1949

A study of the operational functions and related costs of class I motor carriers of property ...

BOSTON UNIVERSITY

College of Business Administration

THESIS

A Study of the Operational Functions and Related Costs of Class I Motor Carriers of Property with Particular Emphasis on the Development of Standard Costs

by

George F. Riley, Jr.
(B.S. in Edu. Massachusetts State
Teachers College, Bridgewater, Mass. 1942)

Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

Table of Contents

	Page
I. A BRIEF HISTORY OF THE MOTOR CARRIER OF PROPERTY	7
A. Introduction	7
B. The Interstate Commerce Commission.	8
C. The Motor Carriers' Act of 1935	13
D. Prescribed Accounting Regulations	14
E. Accounting for Motor Carriers of Property	16
F. Comparison of a Class I Carrier with a Class II Carrier	18
1. A Class I Carrier.	19
2. A Class II Carrier	20
G. Summary	21
II. MOTOR CARRIER COSTS	23
A. Introduction.	23
B. Variable Costs	23
C. Constant Costs	26
D. Joint Costs	27
E. Summary	27
III. OPERATIONAL COSTS OF THE MOTOR CARRIER	29
A. Introduction	29
B. Definition of Standard Costs	29
C. Reasons for Standard Costs	30
D. Standards for the Motor Carrier of Property	32
E. Mileage Costs	33

Table of Contents

Page

I. A BRIEF HISTORY OF THE MOTOR CARRIER OF PROPERTY 7

A. Introduction 7

B. The Interstate Commerce Commission 9

C. The Motor Carriers' Act of 1935 12

D. Prescribed Accounting Regulations 15

E. Accounting for Motor Carriers of Property 16

F. Comparison of a Class I Carrier with a Class II Carrier . 18

1. A Class I Carrier 19

2. A Class II Carrier 20

G. Summary 21

II. MOTOR CARRIER COSTS 23

A. Introduction 23

B. Variable Costs 25

C. Constant Costs 26

D. Joint Costs 27

E. Summary 27

III. OPERATIONAL COSTS OF THE MOTOR CARRIER 29

A. Introduction 29

B. Definition of Standard Costs 29

C. Reasons for Standard Costs 30

D. Standards for the Motor Carrier of Property 32

E. Mileage Costs 33

Page

F. Hourly Costs 34

G. Terminal Costs 34

H. Billing and Accounting Costs 35

I. Sales Costs 35

J. Administrative Costs 36

K. Summary 36

IV. ACCOUNTS USED IN THE DEVELOPMENT OF STANDARD COSTS FOR MOTOR CARRIERS OF PROPERTY 38

A. Introduction 38

B. Mileage Costs. 38

C. Hourly Costs 40

D. Terminal Costs 44

E. Billing and Accounting Costs 45

F. Sales Costs. 46

G. Administrative Expenses 47

H. Exceptions 49

V. DEVELOPMENT OF STANDARD COSTS 54

A. Introduction 54

B. Direct and Indirect Mileage Costs 55

C. Mileage Statistics 56

D. Hourly Costs 67

E. Terminal Costs 73

F. Billing and Accounting Costs 78

G. Sales Cost 81

Page

H. Administrative Cost 84

I. Summary 86

VI. THE USES OF STANDARD COSTS 89

A. Introduction 89

B. Line Haul Operations 89

C. Pick Up and Delivery Operations 91

D. Terminal Operations 97

E. Billing and Accounting Operations 97

F. Advertising Operations 97

G. Administrative Operations 99

VII. PROBLEMS IN THE DEVELOPMENT OF STANDARD COSTS FOR MOTOR CARRIER OF PROPERTY. 101

A. The Problem of Charging the Correct Account with Costs Applicable to that Account 101

B. The Problem of Maintaining Adequate Records 103

C. Problems of Unusual Expenses When Setting Standard Costs. 103

D. The Problem of Adapting the Uniform System of Accounts to the Standard Costs System. 104

VIII. GENERAL CONCLUSIONS 105

APPENDIX

BIBLIOGRAPHY

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

Table of Illustrations

Pertaining to the Computation of Standard Costs

Title	Page
1. Illustration I. Break-Down of Accounts as Prescribed for Class I Carrier of Freight into Six Cost Classifications	52-53
2. Illustration II. Schedule for Computation of Mileage Costs.	66
3. Illustration III. Schedule for Computation of Hourly Costs.	72
4. Illustration IV. Schedule for Computation of Terminal Costs	77
5. Illustration V. Schedule for Computation of Billing and Accounting Costs.	80
6. Illustration VI. Schedule for Computation of Sales Costs.	85
7. Illustration VII. Schedule for Computation of Administrative Costs	87
8. Illustration VIII. Development of Line Haul Cost by the Use of Standard Costs	92
9. Illustration IX. Development of Pick-Up and Delivery Cost by the Use of Standards	98
10. Illustration X	100
X-A. Development of Terminal Cost by the Use of Standard Costs.	100
X-B. Development of Billing and Accounting Cost by the Use of Standard Costs.	100
X-C. Development of Sales Cost by the Use of Standard Costs.	100
X-D. Development of Administrative Cost by the Use of Standard Costs	100

Table of Illustrations

Pertaining to the Computation of Standard Costs

Table	Page
I. Illustration I. Break-Down of Accounts as Prescribed for Class I Carrier of Freight into Six Cost Classifications	52-53
II. Illustration II. Schedule for Computation of Mileage Costs.	66
III. Illustration III. Schedule for Computation of Hourly Costs.	72
IV. Illustration IV. Schedule for Computation of Terminal Costs	77
V. Illustration V. Schedule for Computation of Billing and Accounting Costs	80
VI. Illustration VI. Schedule for Computation of Sales Costs.	85
VII. Illustration VII. Schedule for Computation of Administrative Costs	87
VIII. Illustration VIII. Development of Line Haul Cost by the Use of Standard Costs	95
IX. Illustration IX. Development of Pick-Up and Delivery Cost by the Use of Standards	98
X. Illustration X	100
X-A. Development of Terminal Cost by the Use of Standard Costs.	100
X-B. Development of Billing and Accounting Cost by the Use of Standard Costs.	100
X-C. Development of Sales Cost by the Use of Standard Costs.	100
X-D. Development of Administrative Cost by the Use of Standard Costs	100

List of Tables

Table		Page
1	Operating Ratios by Quarters	126
2	The Motor Carrier Revenue Dollar and Where It Goes	127

List of Tables

Table		Page
1	Operating Ratios by Quarters	164
2	The Motor Carrier Revenue Dollar and Where It Goes	167

List of Charts

Chart		Page
1	Proportion of Wages Paid Out of Gross Revenue . .	116
2	Average Wages Per Employee	117
3	For-Hire Truckloadings by Months, 1937 - 1946 . .	118

List of Charts

Chart		Page
1	Proportion of Wages Paid Out of Gross Revenue . .	116
2	Average Wages Per Employee	117
3	Per-Site Production by Months, 1937 - 1946 . .	118

CHAPTER I

A Brief History of the Motor Carrier of Property

A. Introduction

The function of a motor carrier is to serve the public. It can be a great service for good, or for evil, depending on its methods of operation and the manner in which it conducts itself in relation to the public it serves. The present motor carrier service we have in America is the result of a gradual evolution from the World War I days when roads were muddy lanes and the vehicles were oddities. During that first war, the world first received an inkling of the possibilities that were inherent in the gasoline power-horse. With the planning and construction of good highways, and with the improvement in the gasoline combustion engine, motor transportation grew in much the same manner as did the railroads fifty years before.

The practises of the motor carriers were unregulated by state or federal rules during the first stages of development. Many of the evils practised by the railroads in former years were adopted by the motor carriers. There was no rate control over trucking charges. By 1927, the industry was in a deplorable state. Installment buying was in vogue. Anyone with a small down payment could purchase a truck and immediately hold himself out for hire. To get business, rates were cut to below cost, discriminatory rates were offered to privileged shippers, secret agreements were entered into between trucking companies, and between shippers and truckers. "Wildcat" companies sold stock one week and were bankrupt the next. It was not the carriers alone who

CHAPTER I

A Brief History of the Motor Carrier of Property

A. Introduction

The function of a motor carrier is to serve the public. It can be a great service for good, or for evil, depending on its methods of operation and the manner in which it conducts itself in relation to the public it serves. The present motor carrier service we have in America is the result of a gradual evolution from the World War I days when roads were muddy lanes and the vehicles were oddities. During that first war, the world first received an inkling of the possibilities that were inherent in the gasoline power-horse. With the planning and construction of good highways, and with the improvement in the gasoline combustion engine, motor transportation grew in much the same manner as did the railroads fifty years before.

The practices of the motor carriers were unregulated by state or federal rules during the first stages of development. Many of the evils practised by the railroads in former years were adopted by the motor carriers. There was no rate control over trucking charges. By 1927, the industry was in a deplorable state. Installment buying was in vogue. Anyone with a small down payment could purchase a truck and immediately hold himself out for hire. To get business, rates were cut to below cost, discriminatory rates were offered to privileged shippers, secret agreements were entered into between trucking companies, and between shippers and truckers. "Fifties" companies would block one week and were bankrupt the next. It was not the carriers alone who

suffered, but also the investing public. The shipper could not be certain of securing transportation for his goods, and still less certain of the prices he would have to pay. Shippers could not recover freight damages. It was therefore inevitable that, sooner or later, for the protection of the public, the motor carriers would be brought under some type of federal and state regulation. This came about with the passing of the Federal Motor Carriers Act of 1935 which brought the trucking industry under the rule of the Interstate Commerce Commission, as were the railroads. In order to better understand exactly what type of regulations were imposed on the motor carriers of America, let us review the origination and growth of the Interstate Commerce Commission.

B. The Interstate Commerce Commission

The Interstate Commerce Commission came into being in 1887 under the Interstate Commerce Act (an Act to Regulate Commerce, February 4, 1887). The commerce clause in the Federal Constitution had long vested in Congress the power to regulate commerce "with foreign nations, among the several States, and with the Indian tribes," but had never seen fit to exercise this power. Prior to the passage of the 1887 Act, matters of litigation involving the common carriers had been settled under common law. But the railroad presented problems unlike those of the stage coach and canal boat. The following passage from From Trail Dust to Star Dust, by E. A. Starr, indicates the reasons for passage of the Act:

> "The passage of the Collum Act, then entitled an Act to Regulate Interstate Commerce, was brought about by a public demand for legislation to correct existing discriminations in transportation charges

> and practices. Not only were the various railroads in many cases showing to certain localities undue preference to the prejudice of other localities, but the practise of secret rebating had been in vogue. This was generally in the case of large shippers who would threaten to take their business elsewhere unless granted subnormal rates. The devices of underbilling and of shifting classifications were common practises. Particularly due to the fact that many lines had built into territory already adequately served by railroads, 'rate wars' were of common occurrence and rates were reduced to below cost of transportation, at times. Again, rates for transportation were changed without warning to the public. In fact, it has been said that the shipper or traveller of that period never knew, until he had settled his freight bill or had paid for his ticket, just what the transportation service would cost him." (1)

The chief provisions of the act were as follows:

1. Prohibitions against unreasonable rates.

2. Prohibitions against preferences and prejudices in transportation matters.

3. Prohibition against unjust discrimination between types of goods and between shippers.

4. Prohibition of charging of higher rates for shorter distances than charged, under similar conditions, for longer hauls, when the longer haul included the haul for the shorter distance in the same direction.

5. Requirement of filing and posting tariffs by the carriers under regulation.

(1) From Trail Dust to Star Dust, by Edward A. Starr, published by the Transportation Press, 1945. Page 159.

The act was a good one and a step in the right direction. However, court interpretations so limited and curtailed its powers that it became an impotent factor in the nation's transportation dilemma. For example, in a court case, the court declared that the Act did not give the Commission authority to prescribe rates for the future. (1)

History relates that it was enforced in an extremely lax manner. The reasons are quite evident if one recalls the power of the railroad monopolies during that period of our history. Railroads had fallen into the hands of the major banking houses and these banking houses had many extra-curricula interests - and powers.

The Interstate Commerce Commission, as established under the authority of this 1887 Congressional Act, is a quasi-judicial body whose function is to carry out the purposes of the Act. It is not one of the executive bureaus of the government, but reports directly to Congress.

Under the original act of 1887, there was no noticeable overall change in the illegal and unwholesome practises of the railroads. It was not until 1903 and the passage of the Elkins Act that the Commission was given the authority and power to cope with the problems of transportation regulation. This act provided penalties for rebates and failure to collect charges. It was deemed a misdemeanor to depart from published rates. The Elkins Act was followed by the Hepburn Amendment of 1906 which gave the Commission power to "determine and prescribe just and reasonable maximum rates." Reports to the Commission

(1) Maximum Rate Case, 167 U.S. 479.

were standardized. The Carmack Amendment of 1906 provided that the initial line must issue a bill of lading and be liable for all damages to shippers' goods when such damages occurred on its own line, or on that of a connecting carrier. In 1910, the Mann-Elkins Law provided penalties for those carriers who gave written misquotations of rates. Under this law, the Commission was granted authority to institute inquiries on its own initiative. Shippers were given the power to route their own consignments. Several less important acts were passed in succeeding years. The types of service under the jurisdiction of the act were: railroads, express companies, sleeping car companies, pipe lines, telegraph, telephone and cable companies (wire and wireless), and water carriers. When the trucking industry came into being, it was not subject to the rules of these acts, not being specifically mentioned therein.

Due to the several amendments and their enforcement, the Interstate Commerce Commission was now an effective instrument. It had sufficient power to regulate interstate commerce for the good of the public, and, at the same time, to give a greater security to the carriers by assuring them a reasonable rate of return on their investment. The investing public could be sure that the industry was in a healthy state, and a good risk, by the very fact that the Commission allowed them to continue operations. Bills of lading were required. There was a basis for settling claims for lost and damaged freight because responsibility could be fixed.

Despite regulation, the railroads were still in a virtual monopolistic state. Water power offered but marginal competition.

In the middle and late 1920's, as the trucking industry started to grow, the railroads began to feel the effects of their first serious competition. The railroads lobbied against the truckers, taking the position that as trucks used the public highways, they were being indirectly subsidized by the governments that built the highways. Many railroad advertising posters carried the line "we pay our own way." Truckers feared restrictions by the Interstate Commerce Commission for in all of its existence, the problems of the Interstate Commerce Commission were, for the most part, the problems of the railroads. It was a general feeling that the Commission was "railroad-minded" and any of its rulings would tend to eventually legislate the motor carriers off of the highways of America.

