

AN ABSTRACT OF THE THESIS OF

John R. Vacca for the Master of Business Administration
(name of student) (degree)

in Business Administration presented on December, 1978
(major) (date)

Title: Inventory Control in the Railway Industry

Abstract approved: *George K. Walters*

STATEMENT OF THE PROBLEM

The purpose of this study was to determine the most acceptable methods and procedures to control inventories in the Railway Industry, with special emphasis on the acquisition and disbursement of materials and supplies used in the daily operations of the U.S. railroads. The procedures will help to provide the answers for the current practices of the U.S. railroads in relation to the following questions:

1. Are inventory quantities adequately protected against losses from theft, obsolescence, spoilage, and unauthorized withdrawals by employees?
2. Is there separate-item accountability for both material and dollars for inventory quantities received, on hand, and issued?
3. Does proper authorization exist for inventory removed from stock?
4. Does control exist for accounting activities in the inventory records, cost accounting records or general ledger?
5. How is the accuracy of the inventory account balances verified?
6. Who is responsible for approving all major inventory adjustments?
7. Are fungible materials stored in identifiable lots and adequate records maintained?
8. Do inventories that are subject to considerable variation during the year require a periodic review?

ABBREVIATED METHODS OF PROCEDURE

The procedure for completion of this research study involved the study of related literature and various inventory methods being used to implement inventory control in the railway industry. The step-by-step method of procedure was as follows:

The basic concepts of inventory control were learned through on-the-job training; through attendance at a workshop; through attendance of a seminar; and through extensive library research. A study of inventory control in the railway industry was done through library research and personal interviews. Letters and questionnaires were sent to western, eastern, and southern U. S. railroads that were known to be developing new methods of inventory control.

SUMMARY

The most pertinent material relating to the inventory control system developed through this study was found in questionnaires that were returned by a number of U. S. railroads and related literature.

The railway industry's cost systems are summarized with a view toward determining the accuracy of the figures for inventory costs resulting from the method of cost accumulation in force.

General ledger controlling accounts were maintained by a number of railroads. Most of the railroads separate materials and their records, and trace receipts and issues, so theft is left as the only method of fraud possible, and it is usually discoverable.

Purchase orders for goods and materials have usually been placed as needed and for optimum quantities by most railroads.

Most railroads try to detect material or merchandise which is defective or otherwise fails to meet company standards.

Careless counting of quantities resulting in shipping more goods than are charged to a railway's storepoint is discouraged.

Effective control and management of the railway industry depended heavily on use of adequate reports covering all activities relating to inventories.

CONCLUSIONS

1. Differences between book and physical inventories were ascertained, differences adjusted, and the amount of overage or shortage were properly accounted for.

2. All transactions pertaining to the issue of the inventory quantities were accounted for and entered in the controlling records.

3. An evaluation of the possibilities for errors in the inventory compilation system indicated that footings, extensions, and recapitulations of the inventory were rechecked by railway employees independent of those making the original computations.

4. Inventories subject to considerable variation during the year, required a periodic review to assure adequate coverage.

RECOMMENDATIONS

1. Control over all outward movement of materials should be centered in the store department, which should operate under the general requirement that nothing is to be released from the department without written authorization.

2. General ledger perpetual inventory records should be used for the preparation of interim financial statements.

3. Count tags or tickets should be prenumbered and all numbers accounted for as soon as the tickets are turned in to ascertain that no tickets are omitted from the final inventory figures.

4. Annually, when the physical inventory is taken, variances between book balances and the physical inventory should be reported.

5. Extensions and footings should also be tested by the internal auditors, and they should verify the inventory variances developed from the comparison of the book and physical inventory amounts.

INVENTORY CONTROL IN THE
RAILWAY INDUSTRY

A Thesis
Presented to
Division of Business
And Business Education
Emporia State University
Emporia, Kansas

In Partial Fulfillment
of the Requirements for the Degree
Master of Business Administration

by
John R. Vacca
December, 1978

George Walters

Approved for Major Department

John Lubbo

Committee Member

John J. Preston

Committee Member

Harold Edwards

Approved for Graduate School

398857

DATA PROCESSING

SEP 1967

ACKNOWLEDGMENTS

Sincere appreciation is extended to Dr. George Walters, Dr. Stephen Butcher, and Dr. William Preston for their encouragement, suggestions, and helpful criticisms given during the preparation of this study.

Special thanks are given to the top management of the U.S. railroads for returning the questionnaire used in this study.

Special thanks are extended to my wife, Linda, and my daughter, Wendy, for their patience, help, and encouragement during the preparation of this study.

TABLE OF CONTENTS

	Page
List of Tables	vii
Chapter	
1. INTRODUCTION	1
The Problem	1
Statement of the Problem	2
Importance of the Study	3
Delimitations of the Study	5
Definition of Terms	6
Methods of Procedure	10
2. REVIEW OF RELATED LITERATURE	12
Inventory Control	12
Physical Inventory-taking	14
Written Instructions for Physical Inventory-taking	15
Storage of Inventory Items	16
Inventory Movement Controls	16
Inventory Tags and Count Sheets	17
Inventory Prices, Extensions, and Footings	17
Internal Accounting Controls	18
Purchasing and Inventory Control Objectives	18
Segregation of Duties	19

Chapter

Page

Segregation of Accounting and Operating Activities	20
Accounting for Low Cost Materials and Supplies	21
Segregation of Inventory and General Ledger Records	22
Physical Safeguards	22
Procedural Controls	22
Purchasing Activity Approvals	24
Standard Cost System	24
Cost Accounting Function	25
Overhead Costs	26
Maintaining of Perpetual Records	26
Withdrawals from Inventories	27
Control of Authorizing Documents	27
Procedural and Recording Controls	28
Inventory Reviewing Procedures	28
Inventory-taking Procedures	29
Adjustment of Perpetual Inventory Records	29
Fungible Materials	29
Inventory Insurance Procedures	30
Summary of Internal Accounting Controls	30
3. PRESENTATION AND INTERPRETATION OF DATA	33
Inventory Control Questionnaire Returned According to Railroad Geographical Area	33
Railway Industry Inventory Control Systems	35
Adequacy of Segregation of Duties	35
Procedural Controls--Purchasing	37

Chapter

Page

A. Letter and Questionnaire	93
B. Example of an Inventory Control System Overview .	100
C. Example of Written Instructions for the Taking of Physical Inventories	102
D. Example of an Internal Control Check List . . .	106
E. Example of an Automated Purchase Order	108
F. Example of Inventory Count Tag	110
G. List of Forty-six U.S. Railroads that Responded to the Survey by Geographical District	112

LIST OF TABLES

Table	Page
1. Questionnaire Response by Fifty-five Railroads in the United States Where Inventory Control Programs are Being Implemented	34
2. Adequacy of Segregation of Duties Used in Forty-six Railroads in the United States	36
3. Segregation of Inventory and General Ledger Records by Forty-six Railroads in the United States	38
4. Authorization and Approval of Purchase Orders by Forty-six Railroads in the U. S.	40
5. Type of Standard Cost System Characteristics Used in the Railway Industry by Forty-six Railroads in the United States	41
6. Responsibility of the Standard Cost System for Thirteen Western Railroads in the United States	43
6a. Responsibility of the Standard Cost System for Six Southern Railroads in the United States	44
6b. Responsibility of the Standard Cost System for Twenty-seven Eastern Railroads in the U. S.	45
7. Accumulation and Classification of Overhead Costs by Forty-six Railroads in the U. S.	48
8. Type of Perpetual Record Inventories Maintained by Forty-six Railroads in the United States	49
9. Authorization of Inventory Withdrawals by Forty-six Railroads in the U. S.	51
10. Procedural and Recording Controls for Inventories in the Railway Industry for Forty-six Railroads in the U. S.	52
11. Physical Inventory-taking by Forty-six Railroads in the U. S.	54
12. Physical Arrangement of Inventory Items by Forty-six Railroads in the U. S.	58

Table	Page
13. Inventory Movement Controls for Thirteen Western Railroads in the U. S.	59
13a. Inventory Movement Controls for Six Southern Railroads in the U. S.	60
13b. Inventory Movement Controls for Twenty-seven Eastern Railroads in the U. S.	61
14. Inventory Pricing by Forty-six Railroads in the U. S.	65
15. Inventory-taking Procedures in the Railway Industry for Forty-six Railroads in the U. S.	68
16. Perpetual Inventory Records and Control Accounts of Forty-six Railroads in the U. S.	69

Chapter 1

INTRODUCTION

Recognizing that problems are the rule rather than the exception, in railway industry operations, is the first step toward identifying problems requiring management's attention. Accounting for purchases, and inventory costs is becoming a major problem on most of the railroads, and represents a substantial proportion of the total accounting activity.

In view of the complexities involved in the processing of documents, decisions must be made with great care and require a general understanding of inventory control. Internal control over inventory

comprises the plan of organization and all of the coordinated methods and measures adopted within a business to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage adherence to prescribed managerial policies.¹

The Problem

In a number of railway companies, both large and small, the methods used to identify and value slow-moving or obsolete inventory items are often informally or inconsistently applied. Also, particularly in new or developing railway companies, it is not uncommon to find that accounting records are inadequate to establish costs or values of inventory items.

¹Henry Gunders, Production Costs and Inventories (Chicago, Ill.: Price Waterhouse & Co., 1970), p. 20.

Statement of the Problem

The purpose of this study was to determine the most acceptable methods and procedures to control inventories in the Railway Industry, with special emphasis on the acquisition and disbursement of materials and supplies used in the daily operations of the U.S. railroads. The procedures will help to provide the answers for the current practices of the U.S. railroads in relation to the following questions:

1. Are inventory quantities adequately protected against losses from theft, obsolescence, spoilage, and unauthorized withdrawals by employees?
2. Is there separate-item accountability for both material and dollars for inventory quantities received, on hand, and issued?
3. Are differences between book and physical inventories ascertained, differences adjusted, and the amount of these differences properly accounted for?
4. Does proper authorization exist for inventory removed from stock?
5. Are transactions pertaining to the issue of materials and supplies properly accounted for and entered in the controlling records?
6. Are inventory issues costed according to an acceptable method and the costs accounted for in a manner that provides adequate information for management, including variances from standards?
7. Does control exist for accounting activities in the inventory records, cost accounting records or general ledger?
8. Is responsibility for planning and implementing inventory-taking procedures properly delegated and controlled?

9. How is the accuracy of the inventory account balances verified?

10. Are prices, extensions and footings of inventory listings checked by someone independent of the employee responsible for the original computation?

11. Are procedures adequate for reviewing inventory for excess, obsolete and slow-moving stock and for approving write-downs or dispositions?

12. Do the controls over receiving reports and shipping tickets readily identify the purchase invoices that are to be recorded in the current accounting period?

13. Who is responsible for approving all major inventory adjustments?

14. Are fungible materials stored in identifiable lots and adequate records maintained?

15. Are control procedures adequate to compensate for the lack of detailed inventory records if low cost materials and supplies are charged directly to expense?

16. Do inventories that are subject to considerable variation during the year require a periodic review?

17. Are physical safeguards supplemented by procedures requiring written authorizations for all items and packages taken out?

Importance of the Study

The relative importance of the existence or absence of one or more controls over inventories depends on the nature and complexity of purchasing operations and the interaction of other controls.

Few controls, whether management or accounting, have absolute significance; rather, their significance depends on the circumstances and on the environment in which they are used. . . . Even in railway companies with sophisticated management control systems, reliance on internal accounting controls is needed to assure the validity of the recording and reporting of transactions.¹

Management's objective in reviewing internal accounting controls is to determine, in the context of the overall control pattern of the company, whether opportunities for errors exist in the processing and recording of transactions which could result in material misstatements.

There has been a trend to view all of the individual control steps and procedures as being almost uniformly applicable to every circumstance. This inclination has led to the use of checklist approaches to evaluate controls with most checklists containing questions on virtually all of the control procedures that could be used in a particular area. As a result, checklist approaches to evaluating inventory controls too often are applied on a quantitative rather than on a qualitative basis.

In conducting a review of internal controls over inventories, management should be alert to the possibility of fraud or embezzlement. The methods used to perpetuate inventory fraud vary from simple theft to complex collusive arrangements. Some of the more common methods are as follows:

1. Theft by insiders or outsiders.
2. Returned material improperly classified as worthless and fraudulently removed.
3. Good material improperly classified as defective to cover fraudulent removal.

¹Robert G. Lewis, "Burlington Northern, Frisco Open Talks," Railway Age, CLXXVIII (February, 1977), 7.

4. Actual item counts understated or physical inventory overstated to cover unrecorded shipments.¹

A railroad that does not maintain inventory accounting records in adequate detail is much more vulnerable to inventory fraud than one that does. If the inventory is accurately recorded in appropriate detail, the accounting records should provide the information required to achieve accounting control over the purchasing, movement and shipment of items.

Only after management has familiarized itself with its own company's processing and recording system will they be in a position to evaluate the overall adequacy of its controls. Adequate inventory control is not necessarily attained by employing a specified number and type of "standard" controls.² Overall inventory control results from having different types of controls interact at the right time and in the right place. Evaluating the overall importance of inventory control requires identifying the actual activities and procedures in effect, observing how responsibility for their execution is segregated, and determining how they are executed.³

Delimitations of the Study

This study was delimited to accounting and purchasing procedures that are carried out entirely to control inventory among selected U. S. Railroads. The separation of the broad definition of inventory control into the three elements of organization, operating and information

¹Gunders, op. cit., p. 24.

²Ibid.

³Ibid.

system controls, and internal accounting controls will be discussed. Separating the broad concept of control into narrower and definable elements brings this concept into sharper focus.

With respect to the inventory control element, this study was delimited to those controls directly related to the accuracy and reliability of the processing and recording of transactions. The discussion which follows emphasizes an approach based on:

1. Understanding the control objectives that should be attained in processing and recording purchasing and inventory transactions.

2. Identifying the activities and procedures associated with processing and recording these transactions.

3. Evaluating the adequacy of control by understanding how specific controls either do, or do not, interact and combine in a particular purchasing and inventory system to form an adequate network of overall control.¹

Definition of Terms

The terms used throughout the study are defined as follows:

Action Report

A report printed daily when the stock level of an item reaches its safety stock.²

¹Gunders, loc. cit.

²Howard F. Stettler, Systems Based Independent Audits (Englewood Cliffs, N. J.: Prentice Hall, Inc., 1974), p. 218.

