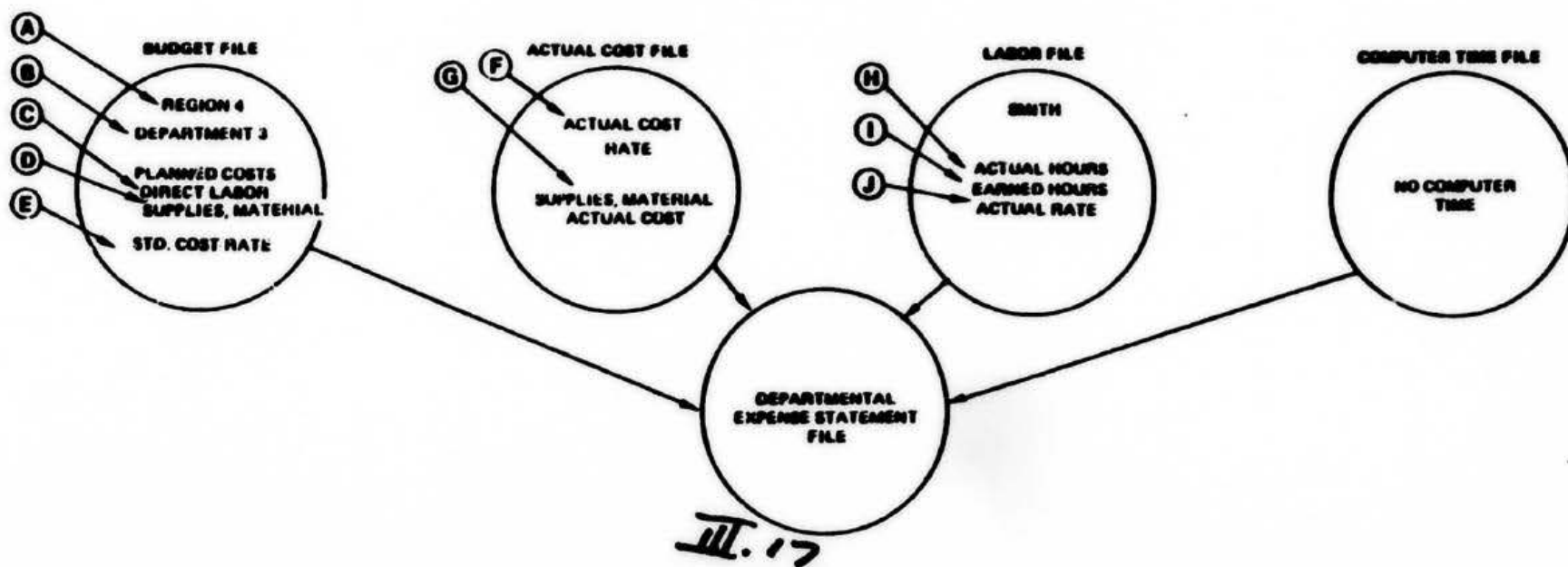
BILLED ITEMS PERFORMANCE REPORT

This report (Exhibit III-7) documents the efforts of the repair shops in minimizing foreign car billing deficits or the contribution that shops make on

EXHIBIT III-6

CONCEPTUAL FLOW OF DEPARTMENTAL EXPENSE STATEMENT

REGION 4 (A)		DEPARTMENTAL EXPENSE STATEMENT						YEAR-TO-DATE
DEPARTMENT 3 (B)		CURRENT						
EXPENSE CATEGORIES	PLANNED COST (C)	ACTUAL COST (W) (F x H)	EARNED DOLLARS (X) (I x J)	VARIANCE			VOL. SPEND	
				TOTAL (X - W)	EFF	RATE		
See Exhibit II 5 Pg. 8 14	(C)	(W) (F x H)	(X) (I x J)	(X - W)				[I - M] [J] [F - J] [H]
	(D)	(G)	(I x E) (Y)	(Y - G) (Z)				(Z - Y) [I - H] [E]



III.18

EXHIBIT III-7

EXAMPLE OF BILLED PERFORMANCE REPORT

REGION 3		BILLED PERFORMANCE REPORT			
DEPARTMENT	CURRENT 1			YEAR-TO-DATE 2	
BILLED EXPENSES	PLANNED	ACTUAL	EARNED	VARIANCE	PLANNED
CONTRACT BILLINGS OR FOREIGN CAR BILLS	4	5	6	7	
EXPENSES: • • • AS REQUIRED					
COST OF REPAIRS VARIABLE FIXED					
NET CONTRIBUTION					

contract repairs. It uses flexible budgets to measure performance in terms of billing and expenses. Billings are stated in actual dollars while expenses are stated in both earned and actual dollars. This is achieved by comparing actual expenses horizontally, on a line-by-line basis, to the earned amounts listed vertically. Actual billings can be contrasted to both the earned and actual expenses to determine repair shop contribution.

Applicability

This document will be prepared for each repair shop that does foreign car or contract repairs. The first level of reporting focuses on individual divisional master mechanics. These in turn will be summarized to report the performance of regional master mechanics, and finally, a total billed performance report reflecting the entire department.

Format

As shown in Exhibit III-7, the vertical listing consisted of billed dollars and the related fixed and variable expenses for the current year and the year to date. It should be noted that billed expenses are dependent upon the specific repair mix. The fixed and variable cost of sales will be displayed on all reports. These amounts are calculated by multiplying the cost rates by the actual units repaired. The data fields in the billed performance report are as follows:

1. Current - The date the period ended.
2. Year-to-Date - The amounts applicable from the beginning of the year.
3. Region/Department - The organizational unit to which the report applies.
4. Planned - The absolute amounts based on the monthly profit plan.
5. Actual - Actual expenses and billed dollars.
6. Earned - With the exception of billings, earned amounts are calculated by multiplying the actual billed dollars by the respective line-item cost rates. The earned billed dollars are equal to the actual sales amounts.
7. Variance - The difference between the actual and earned amounts.

Conceptual Flow

Exhibit III-8 shows the billed performance report, results from revenue reporting, and actual and budgeting components. This information is employed to determine efficiency by region. With the exception of the fixed and variable cost of billed items, actual dollars arise from billing reports and actual costs from billing expense reports. The actual fixed and variable cost of billed items equals the earned amounts, while the earned billed items equals the actual billed items. Earned expenses are calculated from the actual units (programs) sold, the standard expense rates, and production cost rates.

MARGIN CONTRIBUTION REPORT

This report (Exhibit III-9) measures and evaluates billed performance by repair and assists in determining profitability. The report uses the information contained in the Billed Performance Report but displays it in a different manner. Billings are reported in actual dollars while the fixed and variable costs of billings are stated in terms of standard costs. Profitability is then determined by subtracting the cost to repair from the actual sales.

Applicability

This document is a regional report which will be produced for regional managers.

Format

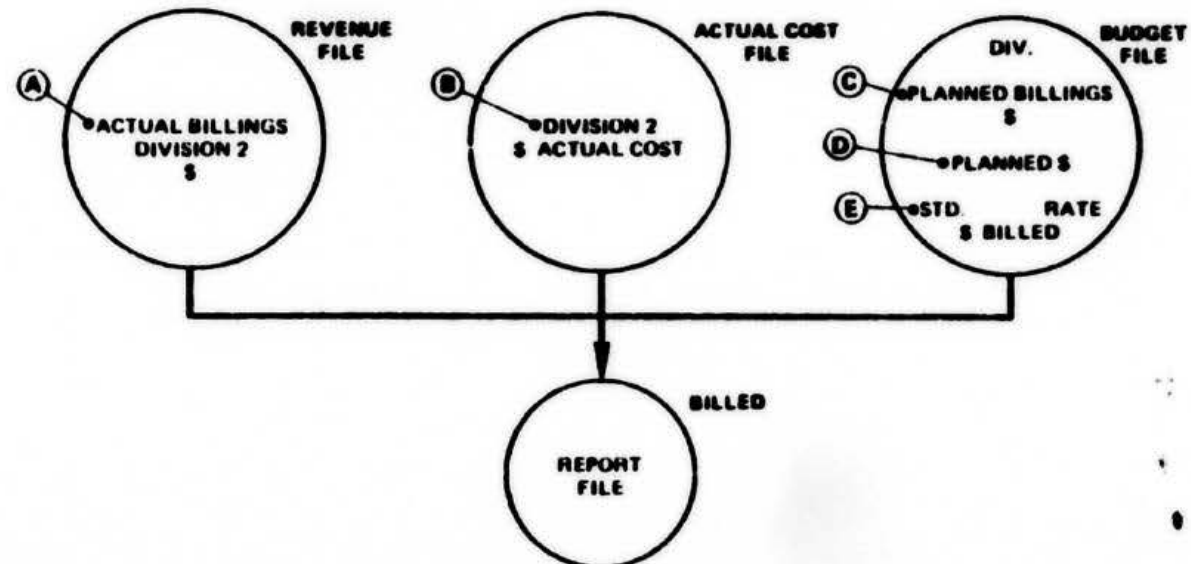
This report contains current and year-to-date sections. The outputs are vertically displayed and subtotals are provided by repair activity and component group to assist management in evaluating profitability. Sales and expenses are listed horizontally. The report furnishes the respective cost margins associated with each repair. The following descriptions refer to the numbered captions shown in Exhibit III-9:

1. Current - The date the period ended.
2. Year-to-Date - The amounts incurred from the beginning of the year.
3. Programs - The various repairs and programs.
4. Billings - The actual billed dollars.