Though the Interstate Commerce Commission had no jurisdiction over the motor carriers, a series of investigations were conducted to determine how motor carriers were affecting the business done by the railroads. The "Motor Bus and Motor Truck Operations" investigation was the first step taken by the Interstate Commerce Commission toward final regulation. This took place in 1926. On November 17, 1930, further hearings were conducted. Some of the findings were as follows:

1. Within certain areas, motor carriers offer better service than railroads, due to their flexibility.

2. Unequal competition exists between rail and motor carriers, due to unregulated motor carrier operations. This had the result of forcing railroads into an unsatisfactory financial condition.

3. There appeared to be an excess of transportation facilities. (1)

(1) Coordination of Motor Transportation, 182, I.C.C. 263.

In the middle and late 1920's, as the trucking industry started to grow, the railroads began to feel the effects of their first serious competition. The railroads lobbied against the truckers, taking the position that as trucks used the public highways, they were being indirectly subsidized by the governments that built the highways. Many railroad advertising posters carried the line "We pay our own way." Truckers feared restrictions by the Interstate Commerce Commission for in full of its existence, the problems of the Interstate Commerce Commission were, for the most part, the problems of the railroads. It was a general feeling that the Commission was "railroad-minded" and any of its rulings would tend to eventually legislate the motor carriers out of the highways of America.

Though the Interstate Commerce Commission had no jurisdiction over the motor carriers, a series of investigations were conducted to determine how motor carriers were affecting the business done by the railroads. The "Motor Bus and Motor Truck Operations" investigation was the first step taken by the Interstate Commerce Commission toward final regulation. This took place in 1926. On November 17, 1930, further hearings were conducted. Some of the findings were as follows:

1. Within certain areas, motor carriers offer better service than railroads, due to their flexibility.

2. Unequal competition exists between rail and motor carriers, due to unregulated motor carrier operations. This had the result of forcing railroads into an unsatisfactory financial condition.

3. There appeared to be an excess of transportation facilities. (1)

(1) Coordination of Motor Transportation, ICC, I.C.C. 269.

C. The Motor Carriers Act of 1935

In 1932, Joseph Eastman, and a commission was directed by President Roosevelt to survey the industry and to report its findings to Congress. Mr. Eastman submitted recommendations for control of the motor carriers. These recommendations served as a basis for the Motor Carriers Act of 1935. The trucking industry was now subject to the original Interstate Commerce Act and all of its later amendments. It would not be able to take undue advantage of the railroads, but would now have to compete on a more equal footing. The act was effective as of October 15, 1935.

All carriers who were doing business on or about June 1, 1935, could continue doing business under the Interstate Commerce Commission if they filed applications within 180 days of October 15, 1935. The same rule applied to contract carriers doing business on or about July 1, 1935. This rule has since come to be known as the "grandfather clause." If an application was not so filed, a carrier had to show a need for his services before he was granted operating rights. That fact holds true to this day. After filing of applications, under the "grandfather clause," the Interstate Commerce Commission required the carriers to show proof of their operations as of the specified dates. Rights to operate were granted to others not claiming under the clause if they could give proof of a bona fide need for their services within specified areas.

The "grandfather clause" is found in Section 206 of the Motor Carriers Act. Section 207 outlines the procedure one must use in obtaining a certificate of public convenience and necessity. The procedure

is as follows:

1. The applicant must be fit, willing, and able to perform the proposed service.

2. The applicant must show need for his services over the specified routes for which he is applying.

The application is given a hearing at which time any carrier can attempt to disprove the applicant's petition, and thereby prevent him from becoming a competitor. Such hearings are scheduled and notification of the time and place is given to all parties who might be interested.

D. Prescribed Accounting Regulations (1)

Up to this point, it has been pointed out how the Interstate Commerce Commission gradually came to the point where it could regulate activities of motor carriers of property and passengers. The problem then was how to go about policing the industry to see that specifications of the law were fulfilled. Obviously, one of the most effective means of control would be through the checks on management and operations by way of prescribed accounting regulations. Through interpretation of the accounts, any illegal activities of the carriers would be evident, if there were such activities. As the operations of motor carriers are quite involved, a mass of detail would be required. Therefore, the problem of prescribing a system of accounts that was complete enough

(1) Sections of the Interstate Commerce Act giving the Interstate Commerce Commission the authority to prescribe systems of accounts for carriers of property are found on pages 108-109.

to give the Commission the information it desired, and yet not so involved as to place a burden on the carrier, confronted the Commission. A survey of the industry indicated that carriers could be divided into three major classes which came to be known as Classes I, II, and III. The following definitions apply to the Classes:

1. Class I--Carriers having average gross operating revenues (including interstate and intrastate) of $100,000 or over annually, from property motor carrier operations.

2. Class II--Carriers having average gross operating revenues (including interstate and intrastate) of $25,000 or over, but under $100,000 annually, from property motor carrier operations.

3. Class III--Carriers having average gross operating revenues (interstate and intrastate) of less than $25,000 annually, from property motor carrier operations.

> "The class to which any carrier belongs shall be determined by the average of its annual gross operating revenues derived from motor carrier operations as a property carrier for the three calendar years immediately preceding the effective date of this system of accounts. If, at the end of any subsequent calendar year, the average of a carrier's annual gross operating revenues from motor carrier operations for the last 3 preceding years is greater than the maximum or less than the minimum for the class in which the carrier has been previously grouped, it shall automatically be grouped in the higher or lower class in which it falls because of such increased or decreased average annual gross operating revenues, and it shall notify the Commission of the change in its status." (1)

(1) Uniform System of Accounts for Class I Common and Contract Motor Carriers of Property, published by the Interstate Commerce Commission, Issue of 1948. Page 6.

to give the Commission the information it desired, and yet not so involved as to place a burden on the carrier, confronted the Commission. A survey of the industry indicated that carriers could be divided into three major classes which came to be known as Classes I, II, and III. The following definitions apply to the Classes:

1. Class I--Carriers having average gross operating revenues (including interstate and intrastate) of $100,000 or over annually, from property motor carrier operations.

2. Class II--Carriers having average gross operating revenues (including interstate and intrastate) of $25,000 or over, but under $100,000 annually, from property motor carrier operations.

3. Class III--Carriers having average gross operating revenues (interstate and intrastate) of less than $25,000 annually, from property motor carrier operations.

> "The class to which any carrier belongs shall be determined by the average of its annual gross operating revenues derived from motor carrier operations as a property carrier for the three calendar years immediately preceding the effective date of this system of accounts. If, at the end of any subsequent calendar year, the average of a carrier's annual gross operating revenues from motor carrier operations for the last 3 preceding years is greater than the maximum or less than the minimum for the class in which the carrier has been previously grouped, it shall automatically be grouped in the higher or lower class in which it falls because of such increased or decreased average annual gross operating revenues, and it shall notify the Commission of the change in its status." (1)

(1) Uniform System of Accounts for Class I Common and Contract Motor Carriers of Property, published by the Interstate Commerce Commission, Issue of 1938. Page 6.

Admittedly, the first system as prescribed by the Interstate Commerce Commission was an experiment. Undoubtedly, modifications would eventually follow. It was decided that only Class I carriers would be subjected to a prescribed system for the present because of two reasons:

1. The larger carriers did the bulk of the business, and were the leaders in their field. Control of the large carriers would result in control of the larger part of the industry.

2. The larger carriers with their larger office forces were better equipped to maintain a prescribed system in detail.

The first system of accounts was prescribed on January 1, 1938. The latest modification, and the system now in use, is that prescribed for use on January 1, 1948. To this date, there has been no accounting system prescribed for Class II and Class III carriers.

E. Accounting for Motor Carriers of Property

The fundamental difference between accounting for a manufacturing concern and a motor carrier is that where the former deals in tangible goods, the latter deals in services. In the former there is no inventory problem except to the extent of repairs parts, and such items as gasoline, oil, alcohol, and lubricants. Despite the elimination of inventory problems, accounting for motor carriers remains as one of the most complicated problems of its kind. According to the noted authority on accounting systems, J. K. Lasser:

> "Accounting for motor carriers under interstate regulation is highly specialized and requires, not only a knowledge of accounting, but a basic understanding of traffic movements, rate structure of

tariffs, and the rules and regulations of the Interstate Commerce Commission." (1)

Some of the items which must be ascertained from the accounting records are as follows:

1. Costs of overhead.

2. Analysis of performance.

3. Prosperity of the business.

4. Adequacy of depreciation.

Some of the factors which must be included in any accounting system for a motor carrier are as follows:

1. Direct accounting as it relates to the operation of the truck.

2. Accounting as it relates to common and contract truck carriers.

3. Accounting as it relates to a truck terminal that participates in the handling of goods from consignor to ultimate consignee.

4. Accounting as it relates to the trucks when such trucks are controlled or operated by a railroad or subsidiary of a common carrier by rail. (2)

When installing an accounting system for a motor carrier, the most important item to be considered is the item of cost. The problem of whether a standard cost system is going to be a part of the system or is going to be maintained as an entity must be solved.

(1) Handbook of Accounting Methods, by J. K. Lasser, published by D. Van Nostrand Company, Inc., New York, copyright 1943, page 779.

(2) The Motor Truck Red Book, published by Traffic Publishing Company, Inc., New York, copyright 1943, page 779.

Authorities remained divided as to whether or not one is a better principle than the other. If the cost records are an integral part of the general accounting system, every transaction relating to the operation of automotive equipment is reflected in the accounts of the general ledger. (1)

For the best classification of accounts, when the cost item is to be measured from the records, the accounts as prescribed by the Interstate Commerce Commission are divided into sections applicable to the various functions of the carriers. For instance, all expenses incurred by the terminal department are in one general classification, as are all administrative and general expenses. Explanations of the various types of costs will be given in detail in subsequent sections of this thesis.

F. Comparison of a Class I Carrier with a Class II Carrier

As an illustration of the fact that the average Class II and/or Class III carrier would be unable to fulfill the requirements of the prescribed accounting system for Class I carriers, (2) the personnel organization of a Class I carrier is outlined below, and compared with a following description of a Class II organization. Both carriers haul general commodities. (3)

(1) Handbook of Accounting Methods, by J. K. Lasser, published by D. Van Nostrand Company, Inc., New York, copyright 1943, page 770.

(2) See pages 110-115 for income and expense accounts as prescribed for Class I Motor Carriers of Property by the I.C.C.

(3) General commodities are all articles of commerce requiring shipment.

1. A Class I Carrier.

The carrier studied is a carrier of general freight. The company has operating rights allowing it to do business within the New England States and New York City. The main office and the terminal are located in the greater Boston area. Other terminals are located in shipping centers within New England. All accounting and bookkeeping is done at the main office in Boston.

At this office, ten employees do all recording and accounting. The personnel breakdown is as follows:

1. One cashier who records receipts, posts to the accounts receivable ledger, and makes up daily bank deposits.

2. Two IBM machine operators.

3. Two clerks whose duties consist of handling account receivable billings.

4. One file clerk who handles filing of all waybills and bills of lading, claims, and correspondence.

5. One accounts payable bookkeeper who records liability to trade accounts and payable to other carriers.

6. One payroll clerk.

7. One stenographer-typist.

8. One head bookkeeper who draws up monthly statements, keeps the ledger, and acts as office manager.

In addition, the traffic department consists of:

1. Two rate clerks who compute charges on shipments.

2. Two part-time clerks whose duties it is to split carrier charges when more than one carrier participates in the haul.

3. One dispatcher who routes the traffic.

There are other rate clerks and dispatchers at the other terminals.

2. A Class II Carrier.

This carrier studied is located in a southeastern Massachusetts industrial town with a population of 40,000. The carrier has operating rights in southeastern Massachusetts and Providence. General commodities are hauled; one terminal is maintained. The carrier conducts the same type of operations as the Class I carrier on the previous page, but on a much smaller scale. The bookkeeping and accounting staff of the smaller carrier consists of the following three employees:

1. A general bookkeeper who records all transactions, receives and pays out all monies.

2. A general clerk who sends out weekly statements to customers and interline carriers, and who also does all filing, and typing.

3. A rate clerk who rates all shipments, completes all waybills, and splits charges thereon between the participating carriers.

A private accountant draws up monthly profit and loss statements, balance sheets, and files all tax returns.

The following profit and loss accounts are used by this carrier:

Gross Revenue
Advertising
Cargo Insurance
Claims Paid
Depreciation
Dues and Salaries
Gasoline and Oil
Insurance
Legal and Auditing

Heat, Light, and Power
Miscellaneous Expenses
Office Expense
Parts Expense
Plates Expense
Policy Adjustments
Rates and Tariffs
Repairs
Road Expenses
Sales Expense
Taxes
Telephone
Rent
Tires and Tubes
Truck Hire
Salaries and Wages

By comparing the above system of profit and loss accounts with that as prescribed for Class I Carriers by the Interstate Commerce Commission, one can realize how inadequate are the records of the smaller carrier and how difficult it would be for the smaller carrier to break down all accounts in the detail required by the prescribed system, using but an office staff of three employees.

G. Summary

The motor carrier industry is, as yet, in its infancy when compared with its big brother, the railroad industry. The growth of the motor carriers of America followed the same pattern as that of the railroads, and is now in a position where it can, and does, offer serious competition. Due to illegal and discriminatory practises, public opinion forced Congress to restrict activities of the carriers. Contained in these restrictions is a prescribed accounting system. As the requirements of the accounting system are detailed, only the largest group of carriers are able, and required, to maintain such a system. In the future, it is possible that Class II and III carriers will have to

Heat, Light, and Power
Miscellaneous Expenses
Office Expense
Parts Expense
Plates Expense
Policy Adjustments
Rates and Tariffs
Repairs
Road Expenses
Salar Expense
Taxes
Telephone
Rent
Tires and Tubes
Truck Kits
Salaries and Wages

By comparing the above system of profit and loss accounts with that as prescribed for Class I Carriers by the Interstate Commerce Commission, one can realize how inadequate are the records of the smaller carrier and how difficult it would be for the smaller carrier to break down all accounts in the detail required by the prescribed system, using but an office staff of three employees.