Authority Number

The number assigned to a job, authority or bill of material for which material is ordered.¹

Authority Program Status Report

A report printed monthly showing all authorized jobs or programs to help in planning program production and curtailing delays.²

As Required Report

A report printed quarterly for all items that have an assigned item number and listed by store point.³

Cash Discount Code

A two-digit code representing the discount offered by the vendor for prompt payment of his invoice.⁴

Delayed Payment Reports

Reports printed monthly listing all invoices by vendor, covered by a Delayed Payment Plan.⁵

Demand Exception Report

A report printed monthly and used as one of the monitoring reports of the computer which has built in limits and is programmed to

¹J. B. Farrell, "Planning in the Modern Corporation," Price Waterhouse Review, III (1965), 4.

²M. J. Cerullo, "Untapped Computer Service Bureau Potential," Journal of Accountancy, CXXXVII (December, 1974), 106.

³D. P. Herron, "Cost Tradeoffs in Distribution Management," International Journal of Physical Distribution, V (July, 1975), 252.

⁴Herron, op. cit., 254.

⁵Ibid.

reject demand data that is higher or lower than can reasonably be expected.¹

Emergency Indicator

A code used to identify material that was purchased in an emergency situation.²

Force Material Transfer

A procedure which enables any location in a railroad's territory to expedite the acquisition of material urgently needed by the using department.³

Lead Time

The number of days from the date the order was placed to the date the material is received.⁴

Material Due

A list of backordered materials.⁵

Need to Purchase Report

A report printed daily advising that the stock level of an item has reached its order point.⁶

¹Ibid., 255.

²T. J. Love, "A Logistics Review for the Small Company," International Journal of Physical Distribution, VI (July, 1976), p. 297.

³Ibid., 299.

⁴Ibid.

⁵Stettler, op. cit., p. 219.

⁶Gunders, op. cit., p. 22.

Purchase Order General Master

A record that contains static information concerning purchase orders or shop orders which are held open until processed.¹

Stock Levels

The quantities on hand, in-transit, on order, backorder, and committed, that reflect the status of the computer records.²

Stock Status Report

The source of information on the status of all stock items, by location and for the entire territory.³

Store

The central location where the catalog card is printed, and mailed, to various locations in the territory.⁴

Surplus Listing

A list that is printed monthly for all surplus items in storage.⁵

¹Arthur B. Toan, Using Information to Manage (New York: The Ronald Press Company, 1968), pp. 16-17.

²Gunders, op. cit., p. 21.

³Ibid.

⁴Stettler, op. cit., p. 219.

⁵Paul Grady, Inventory of Generally Accepted Accounting Principles for Business Enterprises (1965), p. 25.

Tracking Signal Report

A document that is used to monitor the computer to ensure that the average demand for an item is in perspective with the true demand for the item.¹

Unit of Measure, Item Number

A numerical identification of the item to be ordered.²

Unit Price

The latest purchase order price paid for one unit of the item.³

Vendor Receipt Cards

Documents that are generated by the computer for all stock and nonstock item orders, received from the vendor.⁴

Method and Procedures

The procedure for completion of this research study involved the study of related literature and various inventory methods being used to implement inventory control in the railway industry. The step-by-step method of procedure was as follows:

The basic concepts of inventory control were learned through on-the-job training from April, 1977, to the present; through attendance at a workshop, conducted by Price Waterhouse, a Certified Public Accounting Firm, on preparing material inventory control "test checks" and

¹Love, op. cit., 298.

²Ibid., p. 299.

³Lewis, op. cit., 8.

⁴Stettler, op. cit., p. 219.

writing the objectives of the system; through attendance at a seminar, conducted by the Institute of Internal Auditors, a Certified Internal Auditing Organization, on operational reviews of inventory controls, warehousing, storing, and counting of inventories; and through extensive library research.

A study of inventory control in the railway industry was done through library research and personal interviews with Santa Fe Railroad personnel, Price Waterhouse representatives, and others knowledgeable in the area of inventory control.

Fifty-five letters and questionnaires were sent to western, eastern, and southern U. S. railroads that were known to be developing new methods of inventory control, requesting copies and asking questions about their revised inventory management procedures and annual reports (see Appendix A, p. 93). Forty-six usable questionnaires were returned.

The information obtained from the above mentioned sources in this study was used extensively to develop new inventory control procedures in addition to already existing ones in the railway industry.

Chapter 2

REVIEW OF RELATED LITERATURE

A study of related literature led to publications by Larry Sawyer, author of the Practice of Modern Internal Auditing, electronic data processing and railway periodicals, research committee reports by the Institute of Internal Auditors, related textbooks, and research studies. The survey concerned revised inventory management procedures, new methods of inventory control developed by various U. S. Railroads, and the advantages and/or disadvantages encountered by the Railway Industry in employing these new inventory control procedures.

Inventory Control

In the Railway Industry, inventories are as important as money. Sawyer indicated that the purposes and objectives of inventory control are to prevent theft and misuse, to serve as a guide in a purchasing program, and to insure that proper items and quantities are in stock.¹ Sawyer felt that it is necessary that the working capital cycle from cash through inventories and back to cash be properly controlled and guided.

A perpetual inventory system should be in operation, and general ledger controlling accounts should be maintained, according to

¹Larry Sawyer, The Practice of Modern Internal Auditing, (The Institute of Internal Auditors, Inc., 1973), pp. 100-110.

N. A. Smith.¹ A perpetual inventory system may be under the control of a stores clerk, or it may be maintained in the accounting department. If possible, one person should be made responsible for all materials received by and issued from the storerooms. This person should sign for all items received. A controlling account record of the receipts, issues, and inventory balances should be kept in the accounting department; periodically, this department will make its entries in summary form, not in detailed form. Thus, the perpetual subsidiary account totals are verified by a department that does not have access to the materials. The records of the storekeeper--in summary form--and the records of the accounting department should be in agreement. Where differences exist, a complete record of the reconciliation must be maintained for review.

Both Sawyer and Smith indicated that materials should leave the storeroom only upon receipt of written materials requisitions, properly authorized and executed. A duplicate requisition should remain in the requisitioning department for later comparison with the copy in the storeroom. The requisition received by the storekeeper serves as authorization to issue material and credit the accounts. The accounts may be formal, or they may be simply bin tags. The cost and general accounting departments are notified of the issuance by the storekeeper so that the proper order or department may be charged and the controlling inventory accounts (and duplicate perpetual inventory accounts, if they are kept) credited. The controlling accounts, the sum of the perpetual

¹N. A. Smith, "Achieving the Objectives of Internal Auditing," The Internal Auditor, CXCIV (May/June, 1970), 65.

inventory accounts, and the results of a physical inventory should be in agreement.

Improper requisitions or theft can result in lost material. If the materials and their records are separated and if receipts are traced, then missing materials should be recovered. Storage facilities should be established so that items scattered in several places may not be missed, misplaced, or misused.

Physical Inventory-taking

Periodic physical inventory-taking provides an accurate basis for updating inventory balances, and also serves as a check on the work of those responsible for purchasing inventories and the related functions of shipping, and receiving. Evans pointed out that employees responsible for these functions may have a biased interest in the results of physical counts, and they should not be responsible for determining physical inventory-taking procedures.¹ Generally, the chief accounting officer should have the responsibility for planning and implementing inventory-taking procedures.

Inventory account balances, whether "control" account or "detail" account, are merely recorded dollar figures indicating the amount of inventory which should be on hand.² At regular intervals (at least once each year) the accuracy of account balances should be established by taking a physical count of inventories.

¹E. R. Evans, "Managing the Internal Audit Function," The Internal Auditor, CXCVIII (January/February, 1970), 14.

²L. F. Konrath, "The CPA's Risk in Evaluating Internal Control," The Journal of Accountancy, CVI (October, 1971), 53.

Written Instructions for Physical Inventory-taking

Taking physical inventory is frequently a complicated task involving large storage areas and extended periods of time. Under such circumstances, it would usually be unsatisfactory to rely only on oral instructions or general familiarity of the stock-taking crew with the inventories.

To ensure a proper physical inventory, Dykeman suggested that detailed written instructions should be designed to make certain that all items are counted, that each item is counted only once, and that a satisfactory record of these counts is prepared and correctly summarized.¹

The instructions should require complete descriptions of items on tags or count sheets to ensure accuracy in pricing. The instructions should also cover such matters as establishing a satisfactory cutoff to ensure that the count of goods on hand can be correlated with the last recorded shipments and receipts.

It should be ascertained not only that written instructions have been prepared but that the employees assigned to take the physical inventories understand them and are competent to implement them.

Some inventories cannot be measured, weighted or counted, and the quantities must be estimated. For control purposes, estimates should be made by qualified technical personnel who are not responsible for inventory custody.

¹Francis C. Dykeman, Financial Reporting Systems and Techniques, (Prentice-Hall, Inc., 1969), p. 100.

Storage of Inventory Items

Good housekeeping is an important factor in enabling an inventory to be taken accurately and quickly. Prior to the actual count date, Higgins believes that steps should be taken to place stocks in order, to ensure that all items are readily identifiable, to clear aisles and passageways and to segregate scrap and worthless items.¹ Whenever possible, identical goods should be stored in the same location.

Inventory Movement Controls

If at all possible, receiving activities should be discontinued during the physical count of inventories. If shipments are received, the goods should be physically segregated and counted separately. Receiving tickets for such shipments should clearly indicate the goods that were received after the regular count to permit the accounting department to determine the proper accounting for the related invoices.²

Similarly, a record should be made of materials in freight cars at the time of the count. Procedures should be established to account for all materials returned by a storepoint during inventory-taking.

Frequently, the shipping department continues to operate during inventory-taking so that storepoint orders are not held up. It is a common practice to delay the physical count in the shipping room until the last minute so that few or no adjustments of the count for subse-

¹Carter C. Higgins, "Make-or Buy-Re-Examined," Harvard Business Review, XLIX (March-April, 1955), 118-119.

²U. S. Department of Defense, Value Engineering H III, Handbook, (March 26, 1963), pp. 7-8.

quent shipments will be necessary. The shipping records should clearly indicate at what point the count was made and identify the last invoices to be recorded in the current accounting period.

Although it is usual practice to close down a store completely for the physical inventory, occasionally certain departments may be left in operation in case of an emergency. If so, particular care must be taken to isolate these departments. Precautions must be taken to prevent duplicate counts of materials moving through these departments.

Inventory Tags and Count Sheets

Controls over tags or count sheets should minimize the possibility of altering recorded count data or preparing fictitious tags or sheets.¹ Accounting for prenumbered tags and sheets is one form of obtaining control. Where tags are not used and the quantities of merchandise are recorded on inventory sheets, these sheets should bear the initials of the employees responsible for the correctness of the quantities. The employees responsible for inventory compilations should be familiar with the initials or signatures of these employees.

Inventory Prices, Extensions, and Footings

The inventories should be priced by employees familiar with current costs and market prices, or with the sources from which such costs or market prices are obtained.²

An evaluation of the possibilities for errors in the inventory compilation system may indicate that footings, extensions and recapit-

¹AICPA, Audits By Certified Public Accountants, (1962), p. 22.

²"Financial Analysis to Guide Capital Expenditure Decisions," Research Report, no. 43, (1967), p. 76.

ulations of the inventory should be rechecked by employees independent of those making the original computation.

Internal Accounting Controls

In Chapter Three, the Railway Industry's purchasing and inventory control objectives will be discussed; but in order to summarize the control objectives for the purchasing and inventory functions that are typically associated with processing and recording transactions, it is important to list these objectives at this point as an introduction to the various systems used by the railway industry in attempting to attain the control objectives.

Purchasing and Inventory Control Objectives

1. All purchasing activity is authorized and inventories are maintained at optimum levels.
2. All purchasing activities and costs are properly and accurately recorded.
3. All inventory items are subject to effective custodial accountability procedures and physical safeguards.
4. All receipts, transfers and withdrawals of stock are properly recorded.
5. Information on the cost of purchasing and inventories is maintained in appropriate, up-to-date and accurate cost records.
6. All purchasing and inventory transactions are properly accumulated, correctly classified and summarized in the accounts.¹

¹"Survey of Internal Auditing," Research Committee Report, no. 15, (The Institute of Internal Auditors, Inc., 1968), p. 13.

Segregation of Duties

In all but the one-man shop, the number and types of activities required to process and record purchasing and inventory transactions in the railway industry will result in some division of duties. Frederic E. Mints' discussion on auditing procedures established that the work of one individual (or group of individuals) requires a knowledge (or a review) of the work of others, to help detect errors of omission or commission in handling transactions.¹ Duties should be segregated so that no one individual handles all processing and recording phases of a transaction.

If the operating characteristics and the volume of purchasing transactions in a particular railroad are such as to permit different individuals to carry out the activities in each of the following six functions, the opportunity for achieving these control objectives is enhanced as follows:

1. Stock status reports issued.
2. Purchase requisitions issued.
3. Purchased goods received.
4. Data forwarded to update inventory records.
5. Totals developed for entries to inventory control accounts.
6. Control and subsidiary records reconciled.²

¹Frederic E. Mints, "New Developments in Operational Auditing," The Internal Auditor, LXXIV (June, 1960), 11.

²Ibid.

It is important to emphasize that segregating duties may not result in control. The control benefits of segregated duties may be attained only if the flow of activities is designed so that the work of one individual is independent of the work of another and the activities in the processing sequence serve as a check on the proper completion of previous steps.

Mints said that the segregation of duties will be tempered by the volume and financial significance of each type of principal transaction and by the need to process transactions in an efficient and timely manner.¹ These characteristics will, of course, vary widely from railroad to railroad. A further consideration is the cost of establishing and maintaining controls in relation to the risk of loss through error or fraud which might occur in their absence.

In most railroads, responsibilities for many processing and recording activities overlap or combine in a variety of ways. Mints indicated that management must evaluate the controls of any overlapping or combining activities that exists. They should also be aware that other types of controls may operate which minimize the effect of overlapping duties.²

Segregation of Accounting and Operating Activities

Mints found that those responsible for purchasing, inventory-planning, purchasing operations, and inventory custody, are initiating or implementing purchasing and inventory activities. For control pur-

¹Ibid., 12.

²Ibid.

poses, they should not maintain the accounting for such activities in the inventory records, cost accounting records or general ledger.¹

The control benefits of having accounting activities segregated from operating activities may conflict with the information needs of purchasing or inventory personnel, especially if the reporting system does not produce timely or sufficiently detailed inventory or production status information. If such information can be gained only from a review of ledger cards, the production department may require a duplicate set of inventory records or access to the accounting records.

Where duplicate records are maintained or operating personnel have direct access to accounting records, those controls which ensure the integrity and accuracy of the general ledger accounts become increasingly important. If dollar totals are developed and reported to the accounting department at the initial stage of the processing of documents evidencing the receipt, transfer, or withdrawal of stock, the control accounts can serve as the primary basis for assuring the overall accuracy of the subsidiary records.

Accounting for Low Cost Materials and Supplies

Low cost materials and supplies are often charged directly to expense because the costs of maintaining detailed records outweigh the information and control benefits. For items handled this way, especially those having substantial total annual dollar volume, the auditor should review carefully the adequacy of storekeeping procedures and the appropriateness of budgetary expense review procedures.