EXHIBIT III-8

CONCEPTUAL FLOW OF BILLED PERFORMANCE REPORT

BILLED PERFORMANCE REPORT								
REGION DEPARTMENT ^(A)	CURRENT				YEAR-TO-DATE			
	PLAN	ACTUAL	EARNED	VARIANCE	PLAN	ACTUAL	EARNED	VARIANCE
BILLED • • • • •	\$ (C) (D)	\$ (A) (B)	\$ (A) (A) x (E) △	\$ △ - (B)				



III.21

5. **Variable Costs** - These amounts are obtained by multiplying the individual standard variable production charge by the actual number of units repaired.
6. **Contribution** - The difference between the respective sales and variable cost amounts.
7. **Percent of Billings** - The contribution shown in column 6 divided by the billings.
8. **Fixed Costs** - These amounts are obtained by multiplying the individual standard fixed production charge by the actual number of units billed.
9. **Contribution** - The difference between the initial contribution amount and the fixed costs.
10. **Percent of Billings** - The contribution shown in column 9 divided by the billings.

Conceptual Flow

As shown in Exhibit III-10, the Margin Contribution Report requires the System's budgeting and revenue reporting components. Revenue reporting provides coded sales data, while the budgeting component provides the fixed and variable production cost rates. This information is used to generate product line profit contributions.

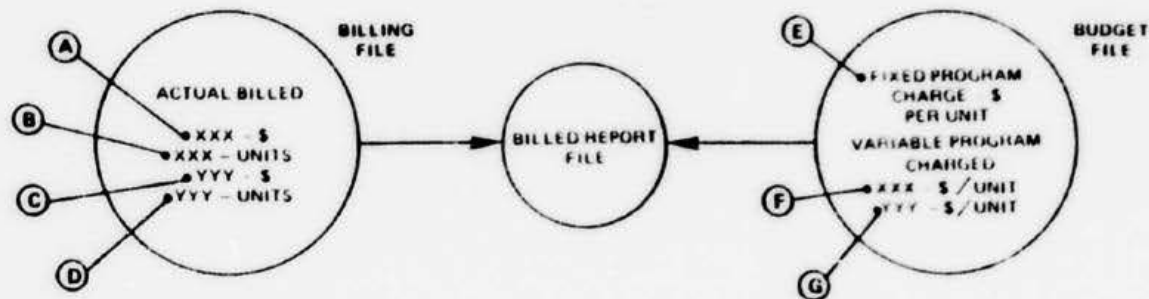
Summary Reports

No summary versions are planned for this report.

III.24
EXHIBIT III-10

CONCEPTUAL FLOW OF MARGIN CONTRIBUTION REPORT

MARGIN CONTRIBUTION REPORT										
CURRENT								YEAR-TO-DATE		
PROGRAMS	BILLINGS	VARIABLE COST	CONTRIBUTION	PERCENT OF BILLINGS	FIXED COSTS	CONTRIBUTION	PERCENT OF BILLINGS	BILLINGS	VARIABLE COSTS	CONTRIBUTION
XXX -	(A)	(B) x (F) △	(A) - △ △	△ : (A)	(B) x (E) △	△ - △ △	△ : (A)			
YYY -	(C)	(D) x (G) △	(C) - △ △	△ : (C)	(D) x (E) △	△ - △ △	△ : (C)			



IV. BUDGETING PROCEDURES

In planning for future activities, management can use certain budgeting techniques to evaluate past performance and provide future direction. The budget also provides a financial expression of management's plans, serving as a financial map for attaining the specified targets. Ideally, each member of the management team participates in planning and budgeting the activities over which he or she has control and is held accountable for performance in these areas.

Budgeting procedures must be designed to accommodate shop operations. All shop activities are divided into one of two categories: production or non-production (direct or indirect). The costs incurred in the production cost centers should relate directly to production, while costs in nonproduction cost centers will tend to be more constant within a relative range of activity.

To accommodate these two classes of shop activity, two budgeting procedures are required: flexible budgets and fixed budgets.

FLEXIBLE BUDGETS

Flexible budgeting is a technique for developing budgets that reflect actual activity levels rather than predetermined fixed amounts. This technique permits management to monitor direct costs as they relate to throughput. The control of throughput is critical to determining the accuracy of the cost information. If large variances occur between actual costs and flexible budgets, it is possible that throughput and/or costs are not being properly reported. This budgeting procedure is crucial to the Cost Information System.

Direct costs are found in two cost collection pools: repair components and work order (labor). The flexible budgeting required for each is slightly different.

Components

The following steps should be followed to develop flexible budgets for components:

- . develop standard costs, comprising direct material and direct labor, for each component;
- . extend the monthly throughput reported for each component by its standard cost to generate an expected cost for actual production;

- compare the expected cost for actual production to the actual cost that was charged to the component that month;
- analyze all direct costs based on usage/efficiency, rate, and volume; and
- analyze all fixed costs in terms of spending and volume.

Work Orders

The following steps should be followed to develop the flexible budgets for work orders:

- develop estimated costs for each work order at the time that the work order is created. This estimated cost is developed by cost center and expense element (direct material and direct labor) within each cost center.
- collect the actual direct costs for each work order in the same format that the estimated costs were developed.
- compare the actual direct costs to the estimated costs for each work order at the time of its completion.
- analyze the resulting variances in terms of the following elements:
 - material price/usage - the difference between the actual material cost/usage and the standard or estimated material cost/usage determined by the actual level of usage;
 - labor rate - the difference between the standard labor rate and the actual labor rate, times the actual hours worked; and
 - labor efficiency - the difference between the standard labor hours and the actual labor hours, times the standard labor rate.

FIXED BUDGETS

Fixed budgets are required to help control two cost collection pools:

- nonproduction cost centers; and

- production cost centers that include unassigned direct costs, such as crane operators' wages.

These cost pools have no base of activity against which costs can be compared. Rather, these costs are expected to be constant for a relative range of activity. However, this does not mean the budget should be exactly the same each month. Although a fixed budget should not change once it is established, it should take into account anticipated changes in production levels.

To the extent possible, fixed budgets should be developed using a zero-base approach rather than a "percent over last year's actual" approach. The zero-base approach entails a complete reevaluation of the tasks the cost center is to accomplish and the associated resource requirements. Prior-year financial data should constitute a source of historical data but not the primary basis for current-year budgeting. This approach represents a mental attitude rather than a definable technique, but it is an important factor.

Therefore, fixed budgets should be developed using the following steps (all information should be expressed on a monthly basis):

1. Identify the expected level of shop production.
2. Determine the quantity of functions each cost center must provide to serve the needs of the production personnel properly. (This step might not be necessary for all cost centers developing fixed budgets, because their functions do not involve production levels; for example, general administration.)
3. Determine the number and type of personnel necessary to perform the required functions, and calculate labor costs.
4. Determine the fringe benefit costs that will result from the labor requirements identified in Step 3.
5. Determine the costs of necessary materials and supplies.
6. Summarize the fixed budgets and review for reasonableness.
7. Collect the actual costs for each cost center in the same format as the fixed budget.
8. Compare the actual monthly costs for each cost center to its fixed budget for that month.
9. Identify reasons for all significant variances.

The fixed budgets should be prepared by the cost center manager in accordance with policies and other considerations. The data are summarized on a Cost Center Budget Input form and reviewed by the shop cost accountant. Both the shop controller and plant manager must review and approve all budgets.

Departmental Expense Budgets

Data contained in these budgets must be shown in one column of the departmental expense statements. These budgets are also used to develop two types of standard overhead cost rates: one is employed in the departmental expense statements, and the other is used in the job cost reports.

Overhead Cost Rates

Overhead cost rates are typically a percentage charge and are determined from the relationship between the yearly budgeted expense amounts and the yearly estimated direct charges in a department. Rates are established by department for specific expense categories and are used to calculate overhead on the departmental expense statements. The use of categorical rates is a more effective means of monitoring performance, since it allows comparisons to be based on individual expense accounts. The specific overhead categories have been tentatively defined as:

- Indirect Labor - labor which cannot be identified with a specific repair but which involves a service associated with the repair facility operations. The following indirect labor costs were considered in this study:
 - Direct Supervision - car foreman and assistant, mechanical foreman, and gang leaders who are directly involved in repair of cars;
 - General Supervision - master mechanic, regional mechanical officer, general foremen, and supporting office force; and
 - All Other Labor - laborers, machine operators, inspectors, maintenance crews (janitors), and write-up men.