6. Summary

The motor carrier industry is, as yet, in its infancy when compared with its big brother, the railroad industry. The growth of the motor carriers of America followed the same pattern as that of the railroads, and is now in a position where it can, and does, offer serious competition. Due to illegal and discriminatory practices, public opinion forced Congress to restrict activities of the carriers. Contained in these restrictions is a prescribed accounting system. As the requirements of the accounting system are detailed, only the largest group of carriers are able, and required, to maintain such a system. In the future, it is possible that Class II and III carriers will have to

maintain an accounting system, but not until the Interstate Commerce Commission can prescribe one that is far more simple than that now in effect for Class I carriers.

CHAPTER II

Motor Carrier Costs

A. Introduction

Any discussion of the use of costs or accounting to be used for costs would be incomplete without giving some recognition to the economics of costs in the transportation industry. A thorough understanding of the economics of carrier costs is impossible on the part of any individual who does not have a first-hand knowledge of the actual operations of a carrier. There are few authorities on costs of motor carriers. The business as it is today is but an infant of twenty-five years. In the Boston area, the writer discovered but one person who was actively engaged as a transportation cost accountant in private enterprise. There are texts on the subject of transportation costs but there is a scarcity of application of cost principles to the actual operational data of motor carriers. The theories recited herein are accepted by transportation economists as the fundamental economics of transportation.

Motor carrier operational costs can be divided into three general groups: variable costs, constant costs, and joint costs.

B. Variable Costs

Variable costs have many other names. From time to time, they have been referred to as out-of-pocket costs, direct costs, separable costs, and differential costs. The variable cost is defined by Daggert as follows:

> "Costs which may be segregated, which are first incurred when a particular article is offered for

> transportation and which disappear when that article ceases to move, are known as out-of-pocket costs. They change by their very nature in proportion to the ammount of traffic and they are, therefore, variable." (1)

Daniels states that:

> "it is the extra expense incurred if this particular traffic moves . . . and not incurred if it does not so move which is termed the 'out-of-pocket' expense for this particular item of traffic." (2)

The variable expenses are those which come into being with the movement of the freight. They include such items as gasoline, drivers' wages, supervision, and also "that portion of the otherwise common expense which varies directly with the units of output," (3) such as depreciation and obsolescence to which trucks are subjected, occasioned by the miles run. Added items of output (4) cause added items of expense which can be directly assigned to the added output. However, it must be pointed out that some variable costs vary more directly with the activities of the carrier than do other variable costs. As an example of this, let us compare the expense of gasoline with that of supervision. The cost of gasoline will vary directly with the use of the vehicles, regardless of how few or how many miles are covered. But the expense of supervision will vary in a series of upward, or downward, steps. The cost of supervising the activities of

(1) Principles of Inland Transportation, by Stuart Daggert, published by Harper Brothers, 1941, page 317.
(2) Price of Transportation Service, by Winthrop Daniels, page 62.
(3) Explanation of the Development of Motor Carrier Costs, published by the Interstate Commerce Commission, Feb. 1949, page 3.
(4) Output is defined as weight or bulk of goods and distance delivered. J. M. Clark, Encyclopedia of Social Sciences (1937), Vol. II.

transportation and which disappear when that article ceases to move, are known as out-of-pocket costs. They change by their very nature in proportion to the amount of traffic and they are, therefore, variable." (1)

Daniels states that:

"It is the extra expense incurred if this particular move . . . and not incurred if it does not so move which is termed the 'out-of-pocket' expense for this particular item of traffic." (2)

The variable expenses are those which come into being with the movement of the freight. They include such items as gasoline, drivers' wages, supervision, and also "that portion of the otherwise common expense which varies directly with the units of output." (3) such as depreciation and obsolescence to which trucks are subjected, occasioned by the miles run. Added items of output (4) cause added items of expense which can be directly assigned to the added output. However, it must be pointed out that some variable costs vary more directly with the activities of the carrier than do other variable costs. As an example of this, let us compare the expense of gasoline with that of supervision. The cost of gasoline will vary directly with the use of the vehicles, regardless of how far or how many miles are covered. But the expense of supervision will vary in a series of upward, or downward, steps. The cost of supervising the activities of

(1) Principles of Inland Transportation, by Stuart Daggett, published by Harper Brothers, 1941, page 317.
(2) Price of Transportation Service, by Winthrop Daniels, page 62.
(3) Regulation of the Development of Motor Carrier Costs, published by the Interstate Commerce Commission, Feb. 1940, page 3.
(4) Output is defined as weight or bulk of goods and distance delivered. I. M. Clark, Impediments of Social Science (1937), Vol. II.

one mechanic would probably be the same as that of ten mechanics. However, with the addition of an eleventh mechanic, more supervision would be necessary and that item of expense would take a step upward. Daggert recognized this principle, that certain variable costs react to operations more quickly than others, when he stated,

> "Doubtless, there are no costs which are purely constant or purely variable, but there are costs that are predominantly of one character or the other." (1)

It has been established that these added costs are incurred by the carrier for each added increment of output. By following this theory one step further, it can be seen how this variable transportation cost concept is of primary importance when rates are to be established. Many times, the question of hauling additional freight can be settled by knowing whether or not the rates will cover variable expenses. Stocker says,

> "If the additional traffic covers all the costs that are incurred by its acceptance, the operator cannot possibly be poorer by accepting the freight." (2)

The Interstate Commerce Commission recognized this principle for it stated,

> "It is a well-established and generally recognized rule that if additional business can be taken on at rates which will contribute at least a little in addition to the actual out-of-pocket expense, the carrier will be advantaged to that extent and all of its patrons will be benefitted to the extent to which such traffic contributes to the net revenue. It is obvious that without the amount of

(1) Principles of Inland Transportation, by Stuart Daggert, published by Harper Brothers, 1941, page 317.

(2) Motor Traffic Management, by H. E. Stocker, published by Prentice-Hall, 1938, page 231.

one mechanic would probably be the same as that of ten mechanics.

However, with the addition of an eleventh mechanic, more supervision would be necessary and that item of expense would take a step upward. Taggart recognized this principle, that certain variable costs react to operations more quickly than others, when he stated,

> "Doubtless, there are no costs which are purely constant or purely variable, but there are costs that are predominantly of one character or the other." (1)

It has been established that these added costs are incurred by the carrier for each added increment of output. By following this theory one step further, it can be seen how this variable transportation cost concept is of primary importance when rates are to be established. Many times, the question of handling additional freight can be settled by knowing whether or not the rates will cover variable expenses. Stocker says,

> "If the additional traffic covers all the costs that are incurred by its acceptance, the operator cannot possibly be poorer by accepting the freight." (2)

The Interstate Commerce Commission recognized this principle for it stated,

> "It is a well-established and generally recognized rule that if additional business can be taken on at rates which will contribute at least a little in addition to the actual out-of-pocket expense, the carrier will be advantaged to that extent and all of its patrons will be benefitted to the extent to which such traffic contributes to the net revenue. It is obvious that without the amount of

(1) Principles of Inland Transportation, by Stuart Daggett, published by Harper Brothers, 1934, page 317.

(2) Motor Freight Management, by H. A. Stocker, published by Prentice-Hall, 1930, page 231.

> net revenue contributed by this class of traffic, assuming a certain amount of revenue to be necessary, such revenue must be contributed entirely by the remaining traffic, and the exclusion of this competitive traffic would increase the burden upon the other traffic to a corresponding extent." (1)

C. Constant Costs

Constant, or indirect, costs are those costs which are not changing continually with operation of the carrier. They are the minimum expenses necessary even before operations can commence. Daggert defines them as follows:

> "The phrase 'constant cost' has been used . . . to indicate those expenses which, in the aggregate, do not change with changes in the volume of business done, neither rising as traffic grows, nor falling off as traffic declines." (2)

Expenses which would continue evenly, even though carrier activities fluctuated greatly, can be called constant. Such expense items as insurance, building maintenance and repairs, and administrative salaries, have elements of constancy in them. It is a basic economic factor, that, though a business can exist over the short run by recovering variable costs, in order to continue operations over the long-run period, constant costs must be met. It has been stated that all tariffs are constructed so that all costs plus a profit will be received through charges, but rates within the tariff can be found which do not fully recover constant costs. (3) This means, of course, that other freight must bear

(1) 24 I.C.C. 129, 132, (1922).

(2) Principles of Inland Transportation, Stuart Daggert, published by Harper Brothers, 1941, page 317.

(3) Stated by Mr. Joseph Day, Examiner of Accounts for the I.C.C. in the New England Area.

not only its variable cost, but more than its share of burden. In the published tariffs, variable costs are always recovered.

D. Joint Costs

To best explain joint carrier costs, it seems advisable to give an example of joint costs resulting from a manufacturing operation. An example of joint production is that of illuminating gas and coke. The production of one is inseparable from the other, but how can expenses of production be allotted between the gas on one hand and the coke on the other. Joint costs must be allocated to the total output of both products on some basis that is deemed equitable. The actual cost of each of the joint products cannot be specifically identified. Some carrier costs have characteristics of joint costs in them. For example, let us say there is a need for truck transportation from Boston to New York City. Freight will be carried one way, and the vehicle will have to return empty unless some other freight can be found. To cover variable costs, other freight is carried on the return trip from New York City to Boston at a low rate. The return trip load has all the elements of a by-product. The cost of the round trip is a joint cost for it represents not only the cost of the "main product" from Boston to New York City, but also the cost of the by-product on the return trip.

E. Summary

From the foregoing discussion, we have recognized three classes of costs which would require recognition if we were constructing compensatory rates based on cost. The expenses of a motor carrier of

property are principally made up of those expenses which have a tendency to change directly with the amount of traffic handled. There also exist other expenses which remain relatively constant though there may be substantial changes in the amount of traffic handled. In effect, they are incurred on behalf of the organization as a whole and cannot be circumvented without abandonment of the entire operation. A third type of cost, called joint cost, is peculiar to such operations as the round trip movement. This type of cost is similar to that found for costs of by-products in the case of manufacturing processes.

CHAPTER III

Operational Costs of the Motor Carrier

A. Introduction

Despite the fact that the motor transportation industry is closely guided and guarded by federal and state regulations, it is one of the most highly competitive industries in America today. Under the "grandfather clause" of the Motor Carriers Act, anyone who had been in business prior to June 1, 1935, could continue operating as a carrier if he could show proof of such operations. As a result, it is entirely possible that there are more carriers than there is business to support them during the slack seasons and years. Marginal businesses are continually going out of operations and selling their operating rights to others who wish to enter the field. The concern that wishes to continue operations, and be certain of a profit and a continued existence, is the one that utilizes every known method of controlling costs and preparing for the operations of the future. One of the most valuable aids that could be utilized by carriers is a good standard cost system.

B. Definition of Standard Costs

W. B. Lawrence states,

> "A standard cost is a figure which represents an amount that can be taken as typical of the cost of an article or other cost factor, and that can be used with substantial accuracy for managerial and cost control purposes." (1)

(1) Cost Accounting, by W. B. Lawrence, published by Prentice-Hall, Inc., 1946, New York, pages 249, 250.

CHAPTER III

Operational Costs of the Motor Carrier

A. Introduction

Despite the fact that the motor transportation industry is closely guided and guarded by federal and state regulations, it is one of the most highly competitive industries in America today. Under the "grandfather clause" of the Motor Carriers Act, anyone who had been in business prior to June 1, 1935, could continue operating as a carrier if he could show proof of such operations. As a result, it is entirely possible that there are more carriers than there is business to support them during the slack seasons and years. Normal businesses are continually going out of operations and selling their operating rights to others who wish to enter the field. The concern that wishes to continue operations, and be certain of a profit and a sustained existence, is the one that utilizes every known method of controlling costs and preparing for the operations of the future. One of the most valuable aids that could be utilized by carriers is a good standard cost system.

B. Definition of Standard Costs

W. B. Lawrence states,

> "A standard cost is a figure which represents an amount that can be taken as typical of the cost of an article or other cost factor, and that can be used with substantial accuracy for managerial and cost control purposes." (1)

(1) Cost Accounting, by W. B. Lawrence, published by Prentice-Hall, Inc., 1945, New York, pages 249, 250.

Cost figures may be divided into two broad classes: historical costs and predetermined costs. (1) After completion of a certain process, or service, the cost data can be surveyed and certain representative amounts can be determined, with the expectation that if the process were to be repeated under similar conditions, similar cost data would result. All things being equal, the operations of the future should bring forth the same statistical results as did the past operations, if such operations are of the same nature. Standard costs are actually a basic tool of industrial forecasting. In speaking of basic standards for production of goods, Paton states,

> "Basic cost standards may be defined as definite allowances for each product cost element set up to serve as measures for the control of plant operations." (2)

Paraphrasing Paton, and adapting the statement to the motor carrier industry, it can be said that standard costs are those predetermined allowances for each function set up to serve as measures for the control of carrier operations. The revenue producing functions of the past must be measured when policies of the future are being determined. (3)

C. Reasons for Standard Costs

Standard costs are as valuable to the seller of transportation services as they are to the manufacturer. It is as important for the

(1) Cost Accounting, Principles and Practice, by John J. W. Neuner, Ph.D., published by Richard D. Irwin, Inc., Chicago, 1947, page 509.

(2) Accountants' Handbook, by W. A. Paton, Ph.D., C.P.A., published by the Ronald Press, New York, 1948, page 225.

(3) Handbook of Accounting Methods, by J. K. Lasser, C.P.A., published by D. Van Nostrand Company, Inc., New York, 1943, page 184, 185.

common carrier of freight to know what it should cost to transport goods as it is for the manufacturer to know what it should cost to make an article.

How can standard costs be used in a trucking concern? With accurate standards, management can detect any variances between the standard and the actual cost and thereby notice what it is that is costing more than was expected. Steps can be taken to attempt to eliminate the causes of the defect. (1) Standard costs can be used to estimate future operational costs and as an aid in the preparation of budgets. They are useful in the preparation of petitions to the Interstate Commerce Commission when requesting a change in rates. Accurate standard costs reduce much clerical labor and expense. Because of the use of standards, the entire organization may become "cost-minded" and aid in keeping actual costs under control. Some of the reasons for cost finding given by Lasser are as follows:

1. To facilitate price setting.

2. To furnish data concerning the employment and efficiency of labor.

3. To show where cost reductions might be affected.

4. To aid in scheduling and planning operations. (2)

It is of the utmost importance that carrier management knows the standard costs for certain operations because much of the work performed by carriers is not capable of being directly controlled by

(1) See "Problems of Unusual Items," page 103.