¹Ibid.

Segregation of Inventory and General Ledger Records

The function of segregating the inventory records from the general ledger records is necessary to ensure that entries to the general ledger accounts are not influenced by employees who maintain subsidiary records. Mosher said:

Unless this segregation of duties is maintained, the general ledger accounts will not serve their control function of providing, through balancing and reconciling procedures, a means of disclosing erroneous or improper entries or balances in the subsidiary records.¹

Physical Safeguards

According to Pooler, appropriate physical safeguards can contribute substantially to the control over inventory items which are susceptible to loss through neglect or pilferage.² Inventory storage areas should be enclosed and access limited to storekeepers who have custodial responsibility. The use of guards at exits to fenced-in areas (or entire plants) may be required. Unless physical safeguards are supplemented by procedures requiring written authorizations for all items and packages taken out, the actual control achieved may be minimal.

Procedural Controls

In reviewing the overall network of control which may exist in a given railroad, management is not only concerned with "who is doing

¹Jack. A. Mosher, "Auditing the Quality of Engineering Drawings," The Internal Auditor, CXXV (Fall, 1964), 16.

²V. H. Pooler, "The Purchasing Man and His Job," AMA, XIV (1964), 176.

what" but also with "what is being done" and "how is it being done."¹ The above items give reason for Sawyers' finding, that controls are attainable through the "what" and "how" or processing and recording transactions.²

Certain activities and procedures are carried out almost entirely for control purposes. For example, "batch totals" over a series of transactions is undertaken solely for control purposes.³

Other procedural controls come into being through the forms used to process and record transactions. Purchase order forms which require signatures or approvals at each step or phase in the purchasing process introduce a form of control over sequential activities. Multicopy requisition forms, which include copies to the purchasing and accounting departments at the time the requisition is filled, can enhance processing and recording controls.

All inventory systems require some degree of written communication. Usually the more formal a system is, the more opportunities there are for implementing procedural controls. Unfortunately, some operating and related paper processing systems are merely mazes of disjointed forms and procedures. A well-designed system will meet the needs of all operating and accounting personnel and be simple enough so that the significance of each form or procedure is readily apparent to all concerned. The overall objective of any system should be to accurately and reliably process and record all purchasing and inventory transactions.

¹Keith Davis, "Evolving Models of Organizational Behavior," The Internal Auditor, CXC (November/December, 1968), 27.

²Ibid.

³Ibid., 28.

The task of evaluating the network of procedural controls over purchasing costs and inventories can be a difficult one if railroad operations are complex. The initial step in evaluating controls in any railroad company must be to understand purchasing operations and appreciate the conditions under which they occur.

Purchasing Activity Approvals

Sawyer indicated that unless there is an organized approach to planning and directing purchasing activities, there is a much greater likelihood of purchasing inventory items at the wrong time, in the wrong quantities or at excessive costs.¹ Purchase orders which are reduced to writing provide a means not only for accumulating important information but also for documenting responsibility for authorizing and approving purchasing decisions.

Standard Cost System

A standard cost system should also be integrated with the general books. Otherwise, the system may become a memorandum record without the protection and control provided by the double-entry system. According to Bruno, records and cost accumulations not under accounting control may result in incomplete or inaccurate data being used for decision making or control purposes.²

It would seem obvious that significant variances from standard costs and their causes should be reported to management. Sometimes,

¹L. B. Sawyer, "The Anatomy of Control," The Internal Auditor, CXXIII (Spring, 1964), 15.

²J. D. Bruno, "Auditing On-Line Realtime Electronic Data Processing Systems," Management Services, CCXVI (March/April, 1968), 17.

however, significant data is developed by the accounting system but never finds its way to operating management. Without such reporting, in an informative and timely manner, management may not be using the effective control tools provided by a standard cost system.

Procedures in effect should assure that the standards used to determine purchasing costs are reviewed regularly. Basic changes in labor rates and prices paid for materials and supplies should be reflected in the standards. Also, since operating conditions and efficiencies change with time, procedures should assure regular review of the purchasing methods and of standard time allowances and costs applicable to them.

Purchasing changes should also be reported to the cost department and reflected in standard costs. In railroads characterized by frequent purchasing changes, reviewing standards may be a continuing and major problem.

Cost Accounting Function

Moloney indicated that a primary objective and responsibility of the cost accounting function is to accumulate, classify, and distribute all purchasing costs to jobs or materials and supplies.¹ Although the type of cost system used varies widely among the railway industry, this basic objective must be achieved if inventory costs and cost of services are to be determined on something more than an arbitrary basis.

¹R. F. Moloney, "New Generation EDP Controls," Management Services, CCXVI (March/April, 1968), 25.

Overhead Costs

Kaufman described the significant advantages to be obtained from identifying overhead costs with the departments responsible for the activities to which the costs relate.¹ Not only does such a system permit the accumulation of costs incurred on a responsibility basis, but it also permits the use of departmental burden rates which, in multi-purchasing operations, may be essential in arriving at purchasing or job costs.

Maintaining of Perpetual Records

If detailed perpetual records are not maintained, the only way to obtain information on the current status or movement of individual inventory items is by physical count or inspection.

According to Chu, perpetual records provide data for operating personnel to plan and control purchasing requirements and to maintain inventories at optimum levels without frequent inventory-taking.² Additionally, they provide accounting control over such assets.

Without detailed inventory records, it is usually difficult to determine the causes of differences between control account balances and physical inventory totals. Detailed records identify differences or shortages with particular items allowing problems to be localized and corrective action taken.

¹Felix Kaufman, "The Computer, the Accountant, and the Next Decade," The Journal of Accountancy, CIV (August, 1971), 33.

²Albert L. C. Chu, "Computer Security: The Corporate Achilles Heel," Business Automation, XII (February 1, 1971), 33.

Withdrawals From Inventories

To assure that all withdrawals from stock are authorized and to establish custodial accountability, John advises that documentation (requisitions, production orders, bills of materials) should be approved by responsible employees who are familiar with the quantities and types of materials needed to do the work for which they are being requisitioned.¹ If requisitions are approved by employees who are unfamiliar with the materials or the operations for which they are being requisitioned, the approval procedure provides little protection against excessive or invalid issues.

Control of Authorizing Documents

Numerical control over authorizing documents (requisitions, purchase orders, bills of materials) can ensure that all such documents are accounted for and recorded. Konrath indicated that if inventory or cost records are kept in both quantities and dollars, with the dollar value controlled in general ledger accounts, the method of recording individual documents in detail inventory or cost accounts must be synchronized with the system used to accumulate and transfer costs between general ledger accounts.²

If material usage is priced by inventory custody employees, procedures for obtaining an independent check on the pricing may be necessary for control purposes, especially when inventory custody and inventory record functions are combined or otherwise inadequately segregated.

¹R. C. John, "Evaluating Internal Control in EDP Audits," The Journal of Accountancy, LXXXVII (February, 1970), 31.

²Konrath, op. cit., 54.

The direct routing to the accounting department of a copy of an authorizing document at the earliest practical point in the processing sequence enhances control. For example, routing a copy of a requisition at the time material is issued establishes an accounting control over subsequent detailed recording in inventory or cost accounts. If the accounting department accounts for the numerical sequence of documents received, assurance is provided that all documents have been recorded. Documents evidencing the return of unused materials to stores should be similarly controlled.

Procedural and Recording Controls

Control procedures, including adequate records and reports, should provide for determining the actual status of goods consigned-out or consigned-in so that the accounting for such items is appropriate.

Inventory Reviewing Procedures

Slow-moving and obsolete merchandise should be valued by officials or employees who are in a position to estimate fair realizable values.¹

Reviews for excess, obsolete or slow-moving stock and approvals of write-downs or dispositions should not be made by an employee responsible for purchasing, shipping or inventory custody. Such reviews require familiarity with the company's stock, usage or demand rates and potential market price.

¹Price Waterhouse & Co., The Independent Accountant's View of Procurement and Purchasing in Industry, (1969), p. 19.

The direct routing to the accounting department of a copy of an authorizing document at the earliest practical point in the processing sequence enhances control. For example, routing a copy of a requisition at the time material is issued establishes an accounting control over subsequent detailed recording in inventory or cost accounts. If the accounting department accounts for the numerical sequence of documents received, assurance is provided that all documents have been recorded. Documents evidencing the return of unused materials to stores should be similarly controlled.

Procedural and Recording Controls

Control procedures, including adequate records and reports, should provide for determining the actual status of goods consigned-out or consigned-in so that the accounting for such items is appropriate.

Inventory Reviewing Procedures

Slow-moving and obsolete merchandise should be valued by officials or employees who are in a position to estimate fair realizable values.¹

Reviews for excess, obsolete or slow-moving stock and approvals of write-downs or dispositions should not be made by an employee responsible for purchasing, shipping or inventory custody. Such reviews require familiarity with the company's stock, usage or demand rates and potential market price.

¹Price Waterhouse & Co. , The Independent Accountant's View of Procurement and Purchasing in Industry, (1969), p. 19.

Inventory-taking Procedures

Company procedures should include control over receiving reports and shipping tickets in a manner which readily identifies the purchase invoices to be recorded in the current accounting period.

Adjustment of Perpetual Inventory Records

Porter indicates that inventory records should be adjusted to the amounts on hand determined by physical counts.¹ All important differences between the physical inventory and the perpetual stock records should be investigated, and the nature of minor differences should be reviewed for indications of a general pattern of errors.

After all differences have been investigated, the general ledger account should be adjusted to agree with the inventory records. All major adjustments should be approved in writing by an appropriate accounting official after he has satisfied himself as to the reasons underlying the differences.

Fungible Materials

Certain types of inventory items pose particular physical and accounting control problems. If fungible materials are stored in identifiable lots and records maintained on each lot, the physical exhaustion of each lot may be readily compared with what should be a zero balance in a related record.²

¹W. T. Porter, "Evaluating Internal Controls in EDP Systems," The Journal of Accountancy, XXXVIII (August, 1964), 36.

²Ibid.

Inventory Insurance Procedures

Inventory insurance procedures should provide commercial or self-insured insurance coverage at all times. Inventories subject to considerable variation during the year (e.g., due to seasonal changes) require continual review to assure adequate coverage. Management should be alert to the possibility that differences between inventory values and insurance coverage may be due to understated inventories rather than excessive coverage.¹

Summary of Internal Accounting Controls

Most railroads have flow charts or other descriptive representation of the recording and processing of purchasing and inventory transactions indicating:

1. Segregation of duties, particularly record-keeping, custodial and operating responsibilities.
2. Procedures for controlling the movement of stock and accumulating quantities and costs of inventories.
3. Procedures for periodic checking of detailed perpetual records by physical counts and reconciling of detailed records to general ledger accounts.
4. Procedures for identifying excess, slow-moving or obsolete inventories.
5. Procedures for controlling inventory held for, or in the possession of outsiders.²

Finally, there is a need for management to obtain copies of memoranda containing recommendations on controls from their internal audit staff or independent auditors. Review of internal accounting

¹Ibid.

²Sawyer, op. cit., 111.

controls is important to maintain an adequacy of procedural and recording controls over purchasing and inventories such as:

1. Cost system of perpetual records--type of cost system, costing basis, cost accumulation procedures and records, inventory records and posting procedures.¹
2. Custodial and physical controls--storekeeping procedures, stock transfers, physical safeguards, and insurance coverage.²
3. Periodic physical counts and pricing procedures.³
4. General ledger records--procedures and basis for inventory entries, reconciliation of detail and perpetual records and ledgers.⁴
5. Adequacy of segregation of duties--among above activities.⁵
6. Segregation of duties--between above and related activities --purchasing, shipping and receiving.⁶
7. Checks to avoid--outright theft or unauthorized shipment of goods.⁷
8. Checks to avoid--falsified counts to cover losses, rejects, and shipments.⁸
9. Checks to avoid--padded requisitions to cover losses, rejects, or unauthorized shipments.⁹
10. Checks to avoid--improper classifications as rejects to cover purchasing mistakes or unauthorized shipments.¹⁰

¹Maloney, op. cit., 26.

²Porter, op. cit., 37.

³Evans, op. cit., 15.

⁴Chu, op. cit., 34.

⁵Mints, op. cit., 12.

⁶Sawyer, op. cit., 112.

⁷Smith, op. cit., 65.

⁸Smith, op. cit., 65.

⁹Smith, op. cit., 113.

¹⁰Smith, op. cit., 66.

The above are areas where both general accounting and cost accounting systems have to be adapted to the unique facts and circumstances of the railroad in which they are used. It is most important that management summarize the particular characteristics of their cost system. Such a summary would include a description of the segregation of accounts between direct and indirect costs and the bases used for allocating indirect costs.

To determine the appropriateness of the accounting principles and methods used by a particular railroad, a determination must first be made that the accounting system is synchronized with the characteristics of operating activities and transactions. A railroad may have excellent management controls and good internal accounting controls, but if inaccurate and unreliable accounting data is used, the financial statements may be seriously affected.

Chapter 3

PRESENTATION AND INTERPRETATION OF DATA

The following presentation and interpretation of data refer to the twenty-seven eastern railroads, thirteen western railroads, and six southern railroads responding to the inventory control survey.

Inventory Control Questionnaire Returned According to Railroad Geographical Area

The response of the western, eastern, and southern railroads to the mailed questionnaire was favorable. Fifty-five letters and questionnaires were mailed to railroads involved in inventory control across the United States. Forty-six, or 83.6 percent (see Appendix G, p. 112), returned the questionnaire; only nine, or 16.4 percent, did not return them as shown on Table 1.

Questionnaires were sent to thirty-three eastern railroads to survey their present inventory control programs. Twenty-seven, or 81.8 percent, returned the questionnaire; six, or 18.2 percent, did not participate in the survey.

The return of completed questionnaires from the western railroads was thirteen, or 100 percent, out of thirteen mailed questionnaires.

Questionnaires were completed by six, or 75 percent, of eight southern railroads; two, or 25 percent, did not participate in the survey.

Table 1
 Questionnaire Response by Fifty-five Railroads
 in the United States Where Inventory Control
 Programs are Being Implemented
 August, 1978

Railroad by Geographical Location	Inventory Control Questionnaire		
	Number sent	Number returned	Percent returned
Eastern	33	27	81.8
Western	13	13	100.0
Southern	8	6	75.0
Totals	55	46	83.6

Railway Industry Inventory Control Systems

The railway industry's inventory controls are the techniques employed to safeguard assets and the reliability of financial records. Many internal control techniques have been built into most of the railway industry's system that they appear to be part of the system's normal processing tasks. If, however, the purpose of a task is to control the processing of transactions, it should be viewed as part of the railroad's internal controls.