- Indirect Material and Shop Supplies - includes the cost of material and supplies which cannot be charged to a specific repaired unit. The following indirect material and shop supplies were included in this study:
 - lubricants;
 - fasteners;
 - welding supplies and gases;
 - small tools; and
 - fuel and lubricants for vehicles assigned to facilities.
- Shop Operations - items that keep the shop in working order and support repair shop operations. The following shop operations were included in this study:
 - water and sewage;
 - electricity;
 - telephone;
 - equipment rent;
 - fuel and lubricants for highway vehicles;
 - power plant (if applicable);
 - shop switching;
 - stationery and printing;
 - shops and support building;
 - machinery (including power plant);
 - track;
 - assigned shop and highway vehicles;
 - depreciation and taxes on applicable property and equipment;

- . interest on land and building;
- . machinery and track;
- . liability and property damage; and
- . computer and personnel allocation.

TREATMENT OF OVERHEAD ITEMS

Overhead items are discussed in the following pages. The method selected by participating railroads may vary due to individual preferences.

Building Repairs and Maintenance

Building repairs and maintenance costs are accounted for in one of two ways:

- . Actual costs incurred for repairs and maintenance each month are charged to a Building Repairs and Maintenance Cost account which is allocated at the end of each month.
- . A maintenance reserve or allowance account is used.

Under both plans, the departmental distribution of repairs and maintenance costs is often determined by the portion of the building that each department occupies, expressed as a percentage of total area.

Depreciation, Insurance, and Taxes

These costs are collected from records under the control of the following general ledger accounts:

- . Accumulated Depreciation;
- . Prepaid Insurance; and
- . Prepaid or Accrued Taxes.

Fixed charges resulting from the above accounts are analyzed and charged under the proper cost classification. Ledgers for property and plant, insurance, and taxes are maintained in valuation accounting. These records can be used to provide a detailed analysis of the fixed charges for each period.

Building Depreciation Cost

A property ledger is used to classify shop investment, land, buildings, and equipment. This record should show location and cost, with accumulated depreciation. The allocation of building depreciation to departments is based upon three factors:

- . cost of the building;
- . total area of the building; and
- . area occupied by each department in the building.

The cost of the building is obtained from a building and equipment ledger. The building's total area (as well as the area of each department within it) is obtained from an AFE or shop layout showing distribution of floor space. From this information, a worksheet analysis of depreciation can be prepared. This analysis provides the total depreciation charge for each building and the allocation, where necessary, to departments within each building.

Depreciation of Machinery and Equipment

Distribution of depreciation of shop machinery and equipment is made to the different departments based upon the following:

- . cost of the equipment;
- . rate of depreciation; and
- . location of the machinery.

This information is provided by the equipment ledger. A worksheet analysis is prepared which provides the information for the departmental expense distribution.

Insurance

Insurance cost consists of several types of coverage against losses. The insurance register is used to record coverages for equipment and facilities. This cost is charged on the basis of insurable value in each department.

Insurance cost should be collected with all other costs, to be prorated on a floor-space basis and distributed to all departments.

Workmen's Compensation Insurance

Workmen's Compensation and liability insurance cost should be accrued monthly. Distribution of Workmen's Compensation is based upon total shop labor, which includes both direct and indirect labor.

Insurance on Machinery and Equipment

Distribution of the cost of insurance on machinery and equipment is based upon the following factors:

- premium cost; and
- machinery and equipment cost.

The monthly insurance premium cost on machinery is obtained from the insurance register. The cost of machinery and equipment is obtained from the fixed asset ledger sheets.

Building Insurance

The basis for allocating building insurance cost is obtained from:

- premium cost;
- total area of the building; and
- area occupied by each department in the building.

The monthly premium cost is obtained from the insurance register. The distribution is similar to that for depreciation on buildings.

Real and Personal Taxes

Taxes on buildings are segregated from those on personal property. Any special taxes levied by county authorities, such as automobile taxes, are charged as site specific.

Taxes on personal property should be allocated departmentally on the basis of the taxable values in each department.

Taxes on machinery and equipment should be charged to the individual departments, according to the valuation percentage of machinery and equipment in each department.

The taxes on materials and stores should be charged to the stores department.

Building Taxes

The distribution of building taxes is based on the area occupied by each department in a building, although other bases are possible. Where real property taxes are prepaid, the amount applicable to a given year is available from a Prepaid Property Taxes account. If property taxes are due sometime after the beginning of the fiscal year, the amount of taxes applicable to the fiscal year must be estimated. If land taxes are assessed separately from building taxes, it is necessary to prorate land taxes applicable to shop buildings in proportion to the area occupied by the building. Distribution of building taxes is similar to the computations made for other costs handled on an area basis.

Railroad Retirement

Distribution of this cost item can be computed in the same manner as Workmen's Compensation.

The payroll tax rates applicable for a given year are multiplied by the departmental labor distribution totals in order to arrive at the allocation of departmental cost for Railroad Retirement.

Shop Office Supplies

There are two ways to account for this item:

- All purchases of office supplies may be charged to an inventory account when purchased. When supplies are needed, they are requisitioned and charged to the requisitioning shop.
- All purchases of office supplies are charged as a cost directly to the shop for which the purchase was made.

Shop Supplies and Indirect Materials

These include the cost of all materials and supplies that are applied directly to the Equipment Repaired account. The primary cost distribution of supplies is made on the basis of an analysis and a summary of the store's requisitions that show the shops to which the supplies were charged.

Fuel Cost

The purchase of fuel may be accounted for by charging the cost either to an inventory account or directly to a cost account. Under the former plan, allocation of fuel cost to departments is based upon the quantities consumed by each department using fuel. Quantities used are measured or estimated. Where fuel is charged to cost at time of purchase, the departmental allocation will be indicated on the purchase voucher.

General Shop Cost

Most costs can be identified with a functional division or department. Regardless of how departmentalized a shop is, however, costs arise which are general to all departments of a shop. In order to collect these costs, a department or cost-center account entitled General Shop Cost or Factory Service is used.

Scrap Disposal

The cost of disposing of scrap may be charged either directly to the department producing the scrap or to Building Occupancy or General Shop Cost.

Indirect Labor

In the broadest sense, indirect labor refers to labor cost that cannot be specifically or directly associated with jobs or products. The distribution of indirect labor cost is obtained from an indirect labor or payroll distribution sheet.

Interest on Investment

Whether imputed or implicit interest on investment should be considered a cost of repair is an unsettled question. If such interest is to be included, the charge for interest on building investment would be prorated on the basis of space occupancy, and the charge for interest in investment in machinery and equipment would be prorated on the basis of the location of these assets.

Utilities (Electricity, Gas)

The cost of utilities can be prorated on the basis of meter records of consumption or, lacking meters, on the basis of capacity of equipment and facilities. If a record of the use of equipment is not maintained, the distribution may be performed solely on the basis of the capacity of the equipment and shop. In some cases, the use of portable meters in each facility for limited periods is an economical method of obtaining an equitable basis for prorating utility costs.

Small Tools

Three basically different methods are used to allocate the cost of small tools. At the time of purchase, such tools may be: (1) capitalized in a Small Tools account, (2) charged to Stores, or (3) charged to expense.

Capitalization Method

All purchases of small tools can be capitalized in a Small Tools account which is considered a fixed asset. Depreciation is applied in order to establish annual and monthly amounts to charge off as expense. It is difficult to administer this method properly due to the variation in (and the uncertainty of) the length of life of many different small tools. Under this method, the monthly allocation of small tools cost is similar to that used for depreciation of machinery and equipment.

Charging to Stores

All small tool purchases can be charged to a stores inventory. As tools are needed, they are requisitioned and charged to the proper department. Analysis of the requisitions provides a means of allocating the cost to departments.

Charging to Expense

Small tool purchases can be charged to expense at the time of purchase. This method is popular because of its simplicity. Analysis is made of all purchase vouchers which indicate a charge to the account for Small Tools, in order to allocate the charges to the several facilities.

Telephone

If a record of telephone calls by facility is kept, telephone cost can be distributed with considerable accuracy. In many cases, it is only the cost of long distance calls that can be identified on a facility basis. The basic monthly charge for local service can be allocated on the basis of the number of telephones in the facility or by means of a special study of telephone use.

Water and Sewage

When water is purchased from a public utility, the statement rendered is based on meter readings. If bills are rendered only quarterly, however, the monthly cost must be estimated. The schedule of rates provided by the utility company can be used to ascertain the estimated water cost.

FINAL STEP AFTER DISTRIBUTION OF OVERHEAD

After all service department costs have been distributed under these or other methods, the total service costs are entered in the repair department accounts. The repair department cost totals now represent the direct repair department costs and indirect service costs distributed to repair departments.