(2) Handbook of Accounting Methods, by J. K. Lasser, C.P.A., published by D. Van Nostrand Company, Inc., New York, 1943

management. For example, the drivers of the vehicles may be using gasoline for their personal use. Management would have no way of knowing that the vehicles were using more gasoline per mile than they had been if standards were not referred to. Other uses of standard costs will be outlined in detail in subsequent chapters.

D. Standards for the Motor Carrier of Property

Before standard costs can be developed for the common carrier of freight, it is necessary to recognize the operations that require a standard. In the manufacturing industry, a standard must be developed for the cost of materials, labor, and overhead. But the freight carrier is selling services, so different types of standards are needed.

The first step, therefore, is to determine what services the trucker offers to the public. Fundamentally, he offers the service of hauling freight from a shipper to a consignee. In order to carry out that service, the carrier must do several things. First of all, he must set up and maintain an organization large enough to be able to offer adequate service to all who might apply. Secondly, he must convince the shipper that he should use his particular service. Then the freight must be picked up and brought to the terminal for reshipment to its ultimate destination. Documents of shipment must be prepared. The proper party must be billed, the results of all operations must be recorded, and statements must be prepared. The freight must be protected while in transit. The carrier may have to repack the freight, and if the freight is lost, stolen, or damaged, the carrier must make good that loss to the shipper.

In order to develop a set of standards for carriers of motor freight, it is necessary to group costs into certain classes. The basis of each class should be the function of motor carrier operations which causes that cost. After a study of operations, it has been determined that there are six distinct types of cost which lend themselves to the development of standards. Each of the costs represents a motor carrier function. For each of these functions, the standard must be developed for future usage. They are as follows:

1. Mileage Costs.
2. Hourly Costs.
3. Terminal Costs.
4. Billing and Accounting Costs.
5. Sales Costs.
6. Administrative Costs.

E. Mileage Costs

The largest group of expenses are those caused by the direct physical operations of the vehicles. The costs of gasoline, oil, repairs, parts, tires, and tubes, are expenses which should be separated from all other carrier costs because they have one thing in common. All are caused by the fact that the vehicles travel over the highways. None of these costs would arise if the vehicles were idle in the garage. Motor carriers use more than one type of equipment. For long hauls, the largest vehicles are used. For the local pick-up and delivery operations, smaller trucks have their place. Therefore, it is evident that the mileage costs of the smaller vehicle will not equal that of the larger trucks and trailers. A standard for mileage expenses must

not only be developed for the company as a whole, but for each class of operating unit within the business. The mechanics of developing such standards will be dealt with in Chapter V.

F. Hourly Costs

All other direct operational costs of the vehicles can be grouped under an hourly cost heading. Such items as insurance of the vehicles, depreciation of the vehicles, taxes (except certain social security taxes), (1) drivers' and helpers' wages continue from hour to hour and day to day even though the vehicles are inoperative. Certain vehicles on certain days will be in operation more hours than others. Drivers are paid on an hours-of-operation basis. The vehicles, while traveling, are operating as revenue producing units. For purposes of standard cost finding, it is necessary to consider only the number of hours the vehicles are in operation. The objective, in this instance, is to compute the cost of operating vehicles per hour. Considerations must be given to the sizes and costs of the vehicles as in the case of mileage costs. The methods of developing hourly standards will be indicated in Chapter VI.

G. Terminal Costs

The next carrier function to be considered is terminal handling of freight across the platform, and the costs which arise from such operations. Platform laborers and supervisors, the cost of operating the terminal, and all expenses caused by the break-bulk operations

(1) Certain social security taxes should not be applied as an hourly cost because such taxes are paid on wages which have been classified either as mileage, terminal, billing and accounting, sales or administrative cost.

of the terminal are examples of this group of expenses. Platform costs include all expenses incurred in connection with the transfer of freight from one line-haul vehicle to another or between a line-haul vehicle and a collection and delivery vehicle. (1) The problem in this instance will be to determine the cost per hundred pounds, or per ton, for freight handled across the terminal platform.

H. Billing and Accounting Costs

Certain costs arise because of the necessity of preparing bills of lading, waybills, and other documents of shipment. The customer must be billed, and the final results of all transactions must be calculated.

> "Billing and collecting expenses include, generally, the salaries of the billing clerks, rating clerks, interline settlement clerks, and clerks whose time is spent wholly in filing and sorting bills." (2)

These costs will all be distributed on a per-shipment basis to arrive at a standard billing and accounting cost per bill prepared.

I. Sales Costs

In order to create a desire on the part of the shipper to use his particular service in preference to that of a competitor, it is necessary for the motor carrier to advertise, and otherwise attempt to solicit business. Due to regulation of rates, and because of the Interstate Commerce Commission prohibitions concerning rate discrimination,

(1) Explanation of the Development of Motor Carrier Costs, published by the Interstate Commerce Commission, 1949, page 42.

(2) Ibid, page 44.

all competition must be on a service basis. Therefore, when a shipper is "shopping" for a carrier, he will hire the one who will offer the best service. By advertising, the carrier tries to convince the shipper that his service is superior to that of all other competitors. Because of this necessary advertising, solicitation, and other methods of selling the service, a distinctive class of costs arises. A standard can be developed for this cost in order to determine what future sales costs should be if an estimated amount of revenue is to be obtained.

J. Administrative Costs

The over-all cost of administration and all other general expenses that are beneficial to the organization as a whole form a class of expenses for which a standard must be developed. Such items as office expenses, and office supplies are administrative costs as are the wages of top management. The reasons for development of such costs are clearly stated by Ortman as follows:

> "The average accounting record is not sufficient for the purpose of judging the efficiency of a clerical department. Cost records . . . will provide unit cost figures by operations . . . (that) will enable us to set standards for each elementary cost unit and facilitate effective executive action through the resulting comparisons."(1)

K. Summary

Standard costs are average expected costs for the future, based on qualified historical past performances. (2) They can be

(1) Handbook of Business Administration, edited by W. J. Donald, published by McGraw Hill Book Co., New York, 1931, page 1004.

(2) See "Problems of Unusual Items," page 103.

used by motor carriers of property in the same manner as they are commonly used in manufacturing industries. The best method of developing motor carrier standard costs is by dividing carrier activities into six major functions and computing a standard for each function. The reasons for computing such standards are numerous. Sweetser states:

> "It is not a mere compilation of figures prepared in the accounting department after the fact, and full of mystery to others. It is a method which provides every department head in advance with accurate allowances showing him the limits to which he can go safely in authorizing expenditures. It shows what the product ought to cost in detail and separates the cost of inefficiency of operations, thereby pointing out weaknesses to be attacked and the direction required for intelligent cost reduction." (1)

(1) From Operating Data For Line Officials, by F. L. Sweetser, General Manager, Dutchess Manufacturing Company, an article in Handbook of Business Administration, published by McGraw Hill Book Company, New York, 1931, page 682.

used by motor carriers of property in the same manner as they are commonly used in manufacturing industries. The best method of developing motor carrier standard costs is by dividing carrier activities into six major functions and computing a standard for each function. The reasons for computing such standards are numerous. Sweetser states:

> "It is not a mere compilation of figures prepared in the accounting department after the fact, and full of mystery to others. It is a method which provides every department head in advance with accurate allowances showing him the limits to which he can go safely in authorizing expenditures. It shows what the product ought to cost in detail and separates the cost of inefficiency of operations, thereby pointing out weaknesses to be attacked and the direction required for intelligent cost reduction." (1)

(1) From Operating Data For Line Officials, by F. L. Sweetser, General Manager, Dutchess Manufacturing Company, an article in Handbook of Business Administration, published by McGraw Hill Book Company, New York, 1931, page 660.

CHAPTER IV

Accounts Used in the Development of Standard Costs for Motor Carriers of Property

A. Introduction

The Interstate Commerce Commission has specified which accounts must be kept by Class I carriers, and has also conveniently numbered such accounts. In order that the development of the six standards described in the preceding chapter shall be used in conjunction with the prescribed system (as of January 1, 1948), the accounts as given will be used, even though it may be necessary to divide some of them into more than one class of expense.

All accounts can now be listed under their six major classifications. The classifications are as follows:

1. Mileage Costs.
2. Hourly Costs.
3. Terminal Costs.
4. Billing and Accounting Costs.
5. Sales Costs.
6. Administrative Costs.

B. Mileage Costs

The mileage factor is the basis for this class of expense. As mileage increases, mileage costs increase, though not necessarily in the same proportion. (1) The following costs and their Interstate

(1) The Use of Costs in Making Rates, by Dr. Ford Edwards, National Committee on Accounting, American Trucking Association, Washington, D.C., October 11, 1948.

CHAPTER IV

Accounts Used in the Development of Standard Costs for Motor Carriers of Property

A. Introduction

The Interstate Commerce Commission has specified which accounts must be kept by Class I carriers, and has also consecutively numbered such accounts. In order that the development of the standards described in the preceding chapter shall be used in connection with the prescribed system (as of January 1, 1944), the accounts as given will be used, even though it may be necessary to divide some of them into more than one class of expense.

All accounts can now be listed under their six major classifications. The classifications are as follows:

1. Mileage Costs.
2. Hourly Costs.
3. Terminal Costs.
4. Billing and Accounting Costs.
5. Sales Costs.
6. Administrative Costs.

B. Mileage Costs

The mileage factor is the basis for this class of expense. As mileage increases, mileage costs increase, though not necessarily in the same proportion. (1) The following costs and their Interstate

(1) The Use of Costs in Making Rates, by Mr. Ford Bowers, National Committee on Accounting, American Trucking Association, Washington, D.C., October 11, 1938.

Commerce Commission classification number are properly included as mileage costs: (1)

1. #4110 - Equipment Maintenance - Supervision. This account shall include salaries and bonuses of officers, foremen, superintendents, and others who direct the repairing, and servicing of revenue equipment, and other equipment used in keeping the vehicles in good running condition. Salaries and other pay of administrative employees of the equipment maintenance department are includible.

2. #4120 - Equipment Maintenance - Office and Other Expense. This account includes the cost of services and supplies and other expenses incurred in the administration of the equipment maintenance department, such as cost of operating service cars, travel expense, postage, and other expenses of this department.

3. #4130 - Equipment Maintenance - Repairs and Servicing of Revenue Equipment. This account includes the salaries of employees, cost of parts, materials, and supplies used in repairing and servicing revenue equipment. Also, the costs of replacing such items as tire chains, lamps, tarpaulins, and fire extinguisher refills are includible.

4. #4160 - Equipment Maintenance - Tires and Tubes. This account includes the cost of tires and tubes used on revenue equipment, and the cost of keeping the tires and tubes in good repair.

5. #4180 - Equipment Maintenance - Other Maintenance Expenses. This account includes the costs of maintaining revenue equipment that

(1) The explanation of accounts given herein is, for the most part, a summary of account explanations as given in the Interstate Commerce Act.

are not provided for elsewhere, such as the cost of heat, light, and power used in the garage, towing, and wrecking costs, etc.

6. #4250 - Transportation - Fuel for Revenue Equipment. This account includes the cost of gasoline and other motor fuel used in revenue equipment.

7. #4260 - Transportation - Oil for Revenue Equipment. This account includes the cost of motor oil used in revenue equipment.

8. #5210 - Taxes - Gasoline, Other Fuel, and Oil Taxes. This account includes the taxes on fuel and lubricants recorded in accounts #4250 and #4260.

9. #5040 - Depreciation of Shop and Garage Equipment. This account includes the depreciation charges of machinery and equipment necessary to keep the vehicles in good repair.

C. Hourly Costs

The items of cost which continue from day to day, regardless of the number of miles traveled by the vehicles, are listed under this heading. The following items are includible as hourly costs:

1. #4210 - Transportation - Supervision. This account includes salaries and bonuses of officers and other employees engaged in supervising and directing transportation. Pay and bonuses of clerks, inspectors, dispatchers and other administrative employees in this department are included.

2. #4220 - Transportation - Office and Other Expenses. This account includes the cost of services and supplies and other expenses incurred in connection with the administration of the transportation department.

3. #4230 - Transportation - Drivers and Helpers. This account includes the pay of drivers, and helpers, even though they may merely be on duty in readiness to go into service.

4. #4280 - Transportation - Other Transportation Expense. This account includes all transportation expenses that are not provided for elsewhere, such as: badges for drivers, drivers' uniforms, fines for traffic violations, and meals for drivers.

5. #4510 - Insurance and Safety - Supervision. This account includes salaries and bonuses of insurance and safety department employees, and an equitable portion of salaries of other officers and employees who are engaged in general supervision of insurance and safety departments. The payments to attorneys and investigators for service in connection with duties of this department are includible.

6. #4520 - Insurance and Safety - Office and Other Expenses. This account includes supervisory expense of this department not included elsewhere, including special costs in procuring insurance, brokerage fees, insurance inspection fees, costs of safety-first campaigns, subscriptions to trade journals. Also includible are costs of travel for employees when such travel is caused by any loss and damage cases.

7. #4530 - Insurance and Safety - Public Liability and Property Damage. This account includes the cost of premiums necessary to protect the carrier against liability for deaths or of injuries to persons and damage to the property of others.

8. #4540 - Insurance and Safety - Workmens' Compensation. This account includes the cost of insurance required to provide for workmens' compensation or similar employee protection. Payments

made, not covered by insurance, on account of claims for injuries to and deaths of employees must be debited to this account.

9. #4550 - Insurance and Safety - Cargo Loss and Damage. This account includes the cost of commercial insurance to protect the carrier against liability for claims resulting from loss and damage to, or delay of, property intrusted to it for transportation and storage.

10. #4560 - Insurance and Safety - Fire, Theft, and Collision. This account includes the cost of commercial insurance to protect the carrier against fire, theft, and collision damage to owned or leased vehicles and for fire insurance on structures and other equipment. If there is not any commercial insurance, or self insurance reserve, this account shall be charged with actual losses from fire, theft, and collision.