Adequacy of Segregation of Duties

Responsibilities for purchasing, inventory planning, purchasing operations, and inventory custody must be segregated from those for inventory records, cost accounting, and the general ledger. Of maximum importance from an internal control standpoint, thirty-four, or 73.9 percent of the railroads that responded to the survey across the U. S. had segregation of duties as a rule, in that no department should control the inventory records relating to its own operation. Three, or 6.5 percent of the railroads had no segregation of duties in relation to the above responsibilities; and the respondents from nine, or 19.4 percent of the railroads felt that it was not applicable to their situation as shown on Table 2.

Broken down by geographical district, twelve out of thirteen, or 92.3 percent of the western railroads surveyed had division of duties.

Most of the eastern railroads' respondents, or 59.3 percent to be exact, felt that operating personnel should be equally as willing to delegate the segregation of duties to others as to delegate the responsibility for record-keeping.

Table 2
 Adequacy of Segregation of Duties Used in Forty-Six
 Railroads in the United States
 August, 1978

Segregation of Duties	Railroads by Geographical District#							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Segregation of Duties	16	59.3	12	92.3	6	100.0	34	73.9
No Segregation of Duties	2	7.4	1	7.7	-	-	3	6.5
No Response	9	33.3	-	-	-	-	9	19.4

*Number and Percent of Response

#Geographical Division of the Railroads by the Interstate
 Commerce Commission

Table 2
 Adequacy of Segregation of Duties Used in Forty-Six
 Railroads in the United States
 August, 1978

Segregation of Duties	Railroads by Geographical District#							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Segregation of Duties	16	59.3	12	92.3	6	100.0	34	73.9
No Segregation of Duties	2	7.4	1	7.7	-	-	3	6.5
No Response	9	33.3	-	-	-	-	9	19.4

*Number and Percent of Response

#Geographical Division of the Railroads by the Interstate
 Commerce Commission

The respondents that were answering for all of the southern railroads that were surveyed felt that a frequent result of segregation of duties was that both accounting and inventory responsibilities should not be delegated to the same person.

Responsibilities for inventory records and general ledger records should also be segregated. Respondents from about 69.6 percent of all the railroads surveyed recognized that there is a need for the segregation of inventory records and general ledger records. Respondents from several of the railroads, or 6.8 percent, felt that there was no need to separate the responsibilities between inventory records and the general ledger as shown on Table 3.

The responsibility for supervising physical inventory-taking and approving the recording of adjustments arising from physical inventory-taking should be assigned to a responsible accounting official. Respondents from 80 percent of the railroads that responded to the survey felt that the accuracy of the physical inventory will directly affect financial position and operating results; therefore, precautionary measures to assure an accurate inventory should be taken by assigning a responsible accounting official to supervise the count. One railroad respondent indicated that it is not necessarily important to assign an accounting official to supervise the inventory-taking and approving the adjustments.

Procedural Controls -- Purchasing

All purchasing activities should be initiated on the basis of properly authorized and approved purchase orders. Respondents from 80 percent of the U. S. railroads felt that there should be an organized approach to planning and directing purchasing activities. Four

Table 3
 Segregation of Inventory and General Ledger
 Records by Forty-six Railroads
 in the United States
 August, 1978

Segregation of Records	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Segregation of Inventory and General Ledger Records	15	55.6	11	84.6	6	100.0	32	69.6
No Segregation of Inventory and General Ledger Records	1	3.7	2	15.4	-	-	3	6.8
No Response	11	40.7	-	-	-	-	11	23.6

*Number and Percent of Response

railroads, or 8.7 percent, did not have any organized approach to delegate responsibility for authorizing and approving purchase orders as shown on Table 4.

Respondents from all of the western and southern railroads surveyed indicated that purchase orders which are reduced to writing provide a means not only for accumulating important information, but also for documenting responsibility for authorizing and approving purchasing decisions.

Of the eastern railroads that responded, respondents from only eighteen, or 66.7 percent, felt that there was a need to approve purchase orders.

Procedural Controls -- Standard Cost System

If a standard cost system is used for inventory valuation, it should be integrated with the general books; variances reported in an informative and timely manner to management; and, standards should be reviewed on a regular basis.

A very poor response was received from the railroads that were surveyed in relation to the implementation of a standard cost system as shown on Table 5.

Norfolk & Western RR, Roanoke, Virginia, has a standard cost system where all new purchased material, by item number, is price averaged by cost plus and expensed on that basis. Their "standard" and "repaired" items are adjusted to a fixed price periodically. The books are based on the above prices.

The Denver & Rio Grande Western Railroad Co., Denver, Colorado, does not use a standard cost accounting system. This railroad uses their own cost responsibility system.

Table 4
 Authorization and Approval of Purchase Orders
 by Forty-six Railroads in the U. S.
 August, 1978

Procedural Controls-- Purchasing	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Organized Approach to Plan and Direct Purchasing Activities	18	66.7	13	100.0	6	100.0	37	80.4
No Organized Approach to Plan and Direct Purchasing Activities	4	14.8	-	-	-	-	4	8.7
No Response	5	18.5	-	-	-	-	5	10.9

*Number and Percent of Response

Table 5
 Type of Standard Cost System Characteristics Used
 in the Railway Industry by Forty-six
 Railroads in the United States
 August, 1978

Type of Standard Cost System Char- acteristics	Railroads by Geographical District#							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Integrated with General Books	2	7.4	4	30.8	1	16.7	7	15.2
Reporting Significant Variances	2	7.4	3	23.1	2	33.4	7	15.1
Regular Review of Standards	2	7.4	2	15.4	2	33.4	6	13.0
Others	6	22.2	2	15.4	1	16.7	9	19.7
No Response	15	55.6	2	15.3	-	-	17	37.0

*Number and Percent of Response

#Geographical Division of the Railroads by the Interstate
 Commerce Commission

Burlington Northern RR, St. Paul, Minnesota, does not review standards on a regular basis, but does compare their monthly budget to actual comparisons.

The cost system must assure that material and labor costs are reliably and consistently accumulated, classified, and distributed to the appropriate materials or jobs. A cross-check of all the railroads surveyed, showed that 23.9 percent had a primary objective and responsibility to accumulate and classify all purchasing costs and distribute them to jobs and materials as shown on Tables 6, 6a, and 6b.

The Chessie System, Baltimore, Maryland, uses responsibility centers and job number accumulations for both material and labor. The use of stock levels, that is, the quantities on hand, in transit, on order, backorder, committed, and thirty-day demand that reflect the status of the computer records are also used.

The respondent from the Manufacturer's Junction Rwy., Cicero, Illinois, indicated that since the company is so small, it is easy to keep track of materials and labor for a specific job. Time tickets and material requisitions are also used for each job.

On the Denver & Rio Grande Western RR, all costs for labor and material (unit prices) are the specific responsibility of some supervisor or officer who operates within his approved budget.

The respondent from the Union Pacific Railroad, Omaha, Nebraska, indicated that field operations forces who initiate basic data can transfer costs between jobs. They are currently working on increased controls to monitor and control transfer costs.

The respondent from the Duluth, Missabe and Iron Range RR Co., Duluth, Minnesota, explained that no system can assure that material and

Table 6
 Responsibility of the Standard Cost System for Thirteen
 Western Railroads in the United States
 August, 1978

Railroads	Material and labor costs are reliably and consistently accumulated, classified and distributed.		
	Yes	No	No Response
The Western Pacific RR. Co.		X	
St. Louis San Francisco Ry.	X		
Duluth, Missabe & Iron Range Rwy. Co.		X	
Minneapolis, Northfield and Southern Railway	X		
Butte, Anaconda & Pacific Ry. Co.			X
The Kansas City Southern Ry. Co.			X
The Minnesota Transfer Railway Co.			X
Southern Pacific Trans.		X	
Valley & Siletz	X		
Burlington Northern Inc.		X	
Oregon, Pacific & Eastern Ry.	X		
The Denver & Rio Grande Western RR. Co.	X		
Union Pacific RR. Co.		X	
Total	5	5	3
Percent of U.S. Total	10.9	10.9	6.5

Table 6a
 Responsibility of the Standard Cost System for Six
 Southern Railroads in the United States
 August, 1978

Railroads	Material and labor costs are reliably and consistently accumulated, classified and distributed.		
	Yes	No	No Response
Florida East Coast Ry. Co.	X	-	-
M-K-T Railroad Co.	X	-	-
Others	-	-	4
Total	2	-	4
Percent of U.S. Total	4.5	-	9.0

Table 6b
 Responsibility of the Standard Cost System for
 Twenty-seven Eastern Railroads in the U.S.
 August, 1978

Railroads	Material and labor costs are reliably and consistently accumulated, classified and distributed		
	Yes	No	No Response
The Chessie System	X	-	-
Bangor and Aroostock RR. Co.	X	-	-
Belfast and Moosehead Lake	X	-	-
Maryland & Penna. RR.	-	X	-
Manufacturer's Junction Ry.	X	-	-
Norfolk & Western Ry.	-	X	-
Others	-	-	21
Total	4	2	21
Percent of U.S. Total	8.7	4.5	45.7

labor costs are reliably and consistently accumulated, classified and distributed to the appropriate materials of jobs. However, their cost system is the vehicle, and dedication to good reliable field reporting is the only thing that will assure reliability.

According to the Florida East Coast Rwy. Co., St. Augustine, Florida, changes are recorded on individual job sheets, which are periodically compared to an estimate prepared prior to commencing a project.

Any type of cost system that is used should ensure that all materials transferred are accurately reported by the stores and purchasing departments; that material pricing procedures are accurate and consistent; and that direct and indirect labor (in both purchasing and materials departments) are accurately classified and reported via job cards, time tickets or other appropriate means. Respondents from 53 percent of all railroads surveyed felt that the transfer and pricing of all materials was done in an accurate and consistent manner. However, respondents from only 26.1 percent of those surveyed felt that direct and indirect labor was being accurately classified.

The respondent from the Minnesota Transfer Railway Company, St. Paul, Minnesota, indicated that there are absolutely no transfers between the stores and purchasing departments.

The Burlington Northern RR respondent specified that certain costs and expenses are accumulated and allocated on a percentage of material value as material is used. A full description of the item being transferred is also accurately reported.

All costs and expenses should be appropriately accumulated and classified. Of the forty-six railroads surveyed, respondents from 56.5 percent felt that there are significant advantages to be obtained from

identifying overhead costs with the departments responsible for the activities to which the costs relate.

Respondents from 41 percent of the eastern railroads indicated that the key to effective inventory control is in the records that are established to accumulate and classify overhead costs.

The majority of western railroads, 69.2 percent to be exact, allocated acquisition and overhead costs to materials. However, all of the southern railroads maintained that overhead costs should be accumulated and classified as shown on Table 7.

Procedural Controls -- Accounting Department

Detailed perpetual records should be maintained for all types of inventories. A moderate response was received from all of the railroads that were surveyed as to the maintaining of perpetual records as shown on Table 8.

The respondent from Union Pacific RR specified that perpetual records are also maintained for rail and ties that are used for both maintenance and property investment purposes. The perpetual records also indicate the bin location of the item or items to be counted.

Burlington Northern RR has perpetual records that are maintained for maintenance materials. The perpetual records also provided data for operating personnel to plan and control purchasing requirements and to maintain inventories at optimum levels without frequent inventory-taking. General ledger perpetual inventory records are also essential for the preparation of interim financial statements.

Table 7
 Accumulation and Classification of Overhead Costs
 by Forty-six Railroads in the U.S.
 August, 1978

Procedural Controls-- Standard Costs	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Overhead Costs Were Accumulated And Classified	11	40.7	9	69.2	6	100.0	26	56.5
Overhead Costs Were Not Accumulated And Classified	6	22.2	3	23.1	-	-	9	19.6
No Response	10	37.1	1	7.7	-	-	11	23.9

*Number and Percent of Response

Table 8
 Type of Perpetual Record Inventories Maintained by
 Forty-six Railroads in the United States
 August, 1978

Types of Inventories	Railroads by Geographical District							
	EAST		WEST		SOUTH		U. S.	
	No.*	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Raw Materials	12	44.4	3	23.1	2	33.3	17	37.0
Work In Process	4	14.8	1	7.7	1	16.7	6	13.0
Finished Goods	8	29.6	2	15.4	2	33.3	12	26.1
Supplies	14	51.8	13	100.0	3	50.0	30	65.2
Scrap	10	37.0	3	23.1	2	33.3	15	32.6
Other (s)	2	7.4	2	15.4	-	-	4	8.7

*Number and Percent of Response

Selective Inventory Control

All withdrawals from inventories should be supported by authorizing documents. The respondents from the majority of the railroads surveyed, 73.9 percent, stated that all withdrawals from stock are authorized and established custodial accountability, documentation, and approvals by responsible employees who are familiar with the quantities and types of materials needed to do the work for which they are being requisitioned.

Respondents from 56 percent of the eastern railroads indicated that the sacrifice of accountability and any attendant losses under selective inventory control should normally be less than the expense of record-keeping, especially because pilferage can still be restricted through normal inspection controls at store exits as shown on Table 9.

Respondents from all of the western and southern railroads indicated that all withdrawals from inventories should be supported by authorizing documents; and, that lead time was an important factor when trying to control withdrawals from the date the order was placed to the date the material is received.

All authorizing documents should be accounted for numerically or otherwise. Fifty-seven percent of the railroads that responded to the above statement in the questionnaire had numerical control over authorizing documents.

Procedural and recording controls should assure that there is proper accounting for all types of inventories. A moderate response was received from all the railroads that were surveyed as to the maintaining of perpetual records as shown on Table 10.

Table 9
 Authorization of Inventory Withdrawals
 by Forty-six Railroads in the U.S.
 August, 1978

Selective Inventory Controls	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
All Withdrawals From Stock Were Authorized	15	55.6	13	100.0	6	100.0	34	73.9
No Withdrawals From Stock Were Authorized	2	7.4	-	-	-	-	2	4.3
No Response	10	37.0	-	-	-	-	10	21.7

*Number and Percent of Response

Table 10
 Procedural and Recording Controls for Inventories
 in the Railway Industry for Forty-six
 Railroads in the U.S.
 August, 1978

Types of Inventories	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Inventories Owned, Consigned-out	12	44.4	5	38.5	2	33.3	19	41.3
Inventories Not Owned, Consigned-in	10	37.0	3	23.1	1	16.7	14	30.4
Others	-	-	-	-	1	16.7	1	2.2
No Response	5	18.6	5	38.4	2	33.3	12	26.1

*Number and Percent of Response

The Atlanta and St. Andrews Bay Railway, Panama City, Florida, not only assures proper accounting for inventories owned and not owned, but also for store stock. An action report is also printed daily when the stock level of an item reaches its safety stock.