These amounts can be used to obtain applicable overhead rates for assigning the departmental cost to repairs. If predetermined rates are used, the repair department cost totals will be compared with charges to repair to determine the amount of overabsorbed (or underabsorbed) departmental overhead.

Labor Budgets

Direct labor budgets must be developed carefully on a cost center/departmental basis. The data provide the input for the planned labor costs on the departmental expense statements and are also used to establish the labor cost rates. The development and use of the specific rates are discussed below.

Actual Employee Cost Rates

This rate is the employee's actual hourly wage rate and will be used to value labor on the job cost reports and departmental expense statements. It excludes all fringe benefits and related payroll costs, since these items have been defined as overhead. These exclusions provide a "pure" labor rate, one which represents the controllable portion of the employee's total wage cost. The use of a fully loaded labor rate could complicate the variance analysis by introducing timing differences.

Standard Activity Cost Rates

A per-hour activity rate must be developed for each direct labor activity. Cost rates are not developed for indirect labor activities since these functions have been defined as overhead. Activity rates represent an average cost that is calculated from the actual employee rates of those individuals who typically perform the activity in question. If there is a significant range in the actual cost rates, it is suggested that more than one activity rate be established and the required differentiation be accomplished through the activity coding. Standard activity cost rates will be used to value earned labor dollars in the job cost reports and departmental expense statements.

Material Budgets

Budgets for materials have a dual purpose. First, the individual budgets are used to develop standard cost and standard billing rates. Second, these budgets contribute collectively to the establishment of a standard purchasing and warehousing cost rate.

Standard Purchasing and Warehousing Overhead Cost Rates

A standard rate must be defined so that these costs can be allocated to jobs. It is based on the yearly budgeted expenses and is calculated by dividing the total budgeted departmental costs by the total budgeted material purchases. As a result, purchasing and warehousing costs will be charged to materials and supplies.

Standard Material Cost Rates

Materials associated with recurring jobs will be classified as standard materials. Once the specific materials have been defined and the appropriate component base selected, standard cost rates can be calculated. These items will be carried in inventory and charged to jobs at their standard cost rates. Consequently, any variances in material price will be recognized at the time of purchase and will not appear on the job cost statement.

Estimated Material Cost Rates

This rate is identical to the standard cost rate except that it applies to the materials used for one-time jobs. Both rates are used to determine the earned material costs found in the job cost statement. Standard cost rates are not developed for these items because a wide variety of materials are used in one-time jobs and it would be impractical to attempt to establish standard rates.

Actual Material Cost Rates

Actual cost rates are also used to value material for one-time jobs. One-time job materials will be carried in inventory and charged to jobs at their actual cost. Since two cost rates are used--actual and estimated--a material price variance will be shown on the job cost statement. This format was selected since the term of these jobs is relatively short and both the purchasing and productive effort can be effectively reviewed using this concept.

LABOR REPORTING

The labor reporting component captures labor data and labor hours which are a major system input. Direct labor efforts will be defined in terms of charged and earned hours. Charged time is equal to the actual hours that an employee devotes to either direct or indirect labor activities. Earned hours are derived from the actual output of direct labor. For activities where no defined CRB code exists (fabrication and special work), earned hours will be calculated from the estimated time that was budgeted for the task. In these instances, an employee's charged time will equal his earned time until the total amount of budgeted time has been consumed. At this point, he will no longer be able to earn time. As a result, earned hours for activities where no code exists will exceed charged time only if the activity has been completed and the actual time required to complete the activity was less than the amount that was budgeted.

Source Documents

Labor data will be obtained from an employee's time card. The recommended contents of this document are:

- Employee - the employee's name and code;
- Date - the date the work was performed;
- Employee Location - the division, department, and cost center to which the employee is assigned;
- Job Number - the numeric identification of a particular job;
- Labor Functions - the direct and indirect labor activities that were performed;
- Hours Charged to Jobs (direct labor) - hours classified as regular time, overtime, or double time, and reported by direct labor activities;
- Hours Not Charged to Jobs (indirect labor) - hours classified as regular time, overtime, or double time, and reported by indirect labor activities;
- Results - the repairs performed, which applies to those direct labor functions in which production counts will determine earned efforts; and

- Supervisor Approval - the name of the supervisor who approves the employee's time card.

Operating Procedures

Time cards are to be completed on a daily basis by all employees and should be approved by their supervisor. Before submitting the time cards to data entry batch control, totals will be used to verify the time entered into the system. A detailed description of this procedure is contained in Appendix A.

V. JOB COST ESTIMATING

The job cost estimating component is the foundation of the Cost Information System. This component combines standard usage, production, and cost rates with a job's specific requirements to estimate job costs. The estimates are used in calculating job profitability and establishing standards. The production and wage rates enable the System to calculate the earned amounts. These features will allow management to evaluate the efficiency and utilization of the productive resources.

SOURCE DOCUMENT

Two source documents support this component. Both documents identify the client, estimated volumes, type of repair efforts, and job elements and provide a general description of the overall job. The differences in the documents concern the level of detail. Sample source documents are presented in Appendix B. The following paragraphs describe their functions.

Job Cost Request

The job cost request document shown in Exhibit V-1 identifies a broad basis, the direct costs associated with a job. Direct labor costs are based on departmental involvement and are not defined by the required repair activities. In most instances, this information is sufficient to determine the profitability of an order. For example, it may be agreed that, for jobs under a set dollar amount, a "Yes" or "No" decision can be reached. If the decision is "Yes," the job will be entered into the System without any further processing. In this way, basic information is provided for all jobs, regardless of their size.

Job Cost Estimate

The job cost estimate document shown in Exhibit V-2 is required for all jobs that exceed a set dollar amount, but can be used for any job. The job cost estimate provided a greater level of detail than the job cost request. It defines job requirements by the type and amount of efforts required. Inputs are defined in terms of standard production, usage, and cost rates; these definitions are essential to the calculation of the earned amounts. This level of detail will assist management in determining the manpower requirements and scheduling production.

EXHIBIT V-2
JOB COST ESTIMATE DOCUMENT

JOB COST ESTIMATE

REQUEST NUMBER _____

ESTIMATE NUMBER _____

DATE _____

SUBMITTED BY _____ **ESTIMATED VOLUME** _____

DESCRIPTION OF WORK _____

		PRICE	TOTAL DIRECT.	OND ADDITIVE	TOTAL COST
DIRECT LABOR ACTIVITIES (BY REPAIR CODE)					
.					
.					
.					
.					
MATERIAL (BY CRB NO.)					
.					
.					
.					
.					
TOTAL LABOR, MATERIAL AND OVERHEAD ADDITIVE					XXXX

OPERATING PROCEDURES

A job cost request must be completed by the mechanical officer and reviewed by the supervisor, at which point a "Yes" or "No" decision is made. If the decision is "Yes" and the dollar value exceeds a certain amount, a job number is assigned and the job is entered into the system. If further detail is required, the job cost estimate is completed before the job is formally entered into the system. A detailed procedural flow is provided in Appendix B.

VI. FINANCIAL ACCOUNTING PROCEDURES

Although the Cost Information System is primarily a source of repair-related cost data, the system also affects financial or general accounting activities, particularly the corporate accounting system.

GENERAL LEDGER

Currently, few repair shops have a general ledger accounting system; however, the Cost Information System will use a form of double-entry general accounting. This procedure is necessary not only to control data flow through the system, but also to provide the shop with the ability to implement profit center accounting.

For the participating carrier, it is likely that all shop costs are recorded in the corporate accounting system. This will continue when the Cost Information System is implemented. The System provides "control" accounts to which its own "subsidiary" accounts will be integrated. Without this link, corporate accounting would be incomplete, and the two systems could not be reconciled at month's end.

To provide this control, the shop general ledger contains an equity account called "corporate control." This account reflects all shop transactions and is related to corporate accounts. Exhibit VI-1 demonstrates the recording of major transactions, and shows how they will appear on both the corporate accounts and the shop accounts.

The general ledger chart of accounts is designed to support both the Cost Information System and profit center accounting. The numbering structure and logic of the accounts presented in the chart will support the System. The number of accounts and numbering structure will require expansion, however, when the profit center concept is implemented.