11. #4570 - Insurance and Safety - Other Insurance Expense. This account includes the cost of commercial insurance against loss from various casualties such as boiler explosion, hurricane, and other risks not provided for elsewhere, or losses from casualties if no insurance is carried.

12. #4580 - Insurance and Safety - Other Insurance and Safety Department Expenses. This account includes the cost of the insurance and safety department, other than risks, and claims, that are not provided for elsewhere.

13. #5220 - Vehicle License and Registration Fees. This account includes the cost of all taxes, licenses, and fees assessed for the privilege of operating revenue vehicles over the highways.

14. #5230 - Real Estate and Personal Property Taxes. This account includes the amounts paid in taxes, based on the value of real estate and personal property.

15. #5240 - Social Security Taxes. This account includes the cost of social security and unemployment and old age benefit taxes payable to the federal and state governments.

16. #5250 - Other Taxes. This account includes the cost of all other taxes not provided for from account #5210 to account #5240.

17. #5010 - Depreciation of Structures. This account includes the depreciation charges of all carrier buildings and structures owned by the carrier. (1)

18. #5020 - Depreciation of Revenue Equipment. This account includes the depreciation charges of all trucks, trailers, and tractors used as revenue producing equipment.

19. #5030 - Depreciation of Service Cars and Equipment. This account includes the depreciation charges of automobiles, wreckers, sand and salt cars, tow cars, etc. (2)

20. #5060 - Depreciation of Miscellaneous Equipment. This account includes the depreciation charges of equipment owned and employed by the carrier not provided for elsewhere.

(1) Depreciation of the terminal should be deducted and allocated to the terminal classification. Office depreciation is part of the billing and accounting cost. Any depreciation of the sales office and of the general office should be allocated to that group of costs. Depreciation of the garage where repair work is done is a part of the mileage costs.

(2) Costs which can be properly allocated to the terminal, sales office, repair garage, administrative office, or billing and accounting or administrative offices should be so allocated.

D. Terminal Costs

The term "terminal" designates any dock, warehouse, depot, or other place of business used for the purpose of accepting or otherwise handling shipment for freight motor carriers. (1) Freight is deposited at the terminal for reshipment to other points. Because of the task of handling freight across the platform, certain costs are incurred. These costs, referred to as terminal costs in this thesis, are as follows:

1. #4310 - Terminal - Supervision Salaries. This account includes the cost of salaries and other payments to officials and employees engaged in terminal operation supervision.

2. #4320 - Terminal - Office and Other Expenses. This account includes the cost of office supplies and expenses consumed in connection with administrative functions of the terminal department.

3. #4340 - Terminal - Salaries and Wages - Platform Employees. This account includes the cost of salaries and wages of all platform employees engaged in loading, unloading, and platform handling of the freight.

4. #4350 - Terminal - Other Terminal Employees. This account includes the pay of miscellaneous terminal employees, as yardmen, janitors, watchmen, and cleaners.

5. #4360 - Terminal - Commission Agents. This account includes the amounts paid to others on a commission or other basis for the

(1) State of Iowa Regulations of Terminals, from Motor Truck Red Book, published by Traffic Publishing Company, Inc., New York, 1940, page 67.

D. Terminal Costs

The term "terminal" designates any dock, warehouse, depot, or other place of business used for the purpose of accepting or otherwise handling shipment for freight motor carriers. (1) Freight is deposited at the terminal for reshipment to other points. Because of the task of handling freight across the platform, certain costs are incurred. These costs, referred to as terminal costs in this thesis, are as follows:

1. #0510 - Terminal - Supervision Salaries. This account includes the cost of salaries and other payments to officials and employees engaged in terminal operation supervision.

2. #0520 - Terminal - Office and Other Expenses. This account includes the cost of office supplies and expenses connected in connection with administrative functions of the terminal department.

3. #0530 - Terminal - Salaries and Wages - Platform Employees. This account includes the cost of salaries and wages of all platform employees engaged in loading, unloading, and platform handling of the freight.

4. #0550 - Terminal - Other Terminal Employees. This account includes the pay of miscellaneous terminal employees, as janitors, watchmen, and cleaners.

5. #0560 - Terminal - Commission Agents. This account includes the amounts paid to others on a commission or other basis for the

(1) State of Iowa Regulations of Terminals, from Motor Truck Red Book, published by Traffic Publishing Company, Inc., New York, 1940, page 57.

solicitation, terminal handling, and pick-up and delivery of freight at points where the carrier does not operate a terminal.

6. #4380 - Terminal - Other Terminal Expenses. This account includes the costs of platform supplies, and other expenses incurred in the operation of the terminal. Light, heat, water, and power used in the terminal are properly includible in this account.

E. Billing and Accounting Costs

Billing and accounting costs include expenses for rating, billing, extending, and other clerical work performed by the carrier's employees. (1) The expenses which are grouped under this classification are as follows:

1. #4312 - Terminal - Salaries and Fees - Billing and Collection. This account includes the pay of cashiers and other employees engaged in rating, billing, and manifesting freight shipments and payments to outside companies for manifesting, rating, and collecting freight bills.

2. #4313 - Terminal - Other Office Employees. This account includes the cost of pay of terminal employees not provided for in account #4312.

3. #4612 - Administrative and General - Salaries and Revenue Accounting. This account includes the pay of employees engaged in handling revenue accounting.

(1) The Use of Costs in Making Rates, by Ford K. Edwards, published by National Committee on Accounting, American Trucking Association, Washington, D.C., October 11, 1948, page 8.

4. #4613 - Administrative and General - Salaries - Other General Office Employees. This account includes the pay of all general office employees not included in account #4612, such as typists, janitors, and other employees.

5. #4622 - Administrative and General - Expenses of General Office Employees. This account includes the traveling and other incidental expenses incurred by general office employees whose salaries are included in accounts #4612 and #4613.

6. #4623 - Administrative and General - Other General Office Expenses. This account includes the cost of supplies and expenses incurred in connection with the carrier's general administrative functions.

7. #4635 - Administrative and General - Outside Auditing Expenses. This account includes the cost of auditing and accounting services rendered by individuals or firms other than the carrier's own employees.

8. #5050 - Depreciation of Furniture and Office Equipment. This account includes depreciation charges for furniture, office appliances and equipment owned by the carrier. (1)

F. Sales Costs

Sales costs are those expenses incurred by selling the service to the public. The expenses included in this class of cost are as follows:

(1) Care must be taken to separate depreciation charges on furniture and fixtures used in other departments, as those used at the terminal.

1. #4410 - Traffic - Supervision. This account includes the salaries and bonuses of officers, traffic managers, and other employees who are directly in charge of the promotion and solicitation of traffic.

2. #4420 - Traffic - Office and Other Expenses. This account includes the supervisory costs not provided for elsewhere, including cost of maintaining and operating automobiles, postage, travel expenses, and other expenses of those employees engaged in selling the services.

3. #4430 - Traffic - Tariffs and Schedules. This account includes the cost of publishing tariffs and schedules, except salaries which are included in the two aforementioned accounts, #4410 and #4420.

4. #4450 - Traffic - Advertising. This account includes the costs, other than salaries, incurred in connection with advertising for the purpose of securing traffic.

5. #4480 - Traffic - Other Traffic Expense. This account includes the costs pertaining to the traffic department not provided for in accounts #4410, #4420, #4430, and #4450.

G. Administrative Expenses

Administrative expenses represent the cost of management and miscellaneous costs that are not caused by any of the direct operations of the enterprise. Costs in this classification are as follows:

1. #4611 - Administrative and General - Salaries, General Officers. This account includes the cost of salaries, bonuses, and other forms of payment for services of general officers whose jurisdiction extends over the carrier's entire transportation system.

2. #4621 - Administrative and General - Expenses, General Officers. This account includes the expenses, incurred for the benefit

of motor carrier operations by officers whose salaries are includible in account #4611, as costs of operation and maintaining vehicles, and traveling expenses.

3. #4630 - Administrative and General - Law Expenses. This account includes costs of carrier's law department, other than salaries of employees, including amounts due outsiders for legal services and related expenses.

4. #4640 - Administrative and General - Communication Service. This account includes costs of telephone, telegraph, radio, etc., service payable to outsiders.

5. #4645 - Administrative and General - Employees' Welfare Service. This account includes payments for pensions and other benefits to active and retired carrier employees and expenses incurred in carrying out relief, medical, or other services for the benefit of the carrier's employees. Any sums paid into any retirement funds must be included in this account.

6. #4650 - Administrative and General - Management and Supervision Fees. This account includes expenses incurred for services received from others under a service contract, or other arrangement provided for the furnishing of general management, supervision, purchasing, financial, or other general services.

7. #4660 - Administrative and General - Uncollectible Revenues. This account includes losses on receivables for carrier operating revenue.

8. #4675 - Administrative and General - Purchasing and Stores Expense. This account includes expenses incurred by the operation of a purchasing department.

9. #4670 - Administrative and General - Regulatory Expenses. This account includes expenses of the carrier in connection with respect to formal cases before federal and state regulatory bodies, or cases to which such a body is a party. Also assessments against the carrier for pay and expenses of the regulatory commission.

10. #4680 - Administrative and General - Other General Expenses. This account includes all expenses connected with motor carrier operations not provided for elsewhere, including fees and expenses of filing annual reports, charitable contributions, etc.

H. Exceptions

Many of the items in some of the six general classes must be further split if accurate results are to be obtained. A graphic illustration of allocation of all accounts used in the development of standard costs can be found by referring to Illustration I on pages 52 and 53.

As certain accounts do not lend themselves easily to this method of classifying costs, special attention must be given to the exceptions in order to avoid any misrepresentations. For example, account #4540, Workmens' Compensation Insurance, has in it elements which rightfully belong to each one of the six classes. It is true that the bulk of wages paid, and workmens' compensation paid, is for wages of the drivers and helpers, (1) but such insurance is also paid on wages of garage repairmen, storekeepers, and all other employees. Therefore, this expense, though listed under the hourly cost group, should be included in each one of the other five classifications.

(1) See "For Hire Truckloadings by Months," page 118.

Another account which has similar characteristics is account #5240, Social Security Taxes.

Actually, there is no limit to the amount of refinement that can be carried through in setting forth an accurate break-down of all costs into the classes suggested. Each carrier has his own peculiar problems, and each carrier must adapt the allocation to fit his own operations.

It will be noted that accounts of the #5300 group, Operating Rents, have been omitted. These accounts would naturally be a part of the operating expenses, but to include them would be a mere repetition of the depreciation charge illustration. If a carrier rented equipment exclusively, there would be no vehicle depreciation charges. It is very possible, and quite common, for a carrier to rent revenue producing equipment from other carriers for certain operations. The rental charges would be included in the same cost classification with depreciation charges for equipment used for the same purposes. One charge is merely a substitution for another.

Illustration I - Explanation

The illustration found on pages 52 and 53 is a graphic presentation of the first step to be taken in the development of standard costs for a motor carrier of property using the system of accounts prescribed by the Interstate Commerce Commission as of January 1, 1948. In order to obtain representative standards, it is necessary to carefully select the period which is closest to the normal period. Ideally, the past year would probably yield the best results because operations of the future year would be expected to more closely parallel the past year, all things being equal. As carrier operations are seasonal, a full year is the minimum period that should be utilized. (1)

By referring to the following two pages, the following items should be noted:

1. The extreme left column contains the prescribed accounts and account numbers, required by the Interstate Commerce Commission.

2. The six cost classifications range from left to right across the pages.

3. A check mark has been placed in the cost column opposite the accounts which contain elements of cost pertaining to that particular class. It will be noted that several accounts are checked in more than one column. This indicates that the items charged to that account have characteristics of several cost groups.

(1) See "Average Wage Per Employee," page 117.

ILLUSTRATION I

Break-Down of Accounts as Prescribed for Class I Carriers of Freights into Six Cost Classifications

ICC Acct No.	Name of Account	Mileage Costs	Hourly Costs	Terminal Costs	Billing & Acctg. Costs	Sales Cost	Admin. Costs
4410	Equipment Maintenance-Supervision	x					
4120	Office & Other Expenses	x					
4130	Repairs & Servicing-Rev.Equip.	x					
4160	Tires & Tubes-Revenue Equip.	x					
4180	Other Maintenance Expenses	x					
4210	Transportation-Supervision		x				
4220	Office & Other Expenses		x				
4230	Drivers & Helpers		x				
4250	Fuel for Revenue Equip.	x					
4260	Oil for Revenue Equip.	x					
4280	Other Transportation Expenses		x				
4311	Terminal-Supervisory Salaries			x			
4312	Salaries & Fees-Bill'g & Coll'g				x		
4313	Other Office Employees			x			
4320	Office & Other Expenses				x		
4340	Salaries & Wages-Platform Emp'es			x			
4350	Other Terminal Employees			x			
4360	Commission Agents			x			
4380	Other Terminal Expenses			x			
4410	Traffic-Supervision					x	
4420	Office & Other Expenses					x	
4430	Tariffs & Schedules					x	
4450	Advertising					x	
4480	Other Traffic Expenses					x	
4510	Insurance & Safety-Supervision		x				
4520	Office & Other Expenses		x				
4530	Public Liability & Prop. Damage		x				
4540	Workmen's Compensation	x	x	x	x	x	x
4550	Cargo Loss & Damage		x				
4560	Fire, Theft, & Collision		x				
4570	Other Insurance Expense		x				
4580	Other Ins. & Safety Dept. Exp.		x				
4611	Administrative & Gen.-Salaries-General Officers						x
4612	Salaries-Revenue Accounting				x		
4613	Salaries-Other Off.Emp'es				x		
4621	Expenses of General Offices						x
4622	Expenses of Gen.Off.Employees				x		
4623	Other Gen. Office Expenses				x		
4630	Law Expenses						x
4635	Outside Auditing Expenses				x		