Physical Inventory Taking

Physical inventories should be taken at least once each year. The number of railroads that take a physical count of inventories at regular intervals to establish accurate account balances stood at thirty-nine, or 84.8 percent, as shown on Table 11.

Response from a majority of eastern railroads responding to the survey, or 81.4 percent, indicated that the physical inventory level determines how effective the various departments have been in carrying out their responsibility to utilize inventory items with which they have been charged, and the resulting inventory adjustment provides a more accurate base for inventory reorder decisions.

Respondents from 100 percent of the western railroads believed that the first step in securing good internal control of the physical inventory is to select a person who has a sufficient grasp of all phases of railway operations.

Many or a majority of the southern railroads, or 66.7 percent, frequently used prepunched cards showing an authority number, bin location, document number, emergency indicator, item number, storepoint, unit of measure, unit of measure item number, unit price, value of the order, and other pertinent information when taking a physical inventory.

Written instructions should be prepared and issued for the guidance of employees participating in physical inventories (see Appendix C, p. 102). Count teams should also adhere to instructions; and sufficient

Table 11
 Physical Inventory-taking by Forty-six
 Railroads in the U.S.
 August, 1978

Physical Inventory Count	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Physical Inventory Was Taken Once a Year	22	81.4	13	100.0	4	66.6	39	84.8
Physical Inventory Was Not Taken Once a Year	3	11.1	-	-	1	16.2	4	8.7
No Response	2	7.5	-	-	1	16.2	3	6.5

*Number and Percent of Response

care should be taken by counters and checkers to ensure that counts are accurate. An affirmative response, 65.2 percent, was received from railroads concerning the need for written instructions while participating in the taking of physical inventories.

The respondents from the Denver and Rio Grande Western Railroad Co. explained that their perpetual inventory is on the computer, and that count teams spot check specific items by manual count to verify computer generated inventory. The respondents also stipulated that written instructions should be prepared covering each separate job to be assigned to various employees; and that steps should also be taken to be certain that these instructions are fully understood, and that each individual is impressed with the importance of carefully following instructions.

The Duluth, Missabe and Iron Range Ry. Co. does take sufficient care to ensure that counts are accurate. However, exceptions during the course of the count do occur and recounts are taken. The counting of inventory items is normally not done by the same employees who are responsible for custody of the inventory.

The Minnesota Transfer Railway Company employs external auditors to spot check their inventory. The reasoning behind the use of the external auditors, was due to the fact that some inventories cannot be measured, weighed or counted, and the quantities must be estimated.

Burlington Northern RR explained that they use internal and external auditors to make personal observations of inventory activities at random locations. The internal auditors use an internal control checklist to ensure adequate internal control during the taking of the physical inventory (see Appendix D, p. 106).

The Valley and Siletz RR, Independence, Oregon, uses teams of two employees to spot check and reconcile any differences in the physical inventory counts. One member of each team may be an employee who is responsible for handling inventory items, to provide better information as to the exact description and location of the items to be counted.

The respondents from the Chessie System explained that their internal auditing department conducts inventory observations and their maintenance of way department provides supervision at divisional post-inventory meetings.

The respondents from the Auto-Train Corporation, of Washington D.C., explained that all of their inventory instructions are in writing. Close adherences to instructions are supervised by company officials.

The Maryland and Pennsylvania RR of York, Pennsylvania, does not make a spot check of the inventory. The company makes 100 percent duplicate counts.

The respondents from Manufacturer's Junction Rwy. indicated, that because their inventory is so small their counts are quite accurate. However, exceptions can occur in the count regardless of the size of the inventory.

The Norfolk and Western Railroad management explained that the materials department and using department make the physical inventory counts. The internal and external auditors are in charge of making spot checks of the inventory.

Inventory items should be physically arranged in such a way that accurate counting is facilitated. Respondents from 80 percent of the railroads that were questioned, indicated that inventory items should be

stacked in neat piles if at all possible to facilitate accurate counting as shown on Table 12.

Eighty-one percent of the respondents for eastern railroads stipulated that good housekeeping is an important factor in enabling an inventory to be taken accurately and quickly.

Most of the respondents for the western railroads, or 84.6 percent, specified that prior to the actual count date, steps should be taken to place stocks in order, to ensure that all items are readily identifiable, to clear aisles and passage ways and to segregate scrap and worthless items.

Finally, the majority of respondents for southern railroads, or 66.7 percent, indicated that inventory items are arranged neatly so that accurate counting is possible.

Inventory movement should be adequately controlled during physical inventory-taking, according to 58.7 percent of the railroads that responded to the survey as shown on Tables 13, 13a, 13b.

Most of the respondents for the railroads specified that if all store activity cannot be stopped during the inventory counting, provisions must be made for items which are transferred from one location to another. The same item should not be counted in both locations, and care should be taken to see that an item which had been moved had not been omitted entirely from the counting process.

The respondent for the Denver and Rio Grande Western RR Co. noted withdrawals on a bin record by date. Pre-punched computer cards are withdrawn with material items and processed daily. An "authority program status report" is also withdrawn along with the computer cards to update material items, and is printed monthly.

Table 12
 Physical Arrangement of Inventory Items
 by Forty-six Railroads in the U.S.
 August, 1978

Inventory Physical Arrangement	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Inventory Items Were Arranged to Facilitate Accurate Counting	22	81.0	11	84.6	4	66.7	37	80.0
Inventory Items Were Not Arranged to Facilitate Accurate Counting	3	11.5	2	15.4	2	33.3	7	15.7
No Response	2	7.5	-	-	-	-	2	4.3

*Number and Percent of Response

Table 13
Inventory Movement Controls for Thirteen
Western Railroads in the U.S.
August, 1978

Railroads	Is Inventory Movement Adequately Controlled During Physical Inventory Taking?		
	Yes	No	No Response
Union Pacific RR	X	-	-
The Denver & Rio Grande Western Ry. Co.	X	-	-
Oregon, Pacific & Eastern Ry.	X	-	-
Burlington Northern Inc.	X	-	-
Valley & Siletz	X	-	-
Southern Pacific Trans.	X	-	-
The Minnesota Transfer Ry. Co.	X	-	-
Minneapolis, Northfield and Southern Railway	X	-	-
The Kansas City Southern Ry. Co.	X	-	-
The Western Pacific Ry. Co.	X	-	-
St. Louis San Francisco Ry.	X	-	-
Duluth, Missabe & Iron Range Rwy. Co.	X	-	-
Butte, Anaconda & Pacific Ry. Co.	X	-	-
Total	13	-	-
Percent of U.S. Total	28.3	-	-

Table 13a
 Inventory Movement Controls for Six
 Southern Railroads in the U.S.
 August, 1978

Railroads	Is Inventory Movement Adequately Controlled During Physical Inventory Taking?		
	Yes	No	No Response
Atlanta & St. Andrews Bay Ry.	X	-	-
Florida East Coast Ry. Co.	X	-	-
M-K-T Ry. Co.	X	-	-
Mississippi Export Ry. Co.	X	-	-
Others			2
Total	4	0	2
Percent of U.S. Total	8.7	0	4.4

Table 13b
 Inventory Movement Controls for Twenty-seven
 Eastern Railroads in the U.S.
 August, 1978

Railroads	Is Inventory Movement Adequately Controlled During Physical Inventory Taking?		
	Yes	No	No Response
Norfolk & Western R.R.	X	-	-
Manufacturer's Junction Ry.	X	-	-
Lake Superior & Ishpeming RR Co.	X	-	-
Providence & Worcester Co.	X	-	-
Maryland & Penna RR.	X	-	-
Belfast & Moosehead Lake	-	X	-
Maine Central RR. Co.	X	-	-
Illinois Terminal RR. Co.	X	-	-
Auto-Train Corp.	X	-	-
Bangor & Aroostook RR. Co.	X	-	-
The Chessie System	X	-	-
Others	-	-	16
Total	10	1	16
Percent of U.S. Total	21.7	2.2	34.8

The Union Pacific RR limits the movement of inventory; and in transit documents are accumulated and reviewed. All possible receiving activities are discontinued during the physical count of inventories.

The St. Louis San Francisco Rwy. of Springfield, Missouri, moves inventory only to sustain daily operation of the railroad during counting.

The respondent for the Burlington Northern RR explained that material in-transit is so designated in their perpetual records.

The Valley and Siletz RR Co. respondent indicated that all the count teams are so busy counting, that there is no inventory movement.

Field personnel at the Chessie System completed in-transit-shipment and receiving forms in order to ensure proper physical counts.

Banger and Aroostook RR Co. personnel check all material activities carefully during the inventory-taking period and adjustments are made to the ledger figures to reflect the same.

Auto-Train Corporation's issue slips are marked pre-count and post-count during the cut-off period.

At the Maine Central RR Co., of Portland, Maine, emergency orders are only processed during inventory week.

The Maryland and Pennsylvania RR inventory procedure is to stop all receivings and movement of materials without the knowledge of the inventory team leader.

The Manufacturer's Junction RR respondent stipulated that the movement of inventory is infrequent during counting.

The Norfolk and Western RR Co. respondent explained that material in transit is accounted for at the receiving location.

The respondents for the Atlanta and St. Andrews Bay Railway Co. stated that during inventory all receipts of stock are kept separate until the counting is completed.

The Florida East Coast Rwy. Co. respondent indicated that any material in cars during inventory verification is confirmed by transfer documents.

The respondent for the M-K-T Railroad Company of Dallas, Texas, explained that material in transit is verified by requisitions covering such materials.

Inventory tags or count sheets should be prenumbered, controlled and accounted for to ensure complete recording on final inventory sheets. The respondents for 48 percent of the railroads surveyed felt that controls over tags or count sheets should minimize the possibility of altering recorded count data or preparing fictitious tags or sheets (see Appendix F, p. 110).

The Union Pacific RR Co. prenumbers their cards and accounts for them through computer programs. The inventory counts are often recorded originally on count tags.

The respondents for Burlington Northern RR explained further that the computer can process an inventory analysis for items possibly overlooked.

The respondents for the Chessie System explained that each inventory card contains a prepunched control number in order to ensure that all items have been accounted for.

The respondents for Banger and Aroostook RR Co. specified that inventory sheets are computer runs of a materials catalog with spaces provided for count and value changes.

Auto-Train Corporation uses preprinted, prenumbered cards to ensure complete recording on final inventory sheets.

The Maine Central RR Co. furnishes each location with a computer printout in numerical sequence of all inventory items.

Maryland and Pennsylvania RR uses assigned prenumbered tags that are recorded and accounted for upon return.

The Norfolk and Western RR uses computer produced inventory tags and count sheets with a control listing.

The Atlanta and St. Andrews Bay Railway uses computer print out sheets for recording prenumbered tags.

Prices, extensions and footings of inventory listings should be checked by someone independent of the employee responsible for the original computations.

The respondents for 65 percent of the railroads questioned indicated that inventories should be priced by employees familiar with current costs and market prices, or with the sources from which such costs or market prices are obtained as shown on Table 14.

Many of the respondents for the western railroads, or 84.6 percent, suggested that after inventory counts have been prepared and checked, the individual items can be priced and extended and inventory totals ascertained for comparison with the general ledger control and any necessary adjustments made to that account.

Respondents for the eastern railroads (59.2 percent), and the southern railroads (50 percent), contended that segregation of duties must exist in checking prices, extensions and footings of inventory listings.

Table 14
 Inventory Pricing by Forty-six
 Railroads in the U.S.
 August, 1978

Segregation of Inventory Pricing	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Had Segregation of Duties for Inventory Pricing	17	59.2	11	84.6	3	50.0	30	65.0
Had No Segregation of Duties for Inventory Pricing	6	22.2	1	7.7	3	50.0	10	21.7
No Response	5	18.6	1	7.7	-	-	6	13.3

*Number and Percent of Response

Procedures should be adequate for reviewing inventory for excess, obsolete and slow-moving stock and for approving their write-down or disposition. Fifty-nine percent of the respondents for the railroads questioned indicated that consignment goods, obsolete or defective parts, or any other items not to be included in the inventory should be clearly marked.

The Chessie System reviews inventory for excess, obsolete and slow-moving stock at their inventory store locations on a monthly basis. Slow-moving and obsolete merchandise are valued by officials or employees who are in a position to estimate fair realizable values.

The respondents for the Bangor and Aroostook RR Co. explained that slow moving or obsolete items are coded and run separately for review and possible write-off and/or disposal.

Based on the opinion of the foreman, amounts of inventory which are obsolete are expensed as scrap by Manufacturer's Junction Rwy.

Norfolk and Western RR's aging reports, on obsolete and slow-moving stock, are produced by the computer.

The respondents for the Denver and Rio Grande Western Railroad Co., indicated that computer runs prepare automatic reorders, force material transfers, surplus force material transfers, and a surplus list. Slow moving or static items are flagged in order for the computer to indicate lead time and stock levels.

The Kansas City Southern Ry. Co. maintains only a supply type inventory for repairs and fixed assets construction. Obsolescence is not considered to be much of a problem for the company.

Duluth, Missabe and Iron Range Rwy. Co. has an annual review for potential obsolete or slow-moving stock in the form of a write-down.

Procedures should be adequate for reviewing inventory for excess, obsolete and slow-moving stock and for approving their write-down or disposition. Fifty-nine percent of the respondents for the railroads questioned indicated that consignment goods, obsolete or defective parts, or any other items not to be included in the inventory should be clearly marked.

The Chessie System reviews inventory for excess, obsolete and slow-moving stock at their inventory store locations on a monthly basis. Slow-moving and obsolete merchandise are valued by officials or employees who are in a position to estimate fair realizable values.

The respondents for the Bangor and Aroostook RR Co. explained that slow moving or obsolete items are coded and run separately for review and possible write-off and/or disposal.

Based on the opinion of the foreman, amounts of inventory which are obsolete are expensed as scrap by Manufacturer's Junction Rwy.

Norfolk and Western RR's aging reports, on obsolete and slow-moving stock, are produced by the computer.

The respondents for the Denver and Rio Grande Western Railroad Co., indicated that computer runs prepare automatic reorders, force material transfers, surplus force material transfers, and a surplus list. Slow moving or static items are flagged in order for the computer to indicate lead time and stock levels.

The Kansas City Southern Ry. Co. maintains only a supply type inventory for repairs and fixed assets construction. Obsolescence is not considered to be much of a problem for the company.

Duluth, Missabe and Iron Range Rwy. Co. has an annual review for potential obsolete or slow-moving stock in the form of a write-down.