COST CODE ACCOUNTING

Currently, some carriers' accounting system records code cost information at the time that costs are incurred. At the end of each month, all the costs incurred at the shop will be located in one of several accounts:

- . raw material inventory;
- . component inventory;

EXHIBIT VI-1

JOURNAL ENTRY SYSTEM

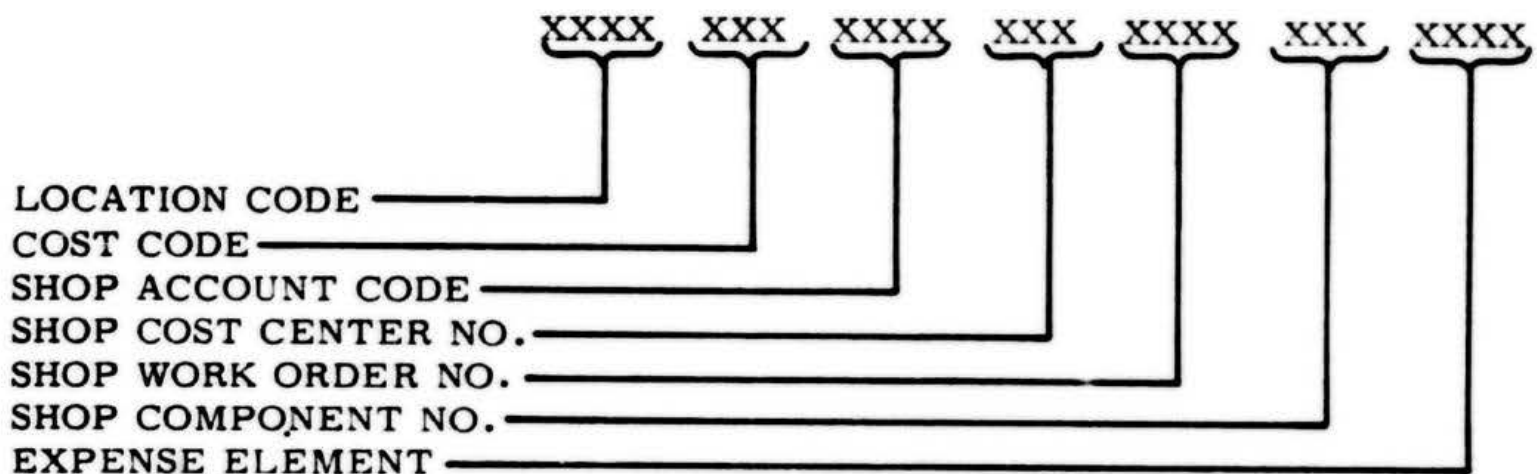
ITEM	SHOP GENERAL LEDGER	CORPORATE ACCOUNTS
1. To record receipt of direct material	DR - Inventory CR - Control Account	DR - Shop Inventory CR - Stores (No Entry for inventory from vendors)
2. To record payment to vendors for purchase of direct material	No Entry	DR - Shop Inventory CR - Cash or A/P
3. To record issue of inventory from Shop storeroom	DR - Direct Material Expense CR - Inventory	DR - Shop Cost Control CR - Shop Inventory
4. To record payroll cost (both direct and indirect)	DR - Labor Expense CR - Control Account	No Entry
5. To record payroll paid	No Entry	DR - Shop Cost Control CR - P/R Liability Accounts CR - Cash
6. To record payment of expense (other than direct material and labor)	DR - Various Expense Accounts CR - Control Account	DR - Shop Cost Control CR - Cash or A/P
7. To accrue costs at month end (labor, material and expenses)	DR - Various Expense Accounts CR - Control Account	DR - Shop Cost Control CR - A/P and other Liability Accounts
8. To reverse last month's accrual of costs	DR - Control Account CR - Various Expense Accounts	DR - A/P and other Liability Accounts CR - Shop Cost Control
9. To record "value added" inventory	DR - Inventory CR - Various Expense Accounts	DR - Shop Inventory CR - Shop Cost Control
10. To record shipment of finished product	DR - Control Account CR - Inventory	No Entry
11. To record billing to customer	No Entry	DR - A/Rec. CR - Billed Repairs DR - Cost of Repairs CR - Inventory
12. To record cash received from customers	No Entry	DR - Cash CR - A/Rec.
13. To close accounts at end of year	DR - Control Account CR - Various P/L Accounts	DR - Billed Repairs CR - Shop Costs CR - P/L Summary Account

- . work orders-in-process inventory; and
- . cost of completed work orders.

This information and the cost codes for completed work orders should be communicated monthly to the accounting department.

CODING

To provide this integration, the participating carrier's coding structure may require modification. A sample structure is outlined below:



The location and cost codes will not be used by the shop accounting system, but will be used to facilitate the accounting done at the corporate accounting level.

The expense element comprises two cost groupings:

- . labor - both direct and indirect labor are reported using a 2-digit prefix.
- . expense elements - all costs other than direct and indirect labor. These elements have no prefix.

The technique used to apply this coding structure will depend on the programming approach applied; perhaps some coding can be done during computer processing. However, the logic of this coding structure is necessary for complete accounting integration.

Because shop personnel are most qualified to do the coding, all vendor invoices and other data input documents will be cycled through the shop before being processed through the corporate accounting system.

PAYROLL

The processing of shop payroll will continue at the corporate level when the System is implemented. The labor data collected throughout the shop for payroll purposes will also provide information for the System. This shop input will be tied to employee time cards on a daily basis to verify the payroll's accuracy.

The corporate payroll system provides the labor expense input for both the Cost Information System and the corporate accounting system.

CORPORATE CHARGES

The System can handle all charges from the corporate office for accounting, computer services, mechanical assistance, and so forth. These items are treated the same as other vendor charges, going through the same coding procedures.

These items, as well as other expenses, are processed within an accounts payable system operated at the shop, with the following procedures:

- . File open purchase orders alphabetically by vendor as received.
- . File receiving reports alphabetically by vendor as received.
- . Match vendor invoices with appropriate purchase orders and receiving reports.
- . Verify quantities, prices, extensions, and footings.
- . Code for processing.
- . Secure necessary approvals.
- . Process accounts payable for payment.
- . Cancel "paid" documents and file.

PROFIT CENTER ACCOUNTING

The Cost Information System was designed with sufficient flexibility for the shops to become profit centers at some future time if management desires. This flexibility permits accounting for charges for services to the

shop and charges to other corporate entities. However, before profit center accounting can be initiated, further study will be required to establish corporate policies and procedures for the transaction methodology, such as transfer pricing, billing, budgeting, and corporate charges.

ACCRUED PERSONNEL COSTS

Certain personnel-related costs, which are paid at one time, actually are incurred throughout the year. For example, vacation is a cost experienced on a constant basis as the employee works, even though the vacation payment is made annually (or periodically). Other examples are holiday, sick leave, and authorized time off. These and similar expenses should be accounted for on an accrued basis. An annual estimate of these costs should be calculated, and one-twelfth of the estimated cost should be expensed monthly. At the time the cost is paid, the expenditure is charged to the accrued liability and not the operations for the month of payment.

MONTHLY CLOSING PROCEDURES

The monthly closing process, if functioning properly, can contribute to presenting management information accurately and on a timely basis. Three tools are basic to controlling this process:

- closing schedule - a preset control sheet which itemizes tasks to be performed, persons responsible, and due dates for the closing. These tasks include data summarization, journal entry preparation, and account reconciliation. The following is a more detailed list of steps to be included in the closing schedule:
 - complete postings of source transactions for labor, material, and accounts payable;
 - prepare necessary adjusting journal entries for accruals and corrections;
 - verify all data entered to the System;
 - verify System data interfaced with corporate accounting;
 - prepare reports and financial statements;

- verify that report totals tie to data input controls;
and
- prepare necessary analyses and reconciliations,
including budget variances.
- receiving cutoff control - a procedure to ensure proper cost recognition for materials received.
- expense control list - a procedure to ensure proper cost recognition for expenses other than materials or direct labor.

Before a monthly close is complete, the shop controller should review these three items and sign off on their completeness.

INVENTORY VALUATION

Balance sheet presentation of inventory valuation will be assisted by the System, because it relates to inventory quantities in the inventory control system.

CONTROL REVIEW

All of the System's controls require the human element to function properly. An employee should be assigned responsibility for reviewing the controls to ensure that they are functioning correctly and that any necessary corrective action is taken.

Expense Control List

A control list of major expenses should be developed and reviewed monthly. This list should include the expense item and name of the expected vendor. Typical items on this list could be insurance premiums, electricity, gas, maintenance services, and corporate charges. If in a given month an expense item has not been received, the expense must be accrued. This accrual should prevent an unnecessary or uneven flow of expenses. The shop's controller should supervise this procedure.

Receiving Cutoff Control

It is important that costs be recorded in the proper accounting period. For example, assume some components are returned from outside processors and consumed in production, but for some reason the vendor's bill is

delayed until the following month. In this example, the prime mover component average cost would be distorted at two points: when throughput occurs and when the cost is recorded.

This problem can be eliminated by establishing a receiving cutoff control. A receiving report form is completed by the receiving department when it logs goods. At month's end, the accounting department will verify that the cost for all goods received in that month have been received and booked. An accrual should be made for those items that have been received but have not been billed by vendors.

All of these accruals will be recorded on one standard journal entry each month. The following month, the journal entry will be reversed, and each of the items reviewed again. If the vendor's invoice has been received and processed, no further action is required. However, if the vendor's invoice has still not been received, the item should be reacrued.

By following this procedure, cost is consistently recognized in the month incurred. In the subsequent month, the entries have a "wash" effect. The reversal of the accrual journal entry offsets the charge from either processing the vendor's invoice or reacruing the cost.