ILLUSTRATION I

Break-Down of Accounts as Prescribed for Class I Carriers

of Freight Into Six Cost Classifications

Name of Account	Mile-age Costs	Hourly Costs	Terminal & Accts. Costs	Handling Sales Costs	Admin. Costs
Equipment Maintenance-Supervision	x				
Office & Other Expenses	x				
Repairs & Servicing-Ser.Equip.	x				
Tires & Tubes-Revenue Equip.	x				
Other Maintenance Expenses	x				
Transportation-Supervision		x			
Office & Other Expenses		x			
Drivers & Helpers		x			
Fuel for Revenue Equip.	x				
Oil for Revenue Equip.	x				
Other Transportation Expenses		x			
Terminal-Supervisory Salaries			x		
Salaries & Fees-Bill'g & Coll'g.			x		
Other Office Employees			x		
Office & Other Expenses			x		
Salaries & Wages-Platform Emp'es			x		
Other Terminal Employees			x		
Demurrage Agents			x		
Other Terminal Expenses			x		
Traffic-Supervision				x	
Office & Other Expenses				x	
Traffic & Schedules				x	
Advertising				x	
Other Traffic Expenses				x	
Insurance & Safety-Supervision			x		
Office & Other Expenses			x		
Public Liability & Prop. Damage			x		
Workmen's Compensation	x	x	x	x	x
Cargo Loss & Damage			x		
Fire, Theft, & Collision			x		
Other Insurance Expenses			x		
Other Ins. & Safety Dept. Exp.			x		
Administrative & Gen.-Salaries-					
General Officers					x
Salaries-Revenue Accounting					x
Salaries-Other Off.Emp'es					x
Expenses of General Offices					x
Expenses of Gen.Off.Employees					x
Other Gen. Office Expenses					x
Law Expenses					x
Outside Auditing Expenses					x

ILLUSTRATION I-B

ICC Acct No.	Name of Account	Mileage Costs	Hourly Costs	Terminal Costs	Billing & Acctg Costs	Sales Cost	Admin-Costs
4640	Administrative & General-Communication Service						x
4645	Employee's Welfare Service						x
4650	Management & Supervision Fees						x
4660	Uncollectible Revenues						x
4670	Regulatory Expenses						x
4675	Purchasing & Store Expenses						x
4680	Other General Expenses						x
5010	Depreciation of Structures	x	x				
5020	of Revenue Equipment		x				
5030	of Service Cars & Equipment		x				
5040	of Shop & Garage Equipment	x					
5050	of Furniture & Office Equip.	x	x	x	x	x	x
5060	of Miscellaneous Equipment		x				
5210	Gasoline, Other Fuel, & Oil Taxes	x					
5220	Vehicle License & Registration Fees		x				
5230	Real Estate & Pers.Prop. Taxes		x				
5240	Social Security Taxes	x	x	x	x	x	x
5250	Other Taxes		x				
TOTAL COSTS							

Name of Account	Mile-age Basis	Hourly Basis	Terminal Basis	Waiting & Accty Basis	Sales Cost	Admin-istrative
Administrative & General-						
Communication Service						x
Employee's Welfare Service						x
Management & Supervision Fees						x
Uncollectible Revenues						x
Regulatory Expenses						x
Franchising & Store Expenses						x
Other General Expenses						x
Depreciation of Structures	x	x				
of Revenue Equipment		x				
of Service Cars & Equipment		x				
of Shop & Garage Equipment						x
of Furniture & Office Equip.	x	x	x	x	x	
of Miscellaneous Equipment		x				
Gasoline, Other Fuel & Oil Taxes	x					
Vehicle Licenses & Registration Fees		x				
Real Estate & Pers.Prop. Taxes		x				
Social Security Taxes	x	x	x	x	x	x
Other Taxes		x				
TOTALS						

CHAPTER V

Development of Standard Costs

A. Introduction

Up to this point, the historical costs of motor carriers have been analyzed and grouped into the six types of cost for which a standard is to be computed. Now it becomes necessary to determine how the standards will be developed, and to determine what such computed standards actually represent. Each item will have to be considered separately, and methods of collecting data will have to be discussed.

The first item to be discussed is the mileage standard. The objective is to determine the cost of operating a vehicle one mile over the highways. The cost of operating all vehicles is not the same, as was indicated in a previous chapter. The typical carrier has in his fleet small trucks, large trucks, and tractor-trailers of various sizes. Trucks range in size from two-ton vehicles to larger sizes capable of hauling several tons. Quite obviously it is going to cost more to operate a large ten-ton truck than a small two-ton vehicle. Standards must be developed for particular size groups of operating units, if they are to be of any practical use. Each carrier must decide how he is going to group his vehicles, keeping in mind the fact that the smaller the range of a group, the more accurate his standards will be. For purposes of illustration in this thesis, trucks are grouped into six size classifications, and tractor-trailers are divided into five. Illustration II on page 66 indicates the correct method of handling this ton-size breakdown when collecting the cost data.

CHAPTER V

Development of Standard Costs

A. Introduction

Up to this point, the historical costs of motor carriers have been analyzed and grouped into the six types of cost for which a standard is to be computed. Now it becomes necessary to determine how the standards will be developed, and to determine what each computed standard actually represent. Each item will have to be considered separately, and methods of collecting data will have to be discussed.

The first item to be discussed is the mileage standard. The objective is to determine the cost of operating a vehicle one mile over the highways. The cost of operating all vehicles is not the same, as was indicated in a previous chapter. The typical carrier has in his fleet small trucks, large trucks, and tractor-trailers of various sizes. Trucks range in size from two-ton vehicles to larger sizes capable of hauling several tons. Quite obviously it is going to cost more to operate a large ten-ton truck than a small two-ton vehicle. Standards must be developed for particular size groups of operating units, if they are to be of any practical use. Each carrier must decide how he is going to group his vehicles, keeping in mind the fact that the smaller the range of a group, the more accurate his standards will be. For purposes of illustration in this thesis, trucks are grouped into six size classifications, and tractor-trailers are divided into five. Illustration II on page 66 indicates the correct method of handling this ton-size breakdown when collecting the cost data.

B. Direct and Indirect Mileage Costs

By studying the mileage costs in Illustration on pages 52 and 53, it can be noted that there are two types of costs which make up the over-all mileage cost. Certain items can be directly charged to specific vehicles while others cannot. For example, gasoline, mechanics labor, and repair parts are easily identified with the vehicles causing those expenses. On the other hand, the cost of heat, light, water, and power used by the garage cannot be said to be caused by specific vehicles, though these costs are caused by the mileage factor of the vehicles. (1) Therefore, there are two types of mileage expenses which must be allocated to the vehicles causing the expenses. One, direct mileage cost, can be specifically identified. The other, indirect mileage cost, must be allocated on an equitable basis.

Ideally, perhaps, the indirect costs should be allocated to those vehicles which actually use the garage facilities, either on a basis of hours in repair, or on a basis of cost of reapir. However, due to the fact that such records are not easily obtained from existing carrier statistics, and because there are certain inequities in such a basis, another method can be used with less difficulty. This method is to allocate the indirect mileage cost of vehicle operation on the basis of actual miles of operation. In other words, if the garage depreciation for a certain year was $1,500, and eight-ton trucks

(1) If the vehicles did not travel over the highways, they would not need repair, therefore no garage or garage facilities would be necessary and no garage expenses would arise. There would be no garage to depreciate, no cost of garage operation, and no indirect mileage costs whatsoever if there was no vehicle mileage factor.

traveled 150,000 miles as compared to 75,000 miles for two-ton vehicles, the eight-ton size group should absorb twice the amount of garage depreciation as the two-ton size group, or $1,000 of the expense.

A final method, and the one used herein, is to allocate the indirect costs on the basis of the total direct mileage costs. This is probably more accurate than the mileage basis discussed above. As the direct costs (gasoline, oil, etc.) of a vehicle increase, very probably mileage of that vehicle increases. As mileage increases, mechanical difficulties are likely to appear, causing more garage expenses. Thus, it would seem logical to assume that indirect costs could be equitably assigned to the vehicles on a direct cost basis.

C. Mileage Statistics

In order to determine standard costs per mile for motor carrier vehicles, it is necessary that the carrier maintain records that will show the following figures:

1. The number of miles traveled for each vehicle.
2. The direct cost of operating each vehicle.

To arrive at the number of miles operated per vehicle for a given period, the carrier must require that a daily record is maintained for each vehicle that will give the mileage traveled each day of the period. To get these figures, each of the carrier's drivers is issued a time card daily. When reporting for work, he fills in the card and punches it in the time clock. These time cards take many forms, but all show the following essential information:

1. The driver's name and social security number.
2. The date.

3. The truck, or tractor and trailer numbers.

4. The speedometer reading of the vehicle.

At the end of his operations with that vehicle for that particular day, he will again record the speedometer reading. It is essential that he fills out and punches a different card for each separate vehicle he uses during any work day. See the following time card for an example of a driver's report.

YOUNG'S MOTOR TRUCK SERVICE

TIME CARD AND DAILY RECORD

DATE January 23, 1949

NAME John Beard

OCCUPATION Driver

TRUCK NO. 5 TRAILER NO. 15

SPEEDOMETER READING: Finish 5800

Start 5675

Total Miles for Day 125

Morn. IN	Noon OUT	Noon IN	Night OUT	Extra IN	Extra OUT

8 Hrs. @ 1.20 Pr Hr. 9.60

½ Hrs. @ 1.80 Pr Hr. .90

Total Day's Pay 10.50

Another type of daily report used is illustrated on pages 59 and 60. This is the Form A-1, Motor Vehicle Daily Report, as suggested by the Society of Automotive Engineers. The following explanation is given of the use of the report:

> "A card, one of which is used each day for each vehicle, is a daily combined performance, operating and repair cost record for individual vehicles. One should be filled out for each vehicle daily and not more than one vehicle number should appear on a card. If a vehicle is not in service, a card should be prepared and the reason the vehicle is out of service shown on the front of the card. This information is necessary in order that the accounting department will have a card for each vehicle daily.
>
> "The front of the form (page 59) should be completely filled in by the driver of the vehicle. The information contained on this side of the form is used to make the necessary charges to the correct work or job orders on which the vehicle was used. Space is provided for verification of the work orders by the foreman or department office in charge of the work on which the vehicle was used. This acts as a check on charges to be made for use of the vehicle.
>
> "The back of the form is used to record the following: (page 60)
>
> "(a) Gasoline and oil either received in the company garage or purchased on the road. The employee in charge of issuing garage store should enter the number of gallons of gasoline, etc.
>
> "(b) Repair Material Used. Material used in making repairs should be entered on this form by the garage foreman or, if there is no foreman, by the mechanic doing the work.
>
> "(c) Repair Labor. The garage foreman or mechanic in charge of the work should make the necessary entries on the card for all labor charges for repairs, washing, greasing, etc, stating class of work performed and hours worked.
>
> "(d) Tires and Tubes Used. The replacement cost of worn-out tires and tubes is entered.

Drivers' Daily Report (Front)

Motor Vehicle Daily Report Form A-1

Vehicle No._____ Date_____ 19____

Division_____ Dept._____

Time Out_____ Time In _____

Total Hours Vehicle Used_____

Mileage In_____

Mileage Out_____ Total Mileage_____

Description of Work	Work or Job Order	Hours

Work Orders Verified By_____

Record of Tire Changes

Tire Removed L.F.___ R.F.___ L.R.I.___ R.R.I.___ L.R.O.____ R.R.O.____

Make and Serial No. Tire Removed_____

Make and Serial No. Tire Applied_____

Mileage Reading When Tire Was Changed_____

Following Repairs Necessary on This Vehicle_____

Signed_____

SOURCE: Form A-1 of Society of Automotive Engineers, Motor Truck Red Book, 1940, page 1941.

Drivers' Daily Report (Rear)

Gasoline and Oil Used		Form A-1 (Back)
Outside Sources ____Gals. Gas $_____ ____Qts. Oil $_____		Company Garage ____Gals. Gas $_____ ____Qts. Oil $_____
Attach Receipts or Charge Slips		

Repair Material Used

From Stock: Quan.	Name and No. of Part	Amt.	
From Outside Sources:			

Repair Labor - Washing - Greasing -Tire Repairs

Employers Name	Class of Work	Hours Worked	Cost	

Tires and Tubes Used	Cost	

SOURCE: Form A-1 of Society of Automotive Engineers, Motor Truck Red Book, 1940.

"After all data is recorded on the card, it is sent to the accounting department." (1)

Motor carrier management has oftentimes found it wise to install in their vehicles certain instruments which serve as a positive check on mileage traveled per day by the vehicles. In order to avoid tampering with these instruments by the drivers, they are so constructed that the drivers cannot control the instrument readings. The two instruments which are in use most widely today are the hub odometer and the tachometer.

The hub odometer is a mileage recorder that is attached to the front wheel of the vehicle, and is sealed. If the odometer is tampered with, the broken seal will so indicate. If the vehicle speedometer is working, (2) it will be a check against that reading. Mileage is registered on the face of the odometer as it is on the conventional speedometer.

The tachometer is a more expensive and complicated device. Primarily, it is not meant to be a mileage recorder, though such figures can be read from it. The tachometer records three things on a circular disk which is replaced daily. By referring to the sample disk, called a tachograph, one can read the following data:

1. The hours of operation for the day.
2. The speed at which the vehicle operated.
3. The distance covered for the day by the vehicle.