Table 15
Inventory-taking Procedures in the Railway Industry
for Forty-six Railroads in the U.S.
August, 1978

Inventory-taking Procedures	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Recorded Liability for all Items Re- ceived and Included in Inventory	16	59.2	12	92.3	4	66.7	32	69.6
Items Sold and Billed, not Shipped, but Excluded from Inventory	10	37.0	7	53.9	3	50.0	20	43.5
Others	-	-	1	7.7	-	-	1	2.2

*Number and Percent of Response

Table 16
 Perpetual Inventory Records and Control Accounts
 of Forty-six Railroads in the U.S.
 August, 1978

Documents Adjusted to the Physical Counts	Railroads by Geographical District							
	EAST		WEST		SOUTH		U.S.	
	No.*	Per- cent	No.	Per- cent	No.	Per- cent	No.	Per- cent
Perpetual Inventory Records and Control Accounts were Adjusted to the Physical Counts	20	74.1	13	100.0	4	66.7	37	80.5
Perpetual In- ventory Records and Control Accounts were not Adjusted to the Physical Counts	4	14.4	-	-	2	33.3	6	13.0
No Response	3	11.5	-	-	-	-	3	6.5

*Number and Percent of Response

The Butte, Anaconda and Pacific Ry. Co. of Anaconda, Montana, makes periodic reviews of excess and slow-moving stock.

Burlington Northern railroad uses parameters for testing inventories against usage that are encoded in the computer process, and exception reports are developed regularly.

The Valley and Siletz RR does not have much of a problem in reviewing the inventory for excess and obsolete stock, because they have very small quantities of materials on hand.

Inventory-taking procedures should assure that: liability has been recorded for all items received and included in inventory; and, items sold and billed but not yet shipped have been excluded from the inventory. Respondents for 38 percent of the railroads surveyed stipulated that procedures include control over receiving reports (as required, delayed payment, demand exception, need to purchase, stock status, tracking signal) and shipping tickets in a manner which readily identifies the purchase invoices to be recorded in the current accounting period as shown on Table 15. In order to identify the purchase invoices, cash discount codes, date invoice received, and vendor receipt cards must be formulated.

The Burlington Northern Railroad also segregates its in-transit material in the perpetual records.

Perpetual inventory records and control accounts should be adjusted to the physical counts, and adjustments should be investigated and approved. Inventory records were adjusted to the amounts on hand and determined by physical counts by 80.5 percent of the railroads surveyed as shown on Table 16.

Detailed perpetual inventory records were maintained, and the records were adjusted to agree with the physical count by 74.1 percent of the eastern railroads that were questioned. A "purchase order general master" was used to check any differences in the purchase of materials which could affect inventory reconciliations.

Major differences in the inventory were investigated before the physical count was accepted as being correct by 100 percent of the western railroads that responded to the survey.

All important differences between the physical inventory and the perpetual stock records were investigated, and the nature of minor differences was reviewed for indications of a general pattern of errors or defalcations by 66.7 percent of the southern railroads questioned.

Automated Records

Fungible materials should be maintained in physically identifiable lots with subsidiary stock records maintained for each lot. Given the above circumstances, inventory accounting is a natural choice for some form of automated data processing, utilizing one of the two basic types of inventory systems: open item or balance forward. Twenty-eight percent of the railroads surveyed used the open-item system, as an adaptation of the "tub file" system of manual record-keeping and involves a separate record for each identifiable stock-keeping unit, whether it be an individual item or a case or other package containing a stated number of the individual items (see Appendix E, p. 108).¹

Twenty-eight percent of the railroads questioned, use computer processing, which is likely to be on a balance-forward, average-cost

¹Ibid., p. 225.

basis; although it is possible to develop Fifo or Lifo costs by accounting for each batch of goods received as a separate lot.

Management Review and Control Procedures

If low cost materials and supplies are charged directly to expense, the control procedures should be adequate to compensate for the lack of detailed inventory records. Low cost materials and supplies are often charged directly to expense because the costs of maintaining detail records outweigh the information and control benefits of 34.8 percent of the railroads surveyed.

The Florida East Coast Railway has controls to compensate for the lack of detailed inventory records, which are basically the same with the exception of issue reports.

Respondents for the Chessie System explained that most direct charge items are maintenance of way responsibility controlled by their materials engineering group.

Respondents for Bangor and Aroostook RR Co. stated that all materials on purchase orders are reviewed by the using department and approved by the purchasing department before payment.

The respondents for the Auto-Train Corporation explained that management reviews all of the expense budgets.

Respondents for the Manufacturer's Junction Ry. noted that their lack of large amounts in purchasing, allows them to keep adequate control.

The respondents for the St. Louis San Francisco Ry. indicated, that low cost materials and supplies are charged directly to expense, and are controlled only to a limited degree.

Quantity control records are maintained by the Butte, Anaconda & Pacific Ry. Co. in regards to low cost materials and supplies that are charged directly to expense.

In gross terms, exceptions could be noted during comparison of budgets to actuals, in regard to direct charges to expense, according to respondents from the Burlington Northern RR.

The general manager of the Valley and Siletz RR approves all transactions in regards to direct charge purchase orders.

Management should review procedures to assure that inventories are adequately insured at all times. Fifty-two percent of the railroads questioned have inventory insurance procedures that provide adequate insurance coverage at all times.

The parent corporation of Valley and Siletz RR continually reviews procedures of inventories that are subject to considerable variation during the year.

The Duluth, Missabe & Iron Range Rwy. Co. is self-insured totally in accordance with company policy.

All of the Denver and Rio Grande Western RR Co.'s properties and materials are insured by the Manager of Insurance.

The Chessie System is basically self-insured for anything less than a catastrophic loss.

The Florida East Coast Rwy. Co. has a blanket policy that insures to the extent of recorded cost.

Management Reports

All of the railway industry's respondents emphasized that effective control and management of the railway system depended heavily on adequate reports covering all activities relating to inventories.

First-hand information was obviously impossible to obtain, and reports served instead to convey the important facts concerning materials and material cost. Monthly operating statements served as an overall check on day-to-day decisions, and top management relied heavily on these statements in evaluating the performance of individuals to whom inventory responsibilities had been delegated. To prepare such statements, the accounting department kept its records in a manner which permitted determining the cost of materials and supplies. Using this key figure, and without the expense of a physical inventory, dollar inventory balances were reported. These balances were broken down by department, by type of inventory or in any other manner which added to the significance of the reported figures.

Responsibility reporting of the operating expenses of the various departments concerned with handling inventories and the related accounting records was essential for control of those expenses. Further useful interpretation of such expense figures could have been made if activity figures were also reported, such as the number of orders handled, tonnage moved, or number of transactions posted. Comparative costs per unit of activity presented the best indication of operating efficiency.

Internal Auditing

Physical safeguards over inventories should be adequate. In order to ensure that safeguards over inventories are adequate, 71.7 percent of the railroads questioned maintained a staff of internal auditors.

Each department which shared in the responsibility for inventories came under the scrutiny of the internal auditor. His examination

disclosed whether procedures reflecting good internal control were being followed, whether operations were conducted efficiently and without waste, and whether transactions had been accurately recorded and reported. The accounting department came under particularly close scrutiny. Records were checked to show if the dollar value of goods on order were being verified. Paid invoices were reviewed to ascertain the accuracy of the recording of these invoices in both the general records and the detailed perpetual inventory records.

The storage function was audited from the standpoint of whether prescribed procedures for receiving and issuing materials were being followed. Of perhaps even greater importance were the physical aspects of the storage function. Materials were checked to ensure that they were stored in an orderly fashion and properly protected against breakage, damage from the elements, and unauthorized withdrawals, but with maximum efficiency in use of space.

The data presented in this chapter was an interpretation of the information collected from the responses by twenty-seven eastern railroads, thirteen western railroads, and six southern railroads. A summary and recommendations will be presented in Chapter 4.

Chapter 4

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine the most acceptable methods and procedures to control inventories in the Railway Industry which will be applicable to the acquisition and disbursement of materials and supplies used in the daily operations of the railroads.

The procedure for completion of this research study involved: learning the basic concepts of inventory control through on-the-job training, attendance at workshops, extensive library research, and letters and questionnaires received from U. S. railroads.

Fifty-five letters and questionnaires were sent to western, eastern, and southern U. S. railroads that were known to be developing new methods of inventory control, requesting copies and asking questions about their revised inventory management procedures and annual reports (see Appendix A, p. 93). Forty-six usable questionnaires were returned.

Summary

To determine the appropriateness of the accounting principles and methods used by a particular railroad, a determination must first be made that the accounting system is synchronized with the characteristics of operating activities and transactions. A railroad may have excellent management controls and good internal accounting controls; but if inaccurate and unreliable accounting data is used, the financial statements may be seriously affected.

The most pertinent material relating to the inventory control procedures developed through this study was found in questionnaires that were returned by a number of U. S. railroads and related literature (see Appendix B, p. 100).

Accounting for purchasing and inventory costs has become a major problem in most railroads and represents a substantial proportion of the total accounting activity. The number of transactions and dollars involved, plus the number of railway employees who handle the inventories from time of acquisition to time of disposition, all point to a need for good internal control over an important series of activities.

Cost System and Perpetual Records

The railway industry's cost systems are summarized with a view toward determining the accuracy of the figures for inventory costs resulting from the method of cost accumulation in force. Inventory requisition summaries were inspected and the quantities traced to the credits or inventory records on a test basis by most railroads. Furthermore, quantities shown on the requisitions agreed with the quantities shown on the inventory records as disbursements. However, if disbursements for which requisitions had not been issued are shown on inventory records, then there could be evidence of inventory manipulation. Authorizations to sign inventory requisitions were compared with the signatures appearing on the requisitions.

A perpetual inventory system was in operation in most of the railroads. The perpetual inventory system was maintained in most cases by the accounting department. A controlling account record of the receipts, issues, and inventory balances was kept in most railway accounting departments; periodically, these departments made their entries in

summary form, not in detailed form. Thus, the perpetual subsidiary account totals were verified by a department that did not have access to the materials in a majority of the railroads.

Custodial and Physical Controls

Custodial and physical controls of inventory were directly related to purchasing and accounting for goods and services in many railway companies. Proper control over railway inventories dictated that the goods be properly ordered, received, controlled, segregated, requisitioned, and used, and the remaining inventories were properly counted, priced, extended, and totaled. Each element of internal control, above, was independent of each other, so that total inventories resulted in proper reflection of costs.

There were many types of loss protection insurance obtainable upon inventory in the railway industry. In relation to custodial and physical controls, the type of inventory in large measure determined the type of insurance to be carried. Most railroads had fire and extended coverage, theft, and burglary insurance to cover small-item merchandise.

Periodic Physical Counts and Pricing Procedures

Inventory-taking procedures were not able to be described for all the different types of railroads. However, certain points were kept in mind by a number of railroads while taking inventory, such as: (1) withdrawals from inventory and additions to inventory were recorded on the count tags or sheets during the time of the taking of the inventory; and (2) all discrepancies between physical and book inventories were recorded and the book inventories corrected.

With modern inventory control methods, many railroads rotated the counting of inventory; that is, certain items of inventory were counted each month (or each week) and the perpetual inventory records were brought into agreement with the count. This way, the inventory was completely counted at least once a year without serious disruption of activity.

Inventory pricing in the railway industry was meant as the dollar amount of inventory to be used for statement purposes at the end of a period, where an amount will be carried forward.

In accordance with recognized principles, the primary basis of accounting for railway inventories is cost.

There is no one method of pricing inventory which is universally applicable to all railroads; however, consistency of method was followed from year to year.

General Ledger Records

General ledger controlling accounts were maintained by a number of railroads. The cost and general accounting departments are always notified of any issuance by a railroad's storekeeper so that the proper order or department may be charged and the controlling inventory accounts credited. The controlling accounts, the sum of the perpetual inventory accounts, and the results of a physical inventory are certain to be in agreement if controlled properly; however, fraud can arise through improper requisitions, theft, or collusion. Most of the railroads separate materials and their records, and trace receipts and issues, so theft is left as the only method of fraud possible and it is usually discoverable.

Adequacy of Segregation of Duties -- Purchasing

Purchase orders for goods and materials have usually been placed as needed and for optimum quantities by most railroads. Furthermore, terms, prices, and clerical accuracy of vendors' invoices are corrected before payment is authorized by railway purchasing management.

Proper consideration to transportation costs and the most economical mode of transportation is taken into account by a majority of the railway industry. Therefore, most railroads have tried to avoid overbuying in relation to current needs, which could have resulted in excessive financing, storage costs, and possible losses due to obsolescence or deterioration.

Finally, failing to order promptly or failing to follow orders, resulting in purchasing delays, have also been avoided by a large number of railroads.

Segregation of Duties -- Receiving

U. S. railroads have also tried to avoid inaccurate counting and permitting shortages in goods received to go undetected. Accepting goods which are not as ordered, is not practiced by most railroads, because it could cause purchasing problems.

Segregation of Duties -- Inspection

Most railroads try to detect material or merchandise which is defective or otherwise fails to meet company standards.

Segregation of Duties -- Storing

Careless handling, resulting in breakage or deterioration of materials and supplies is closely watched by the railroads. Also, the railroads provide adequate protection against access to inventories by outsiders or unauthorized employees, which could result in loss or unaccounted for materials.

Special care is taken by a majority of the railroads to avoid overlooking of inventory items and improperly reporting them as being out of stock.

Segregation of Duties -- Shipping

Careless counting of quantities resulting in shipping more goods than are charged to a railway's storepoint is discouraged.

Segregation of Duties -- Accounting

The railroads provide adequate, current, and reliable data on which to base decisions. They maintain accounting records in such a way that accountability is established so that losses will be disclosed and reported. Furthermore, the railroads exercise proper care in approving disbursements.

Proper segregation of duties and precise recognition of responsibilities are at least as important to good internal control over railway inventories as they are to good internal control over other more liquid assets.

Management Reports and Internal Auditing

Effective control and management of the railway industry depended heavily on use of adequate reports covering all activities relating to inventories. Therefore, annually, when the physical inventory was

taken, variances between book balances and the physical inventory was reported.

In railroads employing standard cost systems, material price variances were developed and reported to reveal market price trends and purchasing efficiency. Also, inventory reports analyzing turnover for various classes of items, or showing an age breakdown for items, were useful in reviewing inventories for slow-moving or obsolete items.

Finally, responsibility reporting of the operating expenses of the various railway departments concerned with handling inventories and the related accounting records were found to be essential for control of those expenses.

On each railroad, inventories came under the scrutiny of the internal auditor. The storage function was usually audited from the standpoint of whether prescribed procedures for receiving and issuing materials were being followed. The railway internal auditor has always been given an important part in the taking and valuing of the physical inventory. Furthermore, the railway internal auditors have been found to be effective agents of the directors and officers in achieving the objectives of inventory control.

Conclusions

The following conclusions are based on information returned by respondents from forty-six railroads throughout the United States:

1. Railway inventory quantities were adequately protected against losses from theft, spoilage, unauthorized withdrawals by employees, and the ravages of the elements.

2. There was separate-item accountability for both material and dollars for inventory quantities received, on hand, and issued.