Scrap

A monthly reconciliation procedure is necessary to verify the revenue received from scrap dealers. As materials are scrapped, a scrap ticket is completed that reports the description, quantity, and other significant data. These tickets will be summarized by dealer and type of material. Tickets will be reconciled monthly to the revenue received, and all discrepancies resolved.

VII. IMPLEMENTATION

A series of preparatory activities must be carried out by railroad management before implementing the Cost Information System. Because the System's implementation and operation will involve personnel in many departments, careful control of these activities is important. One staff member should be designated project manager to coordinate the efforts of everyone involved.

TASKS FOR THE SHOP

Conduct Orientation and Training

Because of the comprehensive nature of the System, all operating departments will need to participate in an intensive orientation and training program in data input, error correction, reconciliation, and report use and interpretation. This orientation and training program should include:

- . general review of the System's operation;
- . detailed review of reporting responsibilities;
- . detailed review of error correction responsibilities;
- . use and interpretation of output reports; and
- . review of the performance responsibilities for each of the operating groups.

The data processing staff will require special orientation and training. This program should include an introduction to the computer software facilities that are required to program and operate the system properly as well as training in their use. Special orientation and training for the accounting staff will also be required. Topics covered in this training should include:

- . familiarization with the new ledger and coding procedures;
- . accounting control techniques and procedures;
- . reconciliation procedures; and
- . corporate reporting procedures.

These orientation and training programs should be conducted throughout the implementation period on a regularly scheduled basis. In this manner, new developments and procedures can be implemented on a phased basis with a minimum impact on the shop's operations.

Set Documentation Standards

Before files, report formats, input documents, or computer programs are designed in detail, the standards for system documentation must be established. These standards should include:

- . naming conventions for files, programs, and reports;
- . library organization for program libraries and current and historical data files;
- . flowcharting approaches, formats, and symbols;
- . report formats;
- . operator instructions; and
- . file descriptions.

These standards should be consistent with the corporate documentation standards already being used.

If these standards are developed and adhered to during implementation, the end product, an operational system, will be easier to operate, maintain, understand, and modify.

Finalize External Interfaces

The details of the interface between the Cost Information System and systems external to it must be finalized before implementation can begin.

Finalize Output Reports

The format of the output reports and any additional reports must be finalized before implementing that portion of the System which produces the reports. The frequency of reports and their distribution must also be finalized before the System is put into operation.

Finalize Input Documents

The format of input documents, the number of copies, and their distribution must be finalized before the data entry modules can be designed. When the format has been finalized, small quantities of each form should be ordered for trial run purposes so that any problems may be corrected before ordering a permanent supply.

Establish Physical Controls

Before programming the System, the edits for all inputs documents must be agreed upon and finalized. Retention periods for all documents should be established. Data storage media and their physical control and security should be established along with retention periods for all off-line computer files.

Established Data Controls

Control of the data in the System is essential to the System's operation and reliability. The nature of the controls will depend on the actual system design; however, the following items should be considered:

- . Input Controls:
 - . batch control techniques;
 - . machine verification of (important) data fields;
 - . control of data conversion from one form to another;
 - . data transmission controls; and
 - . control of error correction and reentry of data.
- . Programming and Processing Controls:
 - . verification of all transactions received and processed;
 - . computer checks for logical data validity tests;
 - . verification of sorting accuracy;
 - . tests for internal header and trailer labels; and

- . tests to ensure that applications are run in proper sequence.
- . Output Controls:
 - . use of header and trailer labels;
 - . reconciliation of control totals (computer totals to pre-determined totals); and
 - . control over error corrections and adjustments to the master file.
- . File Controls:
 - . control totals on each file, and verification each time the file is processed; and
 - . procedures for periodically checking the contents of master files (printouts and review, physical counts, etc.).

Define Files

Before programming each module, the files used and created by the module must be defined. They should be defined in accordance with documentation standards and should include the following parameters:

- . contents;
- . format, including expansion provisions;
- . organization and access method;
- . history files, including retention periods;
- . recovery from data destruction or loss;
- . standard file descriptions;
- . design and programming of file maintenance programs; and
- . creation of test files.

Identify Individual Programs in Each Module

Before programming can begin, the individual programs within each module must be identified; each program may then be designed. The design should include:

- . identification of input files;
- . identification of output files and reports;
- . frequency of program operation;
- . sequence of the program within the module; and
- . detailed logic flowcharts.

Program Modules

When all preliminary steps have been completed for each module, programming on that module may begin. Each module will be programmed, debugged, and tested while it is in the programming phase.

Create Master File

The master files on which the System depends must be created before putting into operation any module which uses the file.

Parallel Operation

Where a module of the Cost Information System is replacing an existing system, the new programs must be run parallel with those of the old system until the project manager is confident that the new module is error free. This step will be particularly important for the payroll system and related applications. At the conclusion of this step, the module will be fully operational.

RECOMMENDED SEQUENCE FOR IMPLEMENTATION

To obtain the earliest possible benefits from the System, a modular or phased implementation is recommended. The sequence in which modules will be implemented should be established at the beginning of the implementation project. For ease of implementation, the following sequence is recommended:

- . labor reporting, including interface with the payroll system;

- . material reporting and inventory;
- . overhead allocation;
- . component inventory;
- . work order reporting;
- . estimating system; and
- . component standards .

Exhibit VII-1 illustrates the preliminary time schedule for complete implementation. If this schedule can be adhered to, the complete System will be operational within approximately 4 months. This assumes, of course, that no major modifications or changes are necessary to accommodate a carrier's existing financial systems.

EXHIBIT VII-1

IMPLEMENTATION SCHEDULE

PHASE	START	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5	MONTH 6	MONTH 7
General Orientation and Training								
Documentation Standards								
External Interfaces								
Physical Controls and Security								
Labor Reporting								
Material Reporting and Inventory								
Overhead Allocation								
Component Inventory								
Work Order Reporting								
Estimating System								
Component Standards								