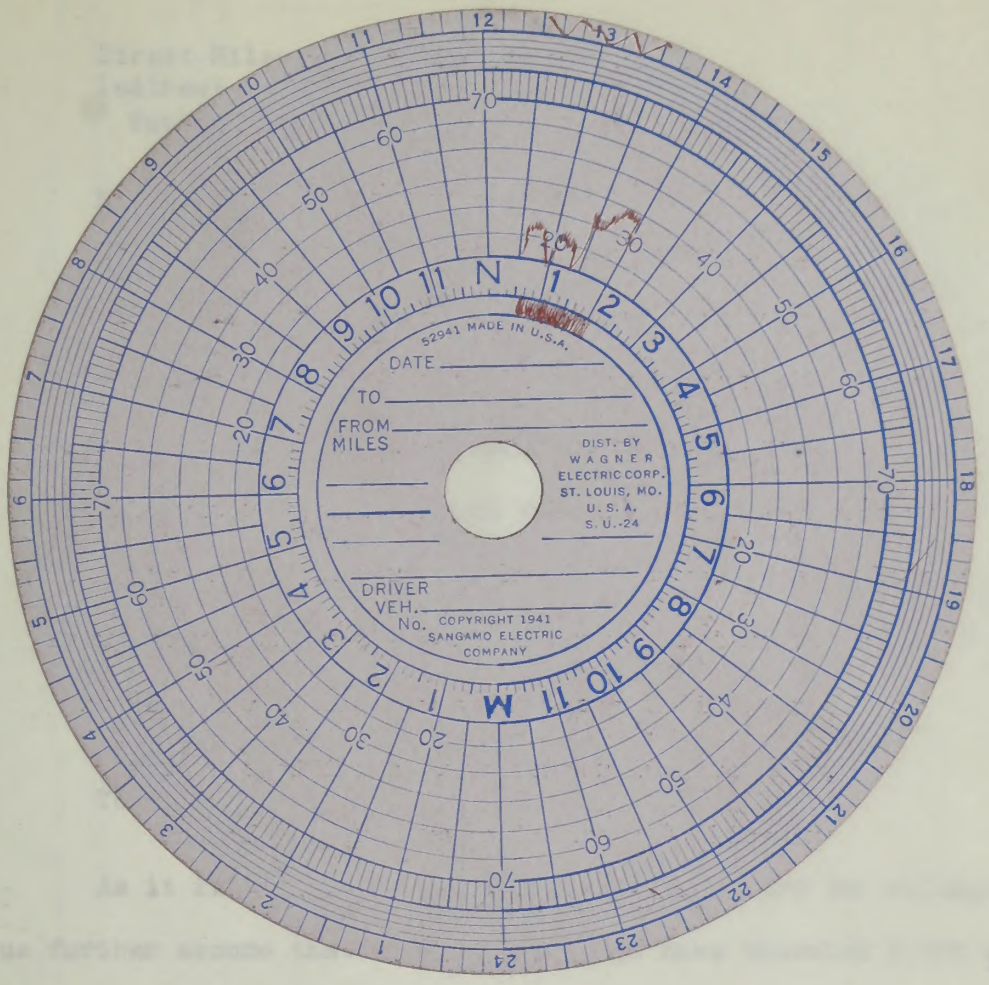
(1) The Motor Truck Red Book, published by the Traffic Publishing Company, Inc., New York, New York, November, 1940, page 140.

(2) During an interview, one carrier operator remarked that no mileage recorders ever worked after the first few months of purchase of the vehicles. Somehow or other, they were subject to many strange "accidents."

The red markings on the inner part of the disk shown on page 63 indicate that the vehicle was in operation from one to two o'clock. The center red mark indicates that the speed of operation of the vehicle did not exceed forty miles per hour. The outer line indicates mileage. Each peak in the line represents a ten-mile distance. It would seem that the hub odometer is a more accurate measure of mileage for the tachograph gives but a close estimate.

The writer questioned several firms in the Boston area concerning the use of tachometers and hub odometers. The replies received ranged from enthusiasm on the part of some operators to frank disapproval on the part of others. Those who disapproved did so not because the instruments were not satisfactory when working properly, but because of the resentment of the drivers at having a "policeman" riding with them. In cases similar to the latter, the instruments needed constant repair, or were discarded because of the cost of numerous repairs. The satisfied users of tachometers and odometers were careful to explain to their drivers that the use of the instruments was as a method of developing costs and setting rates. Where sympathetic management-employee relations existed, the instruments were said to be extremely helpful. One carrier mentioned the fact that the tachographs were acceptable as court evidence concerning claims cases where the speed of the carrier's vehicles could be proven as at the time of highway accidents.

In order to summarize daily vehicle reports, all information recorded on the daily reports is transferred to a monthly worksheet. Such a worksheet is illustrated on page 65. At the end of the month,



after all indirect mileage costs are known, such indirect costs must be assigned to the vehicles in the manner discussed previously. It is necessary to assign to each ton-size group of vehicles a portion of the unassignable costs in the same ratio that direct costs of each class is to the whole. This can best be explained by the following example:

after all indirect mileage costs are known, such indirect costs must be assigned to the vehicles in the manner discussed previously. It is necessary to assign to each non-size group of vehicles a portion of the unassignable costs in the same ratio that direct costs of each class is to the whole. This can best be explained by the following example:

Direct Mileage Cost	$1,000.
Indirect Mileage Cost	500.
Total Mileage Cost	$1,500.

Direct Mileage Cost of 5-Ton Vehicles	$ 600.
Direct Mileage Cost of 2-Ton Vehicles	400.
Total Direct Mileage Cost	$1,000.

Direct Costs of 5-Ton Vehicles is 60% of the Whole, 60% of Indirect Mileage Cost is $300.

Therefore, 5-Ton Vehicles Must Absorb $300. of the Indirect Mileage Cost, Resulting in the Following:

	5-Ton Vehicles	2-Ton Vehicles
Direct Cost	$ 600.	$ 400.
Indirect Cost	300.	200.
Total Mileage Cost	$ 900.	$ 600.

As it is our purpose to establish a standard for mileage cost, let us further assume that five-ton vehicles have traveled 9,000 miles and two-ton vehicles have traveled 12,000 miles.

The following schedule illustrates how the cost per mile for any specific month would be computed.

	5-Ton Vehicles	2-Ton Vehicles
Mileage Cost	$ 900.	$ 600.
Mileage	9,000	12,000
Cost per Mile	$.10	$.05

Illustration II on page 66 indicates the method to be used in computing mileage standards for each class of vehicles for any specific period. Other forms could be used, but the procedure of computation would have to be the same. That procedure, outlined in its simplest steps, is as follows:

DETAIL OF MOTOR VEHICLE COSTS - MONTHLY

Form: Location or

Month_____ Division _____ Assigned to_____Vehicle No._____

Day	Gasoline plus Tax	Oil plus Tax	Tires and Tire Repairs	Repair Material	Repair Labor	Misc.	Depreci-ation	Other Expenses	Fixed Expenses	Mile-age	Hours Used	Total Expenses
1												
2												
3												
4												
5												
6												
. . .	. . .											
30												
31												
Total												

SOURCE: Society of Automotive Engineers - Example Form of Daily Motor Truck Operational Record, Motor Truck Red Book, 1940.

UNIVERSAL OIL MOTOR VEHICLE RECORD - MONTHLY

Name: _____ Location or Division _____ Assigned to _____ Vehicle No. _____

Month _____

Day	Operations this day	Oil and Gas	Tires and Tubes	Repairs	Battery	Misc.	Operation	Other	Diesel	Drive-away	Total Expenses
1											
2											
3											
4											
5											
6											
. . .											
30											
31											
Total											

ILLUSTRATION II

Schedule for Computation of Mileage Costs

	Trucks (Pounds)						Tractor-Trailers (Pounds)				
	Under 3,000	3,000 to 5,000	5,000 to 7,500	7,500 to 10,000	10,000 to 15,000	Over 15,000	5,000 to 10,000	10,000 to 15,000	15,000 to 20,000	20,000 to 25,000	Over 25,000
Direct Operational Costs											
Gasoline											
Gas. Taxes											
Oil											
Oil Taxes											
Tires & Tubes											
Repair Pts.											
Repair Labor											
Miscel.											
Total Direct Costs											
Miles Traveled											
Direct Cost Per Mile											
Other Unassignable Mileage Costs - Include all costs of Column I, Illustration I, not listed above in Direct Costs											
Total Mileage Costs											
Miles Traveled											
Mileage Cost											

1. Separate mileage costs from all other costs.

2. Separate vehicles in size groups.

3. Compute total direct mileage costs for each size-group.

4. Allocate indirect mileage costs on a basis of direct mileage costs for each group.

5. Divide total mileage cost of each group by the number of miles traveled by that size-group.

D. Hourly Costs

Mr. Dickson of the New England Motor Rate Bureau stated,

> "Certain items of cost in the operation of motor trucks are dependent solely upon time and not upon the number of miles operated. Among the items dependent upon time are the fixed charges for insurance, including fire, theft, property damage, license fees and general overhead. These total fixed costs of operation continue at the same rate per hour whether the truck is moving or standing . . ." (1)

The reason for computing an hourly as well as a mileage standard is evident if one but stops to realize that the vehicles themselves perform many types of operation. For illustrative purposes, compare the cost of gasoline with that of driver's wages. There will be no gasoline expense if the vehicle does not move, but the driver must be paid after he reports for work in the morning, even though he does not leave the terminal all day.

To continue further with reasons for separation of the two types of expense, consider the expense of gasoline for a five-ton vehicle and compare it with the gasoline cost for a ten-ton vehicle.

(1) Basic Principles of Expense Distribution Applicable to Motor Transportation, by J. Frank Dickson, Jr., published by the New England Motor Rate Bureau, page 4.

The latter is necessarily much higher. On the other hand, the cost of drivers for each vehicle is the same. The driver is paid by the hour regardless of what size vehicle he operates. (There are some exceptions to this rule.)

To compare the cost of gasoline and drivers' wages on still another basis, assume that truck A is assigned to haul freight on a certain day from Boston to New York City. Truck B is to drive in and around Boston to pick up freight from shippers and deliver other freight to consignees. The cost of gasoline in both cases is $.04 per mile, and drivers' wages are $1.00 per hour. (1) If truck A uses $8.00 worth of gasoline and truck B consumes $3.00 worth, the total gasoline expense would be $11.00. If each truck was in operation for six hours, $12.00 would be the cost of drivers for the day. If the total cost of $23.00 ($11.00 plus $12.00) was equally divided so that a figure of $11.50 per vehicle per day was computed, the inequities are easily seen. Actually, the cost of operation of truck A was $14.00 as compared with truck B's $9.00.

By referring to the hourly cost column of Illustration I, pages 52 and 53, it can be noted that account #5020, Depreciation of Revenue Equipment, is included. Actually, there are three major theories concerning depreciation of revenue equipment. First, there is the straight line basis whereby there is a monthly charge which is the same each month. Second, there is the mileage method wherein the number of operating miles of the vehicle is estimated, and a portion

(1) At the time of writing, wages for truck drivers in the Boston area are $1.20 per hour. Negotiations are in progress for a wage increase.

of the cost is depreciated for each mile of operation. Third, there is the hourly method of depreciating a vehicle wherein the number of operating hours of the useful life of the vehicle are estimated and depreciation is written off on the hourly basis. For reasons expressed later, it seems that the third method, the hourly basis, is the most accurate method of depreciating operating equipment. Depreciation is generally defined as the loss in value of a fixed asset due to wear and tear, deterioration, and obsolescence. (1) Therefore, the operating factor of the vehicles which causes them to depreciate should be the basis for charging depreciation. A straight line basis is not equitable for the nature of motor carrier operation is seasonal. (2)(3) Also, if a vehicle spends a month in a garage, due to extensive repairing or due to a shortage of traffic, that vehicle is not depreciating at as great a rate as a vehicle which is in operation during that month. It should not be subjected to depreciation charges if it is not being used for the purpose for which it was purchased. There are many arguments to support depreciation charged on miles of operating or on hours of operating. Though it is true that the vehicle is depreciating as it moves over the highway and miles are added into its register, it does not seem that the number of miles of operation is as important a factor of depreciation as is number of hours of operation. This can best be illustrated with an example.

(1) Cost Accounting, Principles and Practice, by John J. W. Neuner, published by Richard D. Irwin, Inc., Chicago, Illinois, 1947, page 289.
(2) See "For Hire Truckloadings by Months," page 118.
(3) Seasonal operations will vary with seasonal production of area within which the carrier operates, as the Maine potato season, the cotton season, the orange season, etc.

If truck A operates in a long haul operation between two points for eight hours, and covers 300 miles, and truck B operates within the city limits of a large metropolis for eight hours and covers sixty miles, it does not seem reasonable to assume that truck A depreciated five times as much as did truck B during the eight hour period. Though the mileage on truck A was far greater than truck B, it was necessary for truck B to operate within a congested area, with much stopping and starting, causing as much engine wear and tear as the long through trip of the former vehicle. The hourly basis would be a more correct reflection of the "wearing out" of the vehicle.

As with the mileage costs, hourly costs must be divided into direct hourly costs and indirect hourly costs. The direct hourly costs are those costs which can be specifically identified with the vehicles, and include the following accounts:

1. #4230 - Drivers and Helpers Wages.
2. #4530 - Public Liability and Property Damage Insurance.
3. #4540 - Workmens' Compensation Insurance (applicable to wages paid in #4230).
4. #4550 - Cargo Loss and Damage Insurance.
5. #4560 - Fire, Theft, and Collision Insurance.
6. #5020 - Depreciation of Revenue Equipment.
7. #5220 - Vehicle License and Registration Fees.
8. #5240 - Social Security Taxes (on wages paid in account #4230).

Indirect hourly expenses must be assigned on the basis of the amount of the direct hourly expenses, using the ton-size classifications of vehicles decided on for mileage costs. The following example illustrates the method to be used.

Assume the following facts, using drivers wages as the direct cost and salaries of traffic managers as the indirect cost.

	5-Ton Vehicles	10-Ton Vehicles
Hours of operation (May) (1)	120	100
Wages of drivers (2)	$144.	$120.
Salary of traffic manager	$200.	
Total drivers' wages	$264.	

Proportion of drivers' wages of 5-ton vehicles to total equals 144/264. 144/264 of $200. equals $109.10 assignable to 5-ton vehicles. After computations, the following schedule can be utilized:

	5-Ton Vehicles	10-Ton Vehicles
Direct hourly charge (Drivers' Wages)	$144.	$120.
Indirect hourly charge (Salary of Traffic Manager)	109.10	90.90
	$253.10	$210.90
Hours of operation	120	100
Hourly standard (for these two costs only)	$ 2.11	$ 2.11

Illustration III on page 72 indicates the method to be used when computing hourly standards for hourly costs incurred by motor vehicle operations. The procedure to be used is as follows:

1. Separate hourly costs from all other costs.

2. Separate vehicles in size groups.

3. Compute total direct hourly costs for each size group.

4. Allocate indirect hourly costs on a basis of direct hourly costs for each group.

5. Divide total hourly cost of each group by the number of miles traveled by that size group.

(1) See pages 59 and 65 for hours of operation statistics.

(2) See illustration on page 57 for amount of driver's wages.

Assume the following facts, using drivers wages as the direct cost and salaries of traffic managers as the indirect cost.

	5-Ton Vehicles	10-Ton Vehicles
Hours of operation (May) (1)	120	100
Wages of drivers (2)	$144.	$120.
Salary of traffic manager	$200.	
Total drivers' wages	$264.	