3. Differences between book and physical inventories were ascertained, differences adjusted, and the amount of overage or shortage were properly accounted for.

4. Proper authorization existed for railway inventory quantities removed from stock.

5. Most transactions pertaining to the issue of the inventory quantities were accounted for and entered in the controlling records.

6. Inventory issues were costed according to an acceptable method and the costs accounted for in a manner that provided adequate information for management, including variances from standards.

7. The chief railway accounting officer has the responsibility for planning and implementing inventory-taking procedures.

8. The accuracy of account balances was established at regular intervals by taking a physical count of inventories.

9. For control purposes, estimates were made by qualified railway technical personnel who were not responsible for inventory custody.

10. An evaluation of the possibilities for errors in the inventory compilation system indicated that footings, extensions, and recapitulations of the inventory were rechecked by railway employees independent of those making the original computations.

11. Reviews for excess, obsolete or slowmoving stock and approvals of writedowns or dispositions were not made by railway employees responsible for purchasing, shipping or inventory custody.

12. All major inventory adjustments were approved in writing by an appropriate railway accounting official after satisfying himself as to the reasons underlying the differences.

13. Very few of the fungible materials were stored by the railroads in identifiable lots and records were seldom maintained on each lot.

14. Low cost materials and supplies were not often charged directly to expense because the costs of maintaining detailed records did not outweigh the information and control benefits.

15. Inventories subject to considerable variation during the year required a periodic review to assure adequate coverage.

16. Physical safeguards were supplemented by procedures requiring written authorizations for all items and packages taken out.

Recommendations

1. Control over all outward movement of materials should be centered in the store department, which should operate under the general requirement that nothing is to be released from the department without written authorization.

2. Stock records should be maintained by hand on cards or sheets with individual visible index filing, by accounting machine or posted ledger cards, or by various methods using punched cards.

3. The stock records activity should be under a general or cost accounting, and purchasing system.

4. Receipts of inventory should be posted from copies of receiving reports sent directly to the stock records unit from the receiving department.

5. Serial numbers of the issue forms should be accounted for to assure that none have been lost or overlooked.

6. In systems based on actual costs, the form recording an issue should be costed and extended, so that both quantity and dollars can be posted to the records.

7. Inventories should be controlled by both detailed material records and general ledger perpetual inventory accounts.

8. General ledger perpetual inventory records should be used for the preparation of interim financial statements.

9. Written instructions for the taking of inventory should be prepared covering each separate job to be assigned to various railroad employees, and steps should be taken to be certain that these instructions are fully understood, and that each individual is impressed with the importance of carefully following the instructions.

10. Counting of inventory items should not be done by the same railway employees who are responsible for custody of the inventory.

11. The receiving and store departments should be cleared of all materials before counting is begun, and receiving reports and issuing documents prepared near the date of the inventory count should clearly show the date the goods were received or issued.

12. Supervisors should be on hand to observe the counting process and to be certain that instructions are being followed.
13. Each department should be inspected and "cleared" by a supervisor before the counting is considered to have been completed.
14. A "blind" second count should assure that counting has been accurately performed.
15. Count tags or tickets should be prenumbered and all numbers accounted for as soon as the tickets are turned in to ascertain that no tickets are omitted from the final inventory figures.
16. The first inventory counter or count team should fill in the stock number, description, and location, complete the data for the first count, attach the tag to the inventory, and remove the first-count sub.
17. The quantity figures should be compared with perpetual inventory records if such records are maintained.
18. Automated records should be set up where open-item cards are "gang punched" from "master" cards whenever inventory items are received, and in sufficient number to provide one card for each item of stock received.
19. As orders are received, cards equal to the quantity of stock ordered should be removed from the file.
20. Prepunched cards showing description, location, and other pertinent information should be used in taking a physical inventory.
21. Subsequent machine processing should include arranging the cards in order by a prepunched inventory tag number to determine whether all cards are present, extending quantity and unit cost to obtain total

inventory cost for each item, sorting according to inventory codes and classification, and then listing the items to obtain a complete inventory record and totals.

22. Annually, when the physical inventory is taken, variances between book balances and the physical inventory should be reported.

23. Outstanding purchase commitments should be reported if they are an important factor in the total inventory position.

24. Inventory reports analyzing turnover for various classes of items, or showing an age breakdown for the items, should be used in reviewing inventories for slowmoving or obsolete items.

25. The internal audits department should have an important part in the taking and valuing of the physical inventory.

26. The internal auditors should review and approve the detailed plans and instructions for taking the inventory.

27. Internal auditors should observe the actual taking of the inventory to ascertain whether the established procedures are being followed, and often they will have direct supervisory responsibility in connection with this work.

28. The auditors should satisfy themselves that all materials have been counted, and that all count tickets and inventory sheets have been accounted for.

29. Internal auditors should make tests of inventory pricing, taking particular note that market values have been used when these are below cost and that damaged or obsolete items have been segregated and priced at their realizable value.

30. Extensions and footings should also be tested by the internal auditors, and they should verify the inventory variances developed from the comparison of the book and physical inventory amounts.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

- Dykeman, Francis C. Financial Reporting Systems and Techniques. Prentice-Hall, Inc., 1969.
- Grady, Paul. Inventory of Generally Accepted Accounting Principles For Business Enterprises. 1965.
- Stettler, Howard F. Systems Based Independent Audits. Englewood Cliffs, N.J.: Prentice Hall, Inc., 1974.
- Toan, Arthur B. Using Information to Manage. New York: The Ronald Press Company, 1968.

B. PERIODICALS

- Bruno, J.D. "Auditing On-Line Realtime Electronic Data Processing Systems," Management Services, CCXVI (March/April, 1968), 17.
- Cerullo, M.J. "Untapped Computer Service Bureau Potential," Journal Of Accountancy, CXXXVIII (December, 1974), 106.
- Chu, Albert L.C. "Computer Security: The Corporate Achilles Heel," Business Automation, XII (February 1, 1971), 33.
- Davis, Keith. "Evolving Models of Organizational Behavior," The Internal Auditor, CXC (November/December, 1968), 27.
- Evans, E.R. "Managing the Internal Audit Function," The Internal Auditor, CXCVIII (January/February, 1970), 14.
- Herron, D.P. "Cost Tradeoffs in Distribution Management," International Journal of Physical Distribution, V (July, 1975), 252.
- Higgins, Carter C. "Make-or Buy-Re-Examined," Harvard Business Review, XLIX (March-April, 1955), 118-119.
- John, R.C. "Evaluating Internal Control in EDP Audits," The Journal of Accountancy, LXXXVII (February, 1970), 31.
- Kaufman, Felix. "The Computer, the Accountant, and the Next Decade," The Journal of Accountancy, CIV (August, 1971), 33.

- Konrath, L.F. "The CPA's Risk in Evaluating Internal Control," The Journal of Accountancy, CVI (October, 1971), 53.
- Lewis, Robert G. "Burlington Northern, Frisco Open Talks," Railway Age, CLXXVIII (February, 1977), 7.
- Love, T.J. "A Logistics Review for the Small Company," International Journal of Physical Distribution, VI (July, 1976), 297.
- Miller, Luther S. "MOPAC Adds to '77 Program in '76," Railway Age, CLXXVII (January, 1977), 5.
- Mints, Frederic E. "New Developments in Operational Auditing," The Internal Auditor, LXXIV (June, 1960), 11.
- Moloney, R.F. "New Generation EDP Controls," Management Services, CCXVI (March/April, 1968), 25.
- Mosler, Jack A. "Auditing the Quality of Engineering Drawings," The Internal Auditor, CXXV (Fall, 1964), 16.
- Pooler, V.H. "The Purchasing Man and His Job," AMA, XIV (1964), 176.
- Porter, W.T. "Evaluating Internal Controls in EDP Systems," The Journal of Accounting, XXXVIII (August, 1964), 36.
- Sawyer, L.B. "The Anatomy of Control," The Internal Auditor, CXXIII (Spring, 1964), 15.
- Smith, N.A. "Achieving the Objectives of Internal Auditing," The Internal Auditor, CXCIV (May/June, 1970), 65.

C. UNPUBLISHED MATERIAL

- The Institute of Internal Auditors. "Financial Analysis to Guide Capital Expenditure Decisions." Unpublished Research Report, no. 43, 1967.
- _____. "Survey of Internal Auditing." Unpublished Research Committee Report, no. 15, 1968.

D. OTHER SOURCES

AICPA. Audits By Certified Public Accountants, 1962.

Farrell, J.B. "Planning in the Modern Corporation," Price Waterhouse Review. III (1965), 4.

Gunders, Henry. Production Costs and Inventories, Chicago, Illinois: Price Waterhouse & Co., 1970.

Price Waterhouse & Co. The Independent Accountant's View of Procurement and Purchasing in Industry, 1969.

Sawyer, Larry. The Practice of Modern Internal Auditing, The Institute of Internal Auditors, Inc., 1973.

U.S. Department of Defense. Value Engineering H III, Handbook, 1963.

APPENDIXES

APPENDIX A
LETTER AND QUESTIONNAIRE

3810 N. W. 37th St. Terr.
Topeka, Kansas 66618
May 16, 1978

Mr. Richard L. Murlowski
Vice President, Accounting
Soo Line Railroad Company
800 Soo Line Building
Box 530
Minneapolis, Minnesota 55440

Dear Mr. Murlowski:

You and your Accounting Department Manager can give me some assistance. I am currently writing my thesis for a masters degree in business administration from Emporia State University, Emporia, Kansas. The problem that I am interested in concerns new methods as well as existing ones in railway inventory control.

Enclosed you will find a questionnaire which is being sent to other railroads across the Continental United States, that are presently setting up new inventory control procedures. An addressed stamped envelope is provided for return mailing. Tabulation of the results is scheduled for Tuesday, August 1, 1978. If you desire a copy of the analysis of this survey, please include your name and address. An early return will be appreciated.

Your cooperation will be appreciated.

Sincerely yours,

John R. Vacca
Graduate Student

INVENTORY CONTROL IN THE
RAILWAY INDUSTRY

(To the Accounting Department)

Name of Railroad _____

City _____ State _____

1. Are responsibilities for purchasing and inventory planning, purchasing operations and inventory custody segregated from those for inventory records, cost accounting and general ledger?

Yes _____ No _____

2. Are responsibilities for maintaining inventory records segregated from the general ledger records?

Yes _____ No _____

3. Is responsibility for supervising physical inventory-taking and approving the recording of adjustments arising from physical inventory-taking assigned to a responsible accounting official?

Yes _____ No _____

4. Are all purchasing activities initiated on the basis of properly authorized and approved purchase orders?

Yes _____ No _____

5. If a standard cost system is used by your company, indicate by a check mark in the space provided below the type of characteristics the inventory control system would fall into.

_____ Integrated with the general books.
_____ Significant variances reported in an informative and
timely manner to management.
_____ Standards reviewed on a regular basis.
_____ Other(s) Specify _____

6. Does the cost system assure that material and labor costs are reliably and consistently accumulated, classified and distributed to the appropriate products or jobs?

Yes _____ No _____ If yes, explain your answer further: _____

7. Check if the type of cost system used in your company adheres to the following:

_____ all materials transferred are accurately reported by the stores and purchasing departments.
_____ Material pricing procedures are accurate and consistent.
_____ Direct and indirect labor (in both purchasing materials departments) are accurately classified and reported via job cards, time tickets, or other appropriate means.
_____ Other(s) Specify _____

8. Are all overhead costs appropriately accumulated and classified?

Yes _____ No _____

9. Check the type of inventories that detailed perpetual records are maintained for in your company.

_____ Raw Materials
_____ Work in process
_____ Finished goods
_____ Supplies
_____ Scrap
_____ Other(s) Specify _____

10. Are all withdrawals from inventories supported by authorizing documents?

Yes _____ No _____

11. Are all authorizing documents accounted for numerically or otherwise?

Yes _____ No _____

12. Procedural and recording controls assure that there is proper accounting for the following: (check if applicable to your company)

_____ Inventories owned, but consigned-out, or otherwise stored at outside locations.

_____ Inventories not owned, but consigned-in, stored or otherwise held for the account of others.

_____ Others Specify _____

13. Are physical inventories taken at least once each year?

Yes _____ No _____

14. Are written instructions prepared and issued for the guidance of employees participating in physical inventories?

Yes _____ No _____

15. Do count teams adhere to instructions and is sufficient care taken by counters and checkers to ensure that counts are accurate?

Yes _____ No _____ If yes, explain _____

16. Are inventory items physically arranged in such a way that accurate counting is facilitated?

Yes _____ No _____

17. Is inventory movement adequately controlled during physical inventory-taking?

Yes _____ No _____ If Yes, explain further: _____

18. Are inventory tags or count sheets prenumbered, controlled and accounted for to insure complete recording on final inventory sheets?

Yes _____ No _____ If yes, explain further: _____

19. Are prices, extensions and footings of inventory listings checked by someone independent of the employee responsible for the original computations?

Yes _____ No _____

20. Are procedures adequate for reviewing inventory for excess, obsolete or slow-moving stock and for approving their write-down or disposition?

Yes _____ No _____ If yes, explain further: _____

21. Check whether inventory-taking procedures assure the following in your company:

_____ Liability has been recorded for all items received and included in inventory.

_____ Items sold and billed but not yet shipped have been excluded from the inventory.

_____ Others Specify _____

22. Are perpetual inventory records and control accounts adjusted to physical counts?

Yes _____ No _____

23. Are the adjustments investigated and approved?

Yes _____ No _____

24. Are fungible materials (e.g. grain, coal, lumber) maintained in physically identifiable lots with subsidiary stock records maintained for each lot?

Yes _____ No _____

25. If low cost materials and supplies are charged directly to expense, are control procedures adequate to compensate for the lack of detailed inventory records?