VII.7

APPENDIX A
LABOR REPORTING PROCEDURES

EXHIBIT A-1

LABOR REPORTING PROCEDURE

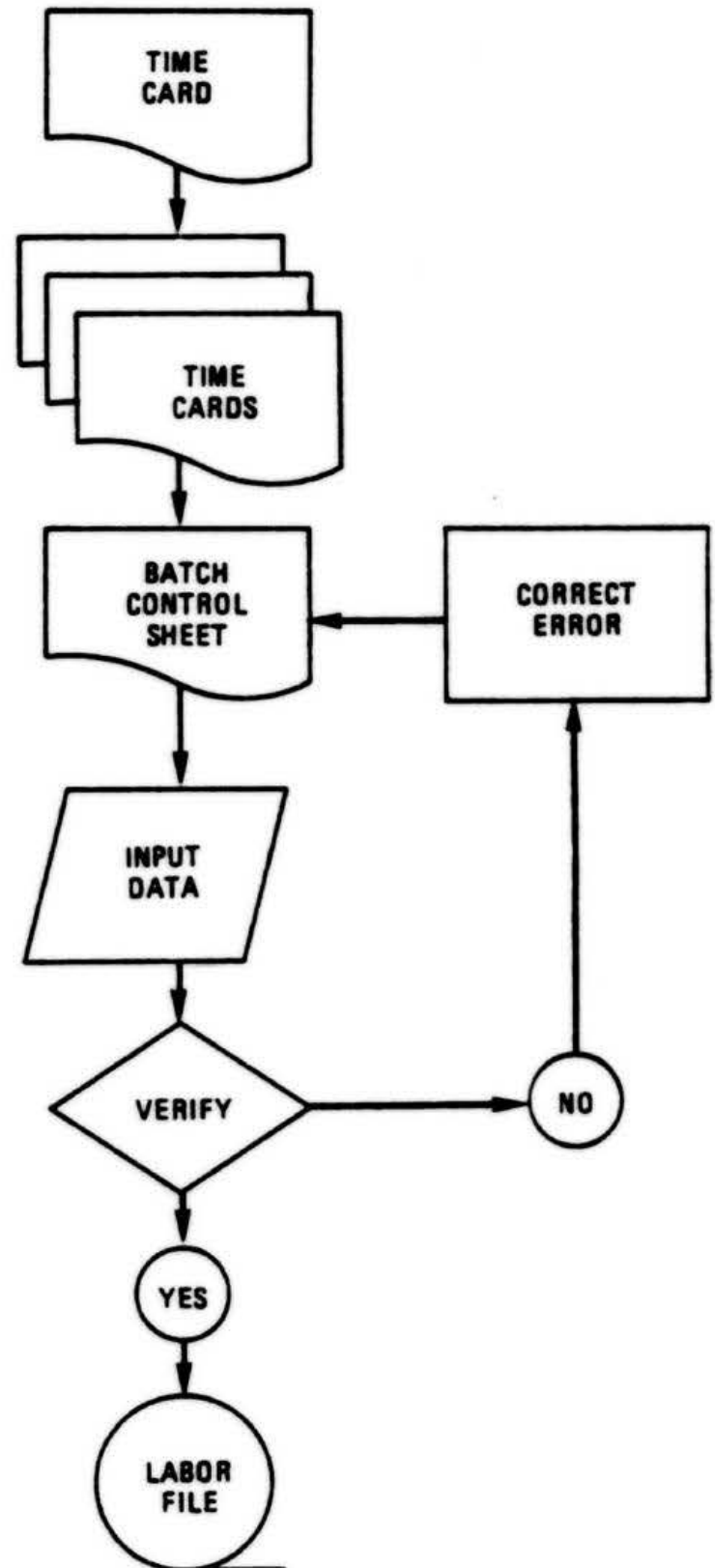
EMPLOYEE COMPLETES TIME CARD
EMPLOYEE NAME
HOURS
JOB NUMBER - ACTIVITY

SUPERVISOR
EDITS AND APPROVES TIME CARDS

ACCOUNTING
CREATE BATCH TOTAL

DATA PROCESSING
ENTER DATA

VERIFY DATA TO BATCH CONTROL TOTALS



APPENDIX B
JOB COST ESTIMATING PROCEDURES

JOB COST ESTIMATING PROCEDURES

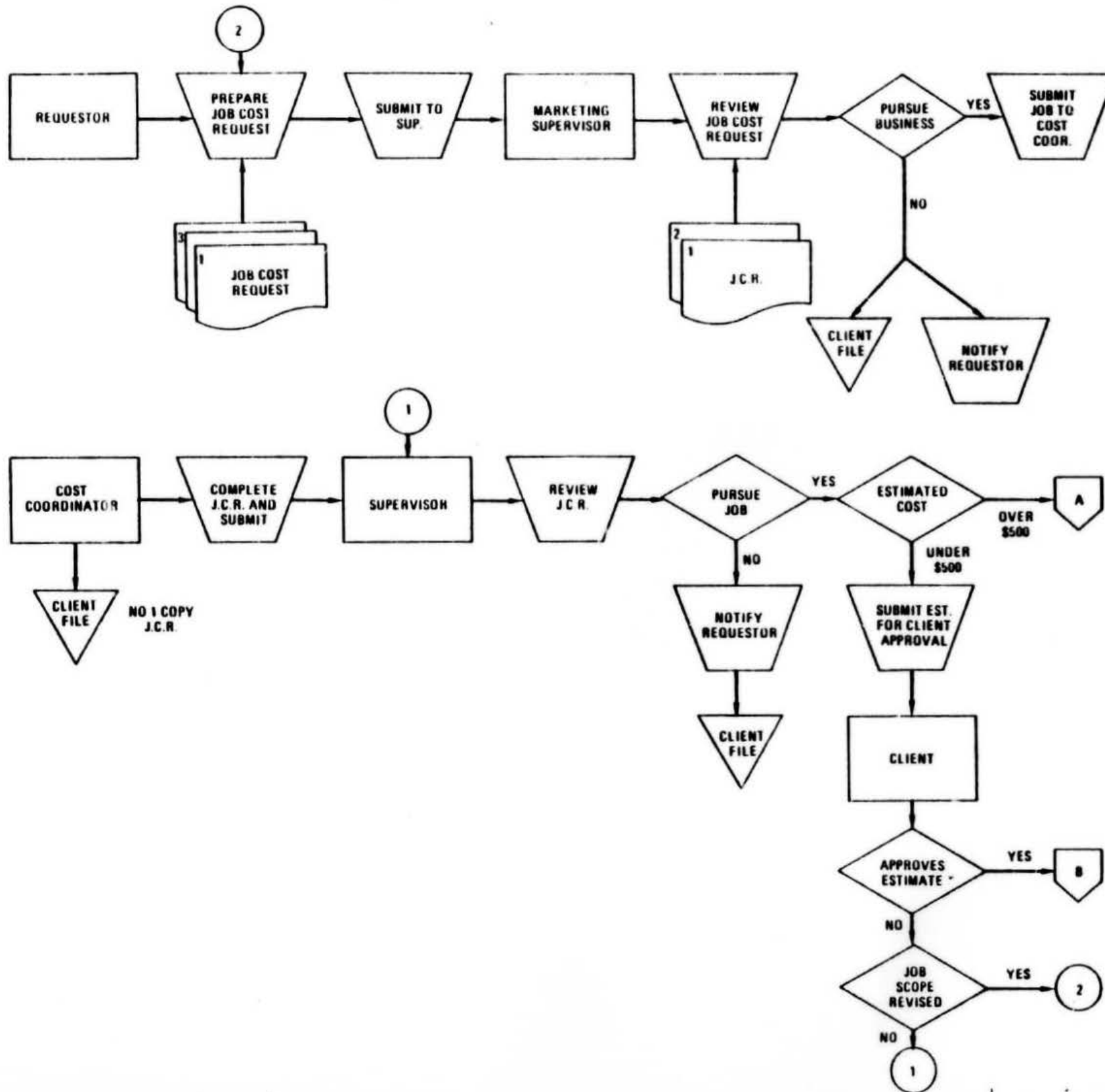
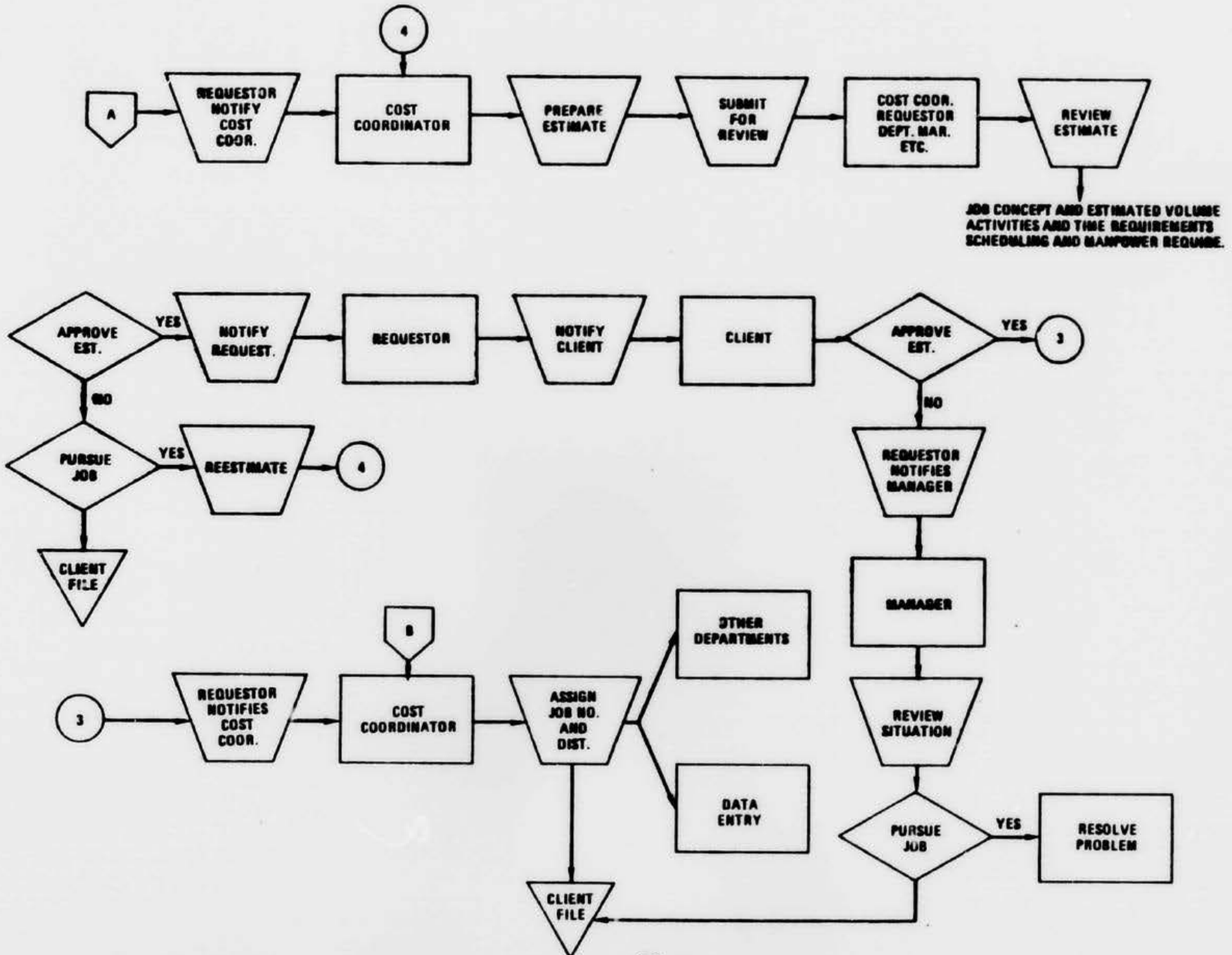


EXHIBIT B-1 (Continued)



B.3

NOTE: This section has no content

APPENDIX C

DIRECT AND INDIRECT LABOR ACTIVITIES

(will be defined when participating carrier is selected)

NOTE: This section has no content

APPENDIX D

DEPARTMENTS AND COST CENTERS

(will be defined when participating carrier is selected)

NOTE: This section has no content

APPENDIX E

MATERIAL CLASSIFICATIONS

(Defined from AAR Standard Bill of Materials)

APPENDIX F
CHART OF ACCOUNTS

APPENDIX F
CHART OF ACCOUNTS

<u>Balance Sheet</u>	
<u>Assets (1000)</u>	<u>Account No.</u>
<u>Current Assets (1100)</u>	
Cash and Cash Equivalents (1110)	
Short-Term Investments (1120)	
Receivables (1130)	
Inventory (1140)	
. Raw Material	1141
. Components	1142
. Work Orders-in-Process	1143
. Finished Production	1144
Payments and Deferred Charges (1150)	
Other Current Assets (1160)	
<u>Fixed Assets (1200)</u>	
Assets at Cost (1210)	
Accumulated Depreciation (1220)	
<u>Other Assets (1300)</u>	
<u>Liabilities and Capital (2000)</u>	
<u>Current Liabilities (2100)</u>	
Payables (2110)	
Accrued Expenses (2120)	
Employee Withholdings (2130)	

Account No.

Noncurrent Liabilities (2200)

Reserves (2300)

Capital (2400)

Corporate Investment (2410)

. Corporate Cost Control

2411

Revenue and Expense (3000)

Sales (3100)

Gross Billings (3110)

Penalty Credits (3120)

Freight-Out and Discounts (3130)

Cost of Sales (3200)

Shop Costs (3210)

. Shop Costs

3211

Manufacturing Expense Control (3300)

General and Administrative Expense Control (3600)

Other Income and Expense (3700)

Other Income (3710)

Other Expense (3720)

Profit and Loss Summary (3800)

EXPENSE ELEMENTS

DIRECT LABOR

See Direct Labor Codes (developed when carrier reviewed)

INDIRECT LABOR

See Indirect Labor Codes (developed when carrier reviewed)

SALARIES

0003 Supervision
0004 Clerical

PREMIUM PAY

0011 Overtime Premium
0012 Shift Differential

EMPLOYEE BENEFITS

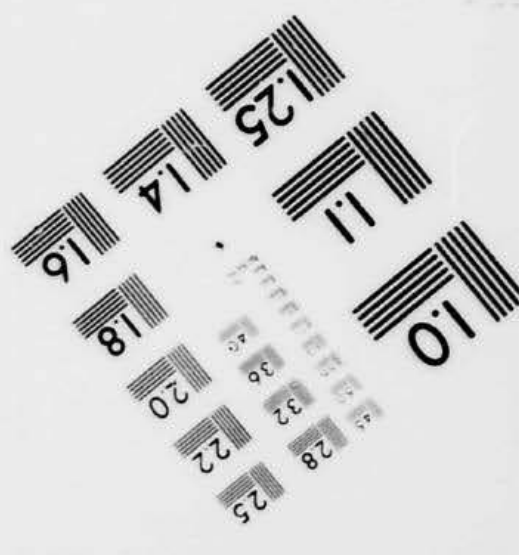
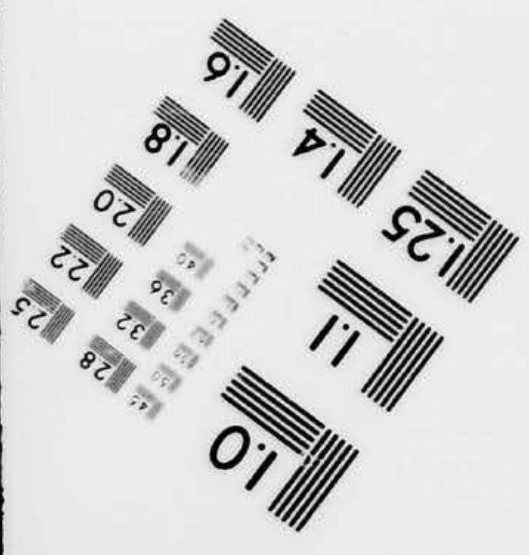
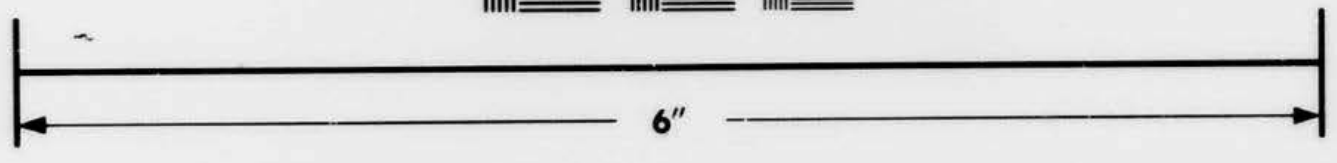
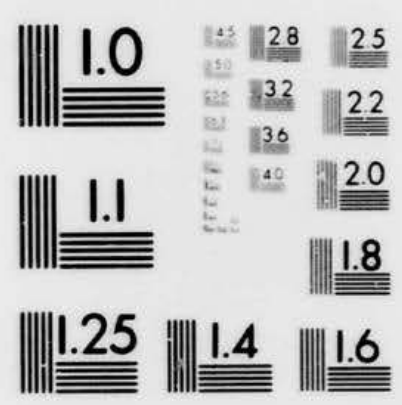
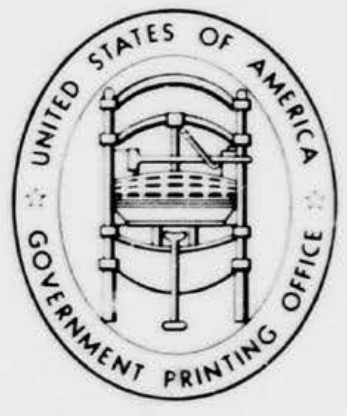
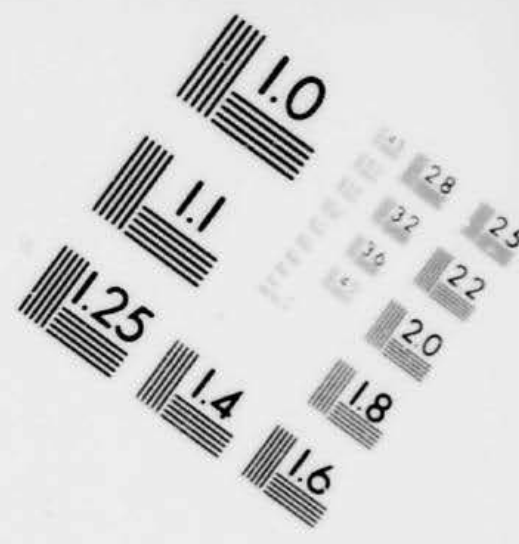
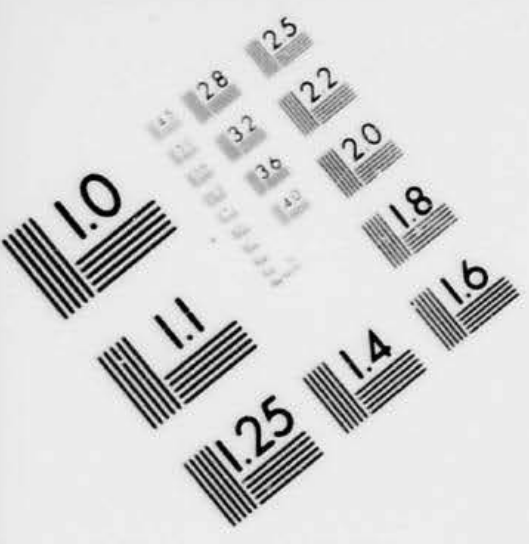
0021 Vacation
0022 Holiday
0023 Group Insurance
0024 Pension
0025 Workmen's Compensation
0026 Payroll Taxes
0027 Employee Relations

SUPPLIES AND SERVICES

0031 Manufacturing and Operating Supplies
0032 Repair and Maintenance Supplies
0033 Perishable Tools
0034 Gas and Oil (Plant Vehicles)
0035 Printing, Stationery and Office Supplies

SUPPLIES AND SERVICES (Cont.)

0036 Utilities
0037 Professional Services
0038 Outside Services
0039 Postage
0040 Telephone and Telegraph
0041 Travel and Entertainment
0042 Dues and Subscriptions
0043 Depreciation
0044 Rental - Real Property
0045 Rental - Equipment
0046 Trucks and Autos
0047 Taxes (Other than Income)
0048 Insurance
0049 Miscellaneous Expenses
0050 Overhead Cost Received
0051 Overhead Cost Allocated



END

July 14, 1981