Yes _____ No _____ If yes, explain further: _____

26. Do management review procedures assure that inventories are adequately insured at all times?

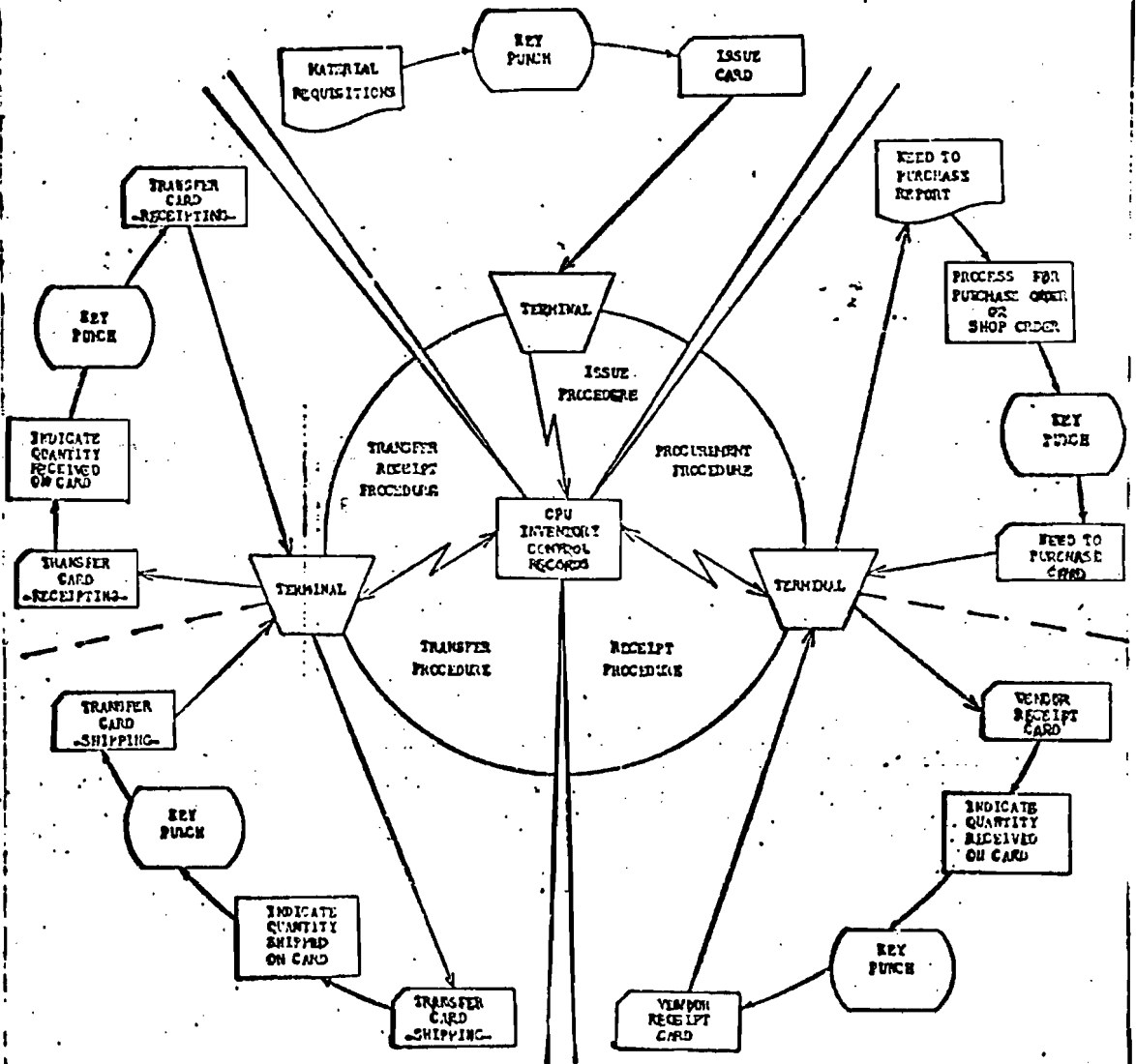
Yes _____ No _____ If yes, explain further: _____

27. Are physical safeguards over inventories adequate?

Yes _____ No _____

APPENDIX B
Example Of An Inventory Control
System Overview

INVENTORY CONTROL SYSTEM OVERVIEW¹



¹This system overview was released by R. L. Murłowski, Vice President of Accounting, for Soo Line Railroad Company, on July 23, 1974.

APPENDIX C

Example of Written Instructions for the
Taking of Physical Inventories

SYSTEM MEMORANDUM

Gentlemen:

Management has agreed to eliminate the annual cycle inventories for material fully implemented under the Inventory Management Procedures.

With the elimination of the annual inventories, it is imperative that the procedures outlined in the Inventory Management Procedure Manual be observed in order to insure that the data reflected in our perpetual inventory records is accurate and represents the true physical level of our inventory. Accurate records are mandatory in order to control inventory and to properly record these assets.

You should continue to closely follow these procedures in order to eliminate any imbalances between the physical count and the computer records as these imbalances could result in an out-of-stock or surplus condition. Those items that are called to your attention under the following methods should be rectified on a daily basis.

1. Daily Reject Listing
2. Action Report
3. Check List
4. Need to Purchase
5. Stock Status
6. Physical Test Checks

The above methods, especially one through three, must be closely investigated and if any doubt exists as to a discrepancy, all documentation for the item should be held for a two or three day period. An inquiry should then be made and, if necessary, the reconciled computer record adjusted to the physical quantity on hand.

In addition, inventory tests of approximately 90 items, selected by the Internal Audit Department, will be checked on a periodic System basis throughout the year. The results of these tests will be furnished by the Internal Audit Department in all interested departments.

Procedures for taking and reconciling the inventory counts are outlined below.

1. Internal Audit Department representative will notify the Purchasing and Materials Department's designated Inventory Coordinator (approximately one week in advance) that inventory tests are being scheduled.

2. Items selected by the Internal Audit Department to be counted will be "flagged" in the computer and all subsequent transactions processed for these items will be rejected and must be used as "reconciliation" items. On the morning of the inventory, a two-part listing produced through the Inventory Management Procedures program will be furnished the P&M Department processing bureau managers ahead of the daily business.

These listings will be mailed to the locations involved with the inventory; however, all stores will be notified by phone of the items to be inventoried by their respective processing bureaus.

3. Upon receipt of the listing (Step 2) by store personnel, the inventory counts should be commenced, reconciled and returned to the processing bureau manager as soon as possible.
 - a. All documentation should be current and documents for items having a daily, weekly, semi-weekly or monthly charge-out must be secured before commencing the physical counts.
 - b. Document "filled" before the physical count but not processed must be used a "reconciliation" items. This would include those documents on the reject listing (flagging procedures) and documents held in the store when the inventory was commenced.
 - c. All "reconciliation" document numbers and quantities must be recorded on the listing or on a separate schedule. If a separate schedule is used, only the total reconciliation should be recorded on the listing. Keep in mind that unprocessed "receipts" must be used as a minus and "issues" used as a plus reconciliation.
 - d. When the listing is complete, the original listing and all documents supporting the "reconciliation" quantities should be released to your processing bureau manager.
4. The inventory input data will be keypunched directly from the listing completed in Step 3. Therefore, it is imperative that the figures be legible, particularly in the "net" columns.
5. There will not be a tolerance factor for these inventories. Therefore, an adjustment will be made for the difference between the "net" quantities reported on the listing and the perpetual inventory record. Consequently, it is imperative that the physical count and reconciliation procedures be as accurate as possible.
6. A listing showing the adjustments developed in Step 5 will be received the day following the inventory input. This listing should be closely reviewed. Any items that have questionable adjustments should be re-inventoried and reconciled to the computer record. If a "secondary adjustment" is required, it

should be made on a document with the initials INV shown in the initials field. This form should be signed for approval by the appropriate P&M Department representative.

NOTE: This step is not to be used to obtain issue documents for differences noted and, if done, a 100% check of your inventory may be requested.

7. At month end a listing showing the results of the inventory (i.e., initial adjustment, secondary adjustments and net adjustment) will be produced as part of the document listing.
8. The processing bureaus should forward the inventory listing and any supporting schedules to the inventory Coordinator. This documentation, should then be sent to the Internal Audit Department (Attn: Inventory-Purchasing Section) for their use.
9. If the results of a store's inventory are not considered satisfactory, an expanded inventory test, using the above procedures, will be made the following month. If the second inventory is not acceptable, a 100% check of the store's inventory, using the IMP cycle inventory program (i.e., initial count - recount procedures) will be made.
10. This new program is scheduled to be tested in September and an inventory conducted in October. Next year it is anticipated that we will conduct two test inventories and that one inventory test will be conducted by the Internal Auditors. You are to assist them in this effort and reach a mutual agreement as to the "net" reconciled physical count before the listing is released to the processing bureau. It should also be understood that "test counts" may be made at the request of the Certified Public Accounting Firm, Internal Audits, Accounting or Purchases and Materials Department management.
11. Any questions concerning the inventory should be directed to your processing bureau manager or the inventory coordinator.¹

¹These inventory instructions were released by D.S. Burns, Chessie System's Auditor of Material Accounts, on September 2, 1977, as a guidance for employees participation in physical inventories.

APPENDIX D

Example of an Internal Control Check List

Internal Controls Check List

The internal controls involved with the inventory require the Internal Auditor to place a special emphasis in this area. Checks should include, but are not limited to, the following:

- | | <u>Done By</u> |
|--|----------------|
| 1. Adequate separation of duties. | _____ |
| 2. Adequate supervision controlling the taking of the inventory. | _____ |
| 3. Proper understanding and control over reconciliation details. | _____ |
| 4. Proper identification of material, i.e., new, second-hand, scrap, located at more than one location, etc. | _____ |
| 5. Segregation of "expensed" items, etc. | _____ |
| 6. Security over the materials. | _____ |
| 7. Compliance with Burlington Northern's inventory policies. | _____ |
| 8. Unusual circumstances, such as items on hand that appear to be for use other than railroad business. (Example: radios, irons, furniture, etc.). | _____ |
| 9. That requisitions are not obtained to cover shortages which would be considered "assumed material usages." ¹ | _____ |

¹This check list was released by E.A. Kohl, Burlington Northern's Director of Disbursement Accounting, on March 1, 1975. The check list is limited, however, it does give you an idea of control problems that may exist.

APPENDIX E

Example of an Automated Purchase Order

FORM NO.

PURCHASES AND MATERIALS DEPARTMENT

PURCHASE ORDER

PAGE OF

ORDER NO.

DATE

V
E
N
D
O
R

S
H
I
P
I
N
G

CARE OF:

BUYER AGREES TO PURCHASE FROM SELLER AT TERMS STATED IN THIS PURCHASE ORDER, INCLUDING TERMS AND CONDITIONS STATED ON THE REVERSE OF THIS PAGE, PROPERTY OR GOODS AS DESCRIBED.

ALL DATA SHADED IN RED MUST BE SHOWN ON ALL INVOICES AND PACKING SLIPS. THE PURCHASE ORDER NUMBER MUST ALSO BE SHOWN ON ALL PACKAGES, BILLS OF LADING AND CORRESPONDENCE.

SEND ORIGINAL INVOICE FOR EACH SHIPMENT TO:

AUDITOR OF DISBURSEMENTS
P.O. BOX

NO CHANGE MAY BE MADE IN THIS PURCHASE ORDER WITHOUT THE EXPRESS AUTHORITY OF THE PURCHASING AGENT NAMED BELOW.

PURCHASES AND MATERIALS DEPARTMENT

QUANTITY	UNIT	ITEM NO.	UNIT PRICE	MATERIAL DESCRIPTION

R
O
U
T
I
N
G

INQUIRY NO.	INQUIRY DATE	TAX EXEMPTION(S)
CONTROL NO.	MATERIAL REQUIRED AT DESTINATION: SHIP UPON RECEIPT OF ORDER, UNLESS OTHERWISE SPECIFIED →	VALUE OF ORDER

DIRECTOR OF PURCHASES AND MATERIALS


BY _____
PURCHASING AGENT

CASH DISCOUNT	SHIPPING POINT	FOB POINT	FREIGHT ALLOWANCE

APPENDIX F

Example of Inventory Count Tag

Inventory Count Tag

 No. 234 TAKER	

SECOND COUNT No. 234	
STOCK NO.	_____
DESCRIPTION	_____
LOCATION	_____
ON HAND	QUANTITY UNIT <input type="text"/> <input type="text"/>
COUNTED BY	_____

FIRST COUNT No. 234	
ON HAND	QUANTITY UNIT <input type="text"/> <input type="text"/>
COUNTED BY	_____

APPENDIX G

List of Forty-six U.S. Railroads that Responded
to the Survey by Geographical District

LIST OF FORTY-SIX U.S. RAILROADS
BY GEOGRAPHICAL DISTRICT

Twenty-seven Eastern Railroads

Auto-Train Corporation
Northwest Washington, D.C.

Bangor and Aroostook Ry. Co.
Bangor, Maine

Belfast & Moosehead Lake Railroad Company
Belfast, Maine

Chesapeake Western Railway
Harrisonburg, Virginia

Chessie System, Inc.
Cleveland, Ohio

Chicago and North Western Transportation Co.
Chicago, Illinois

Chicago, Milwaukee, St. Paul and Pacific RR. Co.
Chicago, Illinois

Conemaugh & Black Lick RR. Co.
Bethlehem, Pennsylvania

Conrail
Philadelphia, Pennsylvania

Emmons Industries, Inc.
York, Pennsylvania

I C Industries, Inc.
Chicago, Illinois

Illinois Terminal RR. Co.
St. Louis, Missouri

Katy Industries, Inc.
Elgin, Illinois

Maine Central Railroad Co.
Portland, Maine

Manufacturer's Junction Ry. Co.
Cicero, Illinois

Maryland and Pennsylvania RR
York, Pennsylvania

Missouri Pacific Corporation
St. Louis, Missouri

New York City Transit Authority
Brooklyn, New York

Norfolk and Western Ry. Co.
Roanoke, Virginia

Penn Central Company
Philadelphia, Pennsylvania

Peoria & Pekin Union Railway Co.
Peoria, Illinois

Providence and Worcester Co.
Woonsocket, Rhode Island

Reading Company
Plymouth Meeting, Pennsylvania

Southern Railway System
Washington, D.C.

The Lake Superior & Ishpeming Railroad Company
Marquette, Michigan

Wabash RR Co.
Roanoke, Virginia

Yankeetown Dock Corporation
Indianapolis, Indiana

Thirteen Western Railroads

Burlington Northern
St. Paul, Minnesota

Butte, Anaconda & Pacific Railway Company
Anaconda, Montana

Duluth, Missabe and Iron Range Railway Co.
Duluth, Minnesota

Minneapolis, Northfield & Southern Railway
Minneapolis, Minnesota

Oregon Pacific & Eastern Ry. Co.
Cottage Grove, Oregon

Southern Pacific Company
San Francisco, California

St. Louis-San Francisco Railway Company
St. Louis, Missouri

The Denver & Rio Grande Western Ry. Co.
Denver, Colorado

The Kansas City Southern Ry. Co.
Kansas City, Missouri

The Minnesota Transfer Ry. Co.
St. Paul, Minnesota

The Western Pacific Ry. Co.
San Francisco, California

Union Pacific RR
Omaha, Nebraska

Valley & Siletz RR
Boise, Idaho

Six Southern Railroads

Atlanta & Saint Andrews Bay Ry. Co.
Dothan, Alabama

Birmingham Southern Railroad Company
Fairfield, Alabama

Florida East Coast RR. Co.
St. Augustine, Florida

Great Southwest Railroad, Inc.
Grand Prairie, Texas

Mississippi Export R.R. Co.
Moss Point, Mississippi

M-K-T RR. Co.
Dallas, Texas