Proportion of drivers' wages of 5-ton vehicles to total equals 144/264.
144/264 of $200. equals $109.10 applicable to 5-ton vehicles. After computations, the following schedule can be utilized:

	5-Ton Vehicles	10-Ton Vehicles
Direct hourly charge (Drivers' Wages)	$144.	$120.
Indirect hourly charge (Salary of Traffic Manager)	109.10	90.90
	$253.10	$210.90
Hours of operation	120	100
Hourly standard (for these two costs only)	$ 2.11	$ 2.11

Illustration III on page 72 indicates the method to be used when computing hourly standards for hourly costs incurred by motor vehicle operations. The procedure to be used is as follows:

1. Separate hourly costs from all other costs.
2. Separate vehicles in size groups.
3. Compute total direct hourly costs for each size group.
4. Allocate indirect hourly costs on a basis of direct hourly costs for each group.
5. Divide total hourly cost of each group by the number of miles traveled by that size group.

(1) See pages 59 and 65 for hours of operation statistics.
(2) See illustration on page 57 for amount of driver's wages.

ILLUSTRATION III

Schedule for Computation of Hourly Costs

	Trucks (Pounds)						Tractor-Trailers (Pounds)				
	Under 3,000	3,000 to 5,000	5,000 to 7,500	7,500 to 10,000	10,000 to 15,000	Over 15,000	5,000 to 10,000	10,000 to 15,000	15,000 to 20,000	20,000 to 25,000	Over 25,000
Hourly Costs (Direct)											
#4230											
#4530											
#4540											
#4550											
#4560											
#5020											
#5220											
#5240											
Total Direct Costs											
Hours of Operation											
Hourly Cost of Direct Costs											
Unassignable Costs											
#4210											
#4220											
#4280											
#4510											
#4520											
#4570											
#4580											
#5010											
#5030											
#5050											
#5060											
#5230											
#5250											
Total Unassignable Costs											
Total Hourly Costs											
Hours of Operation											
Cost per Hour											

ILLUSTRATION III

Schedule for Computation of Hourly Costs

Under 3,000	Trucks (Pounds) 3,000 to 5,000	5,000 to 7,500	7,500 to 10,000	10,000 to 15,000	Over 15,000	Tractor-Trailers (Pounds) 3,000 to 10,000	10,000 to 15,000	15,000 to 20,000	Over 20,000

E. Terminal Costs

The third group of expenses to be considered is that which relates to operation of the motor carrier's freight terminal. Motor freight terminals are often jointly owned and operated by several carriers. Usually, only the largest carriers maintain separate terminals. The proper use of terminals can aid in stabilizing the operations of the carrier and guarantee a more efficient operation of his fleet. Service is speeded up and expensive long haul equipment is utilized more fully by having the smaller less expensive vehicles perform the pick-up and delivery operations from the terminal to the shippers and consignees. When the larger long haul vehicles enter a congested traffic area, rather than delivering the freight to the several consignees, the load is deposited at the platform for re-delivery by the smaller, more maneuverable trucks. At the same time, the long haul vehicle is immediately prepared to take another load to a distant center. Shipments have been collected from the various pick-up and delivery vehicles and consolidated for the distant point. This consolidation function eliminates less-than-truckload (1) movements for long haul vehicles. It must be pointed out that the terminal is necessary only because of the fact that there are less-than-truckload shipments of freight. If all shipments by consignors were full truckloads there would be no need of consolidation at the terminals because the freight could go directly from the consignor to the consignee without any further handling.

Terminal costs are of the following nature, according to stocker:

(1) See "Motor Truck Glossary," page 119.

> "Terminal costs on less truckload freight consist of the cost of pick-up and delivery, loading and unloading trucks at terminal, clerical help used in preparing shipping documents (bills of lading and so forth), terminal supervision, telegraph, telephone, light, heat, power, rent, and insurance, or, when the terminal is owned by the trucking company, capital charges on the investment in terminal properties and equipment." (1)

Although Stocker has included the cost of pick-up and delivery as a terminal cost, in this thesis the cost of pick-up and delivery will be considered later as a separate cost. The cost of clerical help in the preparation of shipping documents has been included under billing and accounting costs. The terminal cost column of Illustration I, pages 52 and 53, indicate the expenses which are includible as terminal cost.

All freight that enters the terminal evenually leaves it. All carrier activities at the terminal are centered about the movement of freight over the platform. Therefore, in developing a standard for terminal costs, that standard must be based on a weight basis. As many shipments are small, a hundred pound unit could be used more easily than a ton unit. The statistics concerning the number of pounds of freight handled at the terminal during the course of the year must be compiled. It is quite probable that these figures are not easily obtained because previous to this point, there was no apparent use for such amounts and no records were maintained. To arrive at an amount, it is necessary to make an estimate of freight handled across the platform, or it may be necessary to make a study of waybills in order to determine which shipments were brought into the terminal.

(1) Motor Traffic Management, by H. E. Stocker, published by Prentice Hall, Inc., New York, 1938, page 186.

"Terminal costs on less truckload freight consist of the cost of pick-up and delivery, loading and unloading trucks at terminal, clerical help used in preparing shipping documents (bills of lading and so forth), terminal supervision, telegraph, telephone, light, heat, power, rent, and insurance, or, when the terminal is owned by the trucking company, capital charges on the investment in terminal properties and equipment." (1)

Although Stocker has included the cost of pick-up and delivery as a terminal cost, in this thesis the cost of pick-up and delivery will be considered later as a separate cost. The cost of clerical help in the preparation of shipping documents has been included under billing and accounting costs. The terminal cost column of Illustration I, pages 52 and 53, indicates the expenses which are includible as terminal cost.

All freight that enters the terminal eventually leaves it. All carrier activities at the terminal are centered about the movement of freight over the platform. Therefore, in developing a standard for terminal costs, that standard must be based on a weight basis. As many shipments are small, a hundred pound unit could be used more easily than a ton unit. The statistics concerning the number of pounds of freight handled at the terminal during the course of the year must be compiled. It is quite probable that these figures are not easily obtained because previous to this point, there was no apparent use for such amounts and no records were maintained. To arrive at an amount, it is necessary to make an estimate of freight handled across the platform, or it may be necessary to make a study of waybills in order to determine which shipments were brought into the terminal.

(1) Motor Trucking Management, by H. M. Stocker, published by Prentice Hall, Inc., New York, 1929, page 134.

A waybill is a document describing a shipment. It accompanies the shipment from its origin to its destination. The following information is contained on every waybill issued: (A sample waybill is shown below.)

1. The date of the shipment.
2. A reference to the bill of lading.
3. The name and address of the shipper.
4. The name and address of the consignee.
5. A description of the goods.
6. The weight of the goods.

DELIVERY RECEIPT

ALSO SERVING
RINGFIELD, WORCESTER, FALL RIVER,
W BEDFORD. — STRAIGHT LOADS
NYWHERE IN THE COMMONWEALTH.

MBER OF MOTOR TRUCK CLUB OF MASSACHUSETTS.
W ENGLAND MOTOR RATE BUREAU INC.

HALL TRUCKING CO.

GENERAL OFFICE: 17 FREMONT ST., TAUNTON, MASS.
TAUNTON 2304 — BROCKTON 8047
BOSTON: HANcock 5446

Full Insurance Coverage

Prompt Returns on all C. O. D's

95589

IPPED TO

OM

/ /4 SHIPPER'S ORDER NO.

COLLECT ☐ CASH ☐ CHARGE ☐ PREPAID ☐

PU. D. ☐

FROM AT PRO

N-LINE

TO

CREDIT CONN. LINE ☐ CHARGE CONN. LINE ☐

IECES	DESCRIPTION	WEIGHT	CLASS	RATE			
							ADVANCES
							DUR CHARGE
							C. D. D. FEE
							TAX
	1						TOTAL CHGE.
							C. D. D.
							TOTAL DUE

KE ALL CHECKS PAYABLE TO HALL TRUCKING CO.

THE INTERSTATE COMMERCE COMMISSION . 223 MOTOR CARRIER'S ACT, REQUIRES THAT . BILLS BE PAID WITHIN 7 DAYS FROM SENTATION.

DATE DELIVERED

DRIVER

RECEIVED IN GOOD ORDER

Per

7. The conditions of the shipment, as to whether it is prepaid cash, prepaid charge, collect cash, collect charge, or C.O.D.

8. A provision for collection of value of goods if it is a C.O.D. shipment.

9. The signature of the consignee and any claims he may make as to whether the shipment is over, short, or damaged.

10. Usually, the waybill also indicates the rates and charges for the shipment.

Depending on the needs of the individual motor carrier, various numbers of copies of waybills are made out for each shipment. Basically, three copies are necessary, and each has the following usage:

Copy 1 (original copy): Upon receipt of the shipment, the consignee signs all copies, the original being returned to the carrier to be used by him as a basis for accounting records, and as a delivery receipt.

Copy 2: This copy is retained by the consignee for whatever use he may have for it, such as comparing it with his purchase invoices.

Copy 3: This copy is returned to the office of the motor carrier and attached to the weekly statements which are sent to the carrier's customers.

Illustration IV on page 77 is used to determine the standard cost per 100 pounds for terminal expenses. The terminal cost column of Illustration I on pages 52 and 53 illustrates the expenses includible as terminal expenses. After computing the standard per 100 pounds, the cost for a ton can be shown merely by multiplying said standard by twenty.

ILLUSTRATION IV

Schedule for Computation of Terminal Cost

Terminal Costs
#4311
#4312
#4313
#4320
#4340
#4350
#4360
#4380
#4540
#5050
#5240

Total Terminal Cost

Hundred Pound Units
Handled Across the Platform

Cost per Hundred Pounds
Cost per Ton

For future periods, accurate figures for amount of weight handled across the platform must be maintained. A record of incoming freight can be kept by the use of manifests. Such a form should include the following information:

1. Waybill number of the incoming shipment.
2. Name of the shipper and of the consignee.
3. Number of pieces in the shipment.
4. Name of the commodity.
5. Weight of the commodity, actual or estimated.
6. Date of receipt of the shipment into the terminal.

If it is found that past experience has been misjudged or miscalculated, the standard must be revised.

The following facts must be kept in mind. Certain customers of the carrier often ship full truck loads of freight to distant points. These shipments never enter the terminal but are carried directly to their destination. Therefore, they should not be required to bear any of the terminal cost.

F. Billing and Accounting Cost

> "Billing and collecting expenses include the compensation of rate clerks and billing clerks directly engaged in rating and billing work and in addition thereto a portion of the compensation of other terminal or general office employees for the time engaged in auditing, revenue accounting, filing of freight bills, etc., where the time consumed is not only directly related to the number of freight bills issued but is also relatively uniform per bill." (1)

(1) Explanation of the Development of Motor Carrier Costs with Statement as to Their Meaning and Significance, published by the Interstate Commerce Commission, February, 1949, page 44.

All carrier accounting and bookkeeping operations which are caused by freight movements are includible in this cost classification. All of these costs can be calculated on a per shipment basis. The amount of clerical labor caused by the shipment of a ten-pound consignment is the same as that caused by the shipment of a ten-ton consignment. Each requires one set of shipping documents, and one statement is sent to each of the consignors at the end of the week. It would not be equitable to consider the cost of billing and accounting for the smaller shipment to be on a poundage basis when compared to the larger shipment.

The following duties of clerical staffs, and the cost arising out of the performing of these duties, are properly charged to the billing and accounting cost group: (1)

1. Rating and billing.
2. Cashier services.
3. Manifesting bills.
4. Revenue accounting.
5. Compiling customers' statements on charge accounts.
6. Credit and collection.
7. Interline accounting.
8. Special clerical work incurred in the handling of shipments moving on Government bills of lading.
9. Filing and mailing.

Illustration V on page 80 indicates the method to be used when computing a standard cost per bill for billing and accounting expenses. The total expense of the accounts found in the billing and

(1) Ibid, page 153.

ILLUSTRATION V

Schedule for Computation of Billing and Accounting Cost

Billing and Accounting Costs	
#4540	_____
#4613	_____
#4622	_____
#4623	_____
#4635	_____
#5050	_____
#5240	_____
Total Billing and Accounting Cost	=====

Number of Bills Issued_____

Cost per Shipment =====

ILLUSTRATION V

Schedule for Computation of Milling and Accounting Cost

accounting cost column of Illustration I, pages 52 and 53, is divided by the number of waybills issued for the period. The result is a standard for this group of expenses.

G. Sales Cost

The fifth standard to be developed is that for the sales effort of the organization. Just as every other business in our competitive system strives to increase profits through the medium of advertising, so does the carrier of property. By the use of newspapers, magazine, private publications, and by salesmen, the carrier tries to persuade the shipper to use his service in preference to that of any other carrier of property. As was indicated previously, the lowering of rates cannot be used as a method of attracting extra freight, leaving competition on the basis of faster and better service. Oftentimes, if the carrier is not large enough to finance an advertising program, he will unite with other carriers for the purpose of selling the service. Competition between truck and railroad outfits, and truck, boat, and plane service gives rise to advertising. As can be seen by referring to the Appendix, the cost of sales effort is an important one in the budget of the motor carrier. (1)

What is the purpose of the sales effort? In a manufacturing industry, oftentimes the cost of the sales effort can be applied as a direct charge to a particular product. The carrier of general commodities has but one thing to sell, and that is service. Therefore, all of the cost of the sales effort is directed to sell more services. These

(1) See Table 2, page 127, "The Motor Carrier Revenue Dollar and Where It Goes."

services increase the carrier's gross revenue, if the selling campaign is successful. Because of the necessity of selling the service, gross revenue must be higher in order to compensate the carrier for his sales cost. Some part of every dollar of gross revenue received represents the cost of selling the service. A standard for sales cost must be based on gross revenue. Where the standards developed for mileage, hourly, terminal, and billing and accounting costs were dollar amounts, the standard for the sales effort is a percentage.

The total gross revenue is the ending balance of account #3000, Operating Revenues. This account is the controlling account for the following accounts, as prescribed by the Interstate Commerce Commission, as of January 1, 1948: (1)

#3100 - Freight Revenue - Intercity - Common Carrier. This account shall include all revenue earned by the carrier from the transportation of property in intercity service, including pick-up and delivery incident thereto, while operating as a common carrier.

#3120 - Freight Revenue - Local Cartage. This account shall include revenue unearned by common or contract carriers from the transportation of property in local cartage service.

#3130 - Intercity Transportation for Other Class I Motor Carriers. This account shall include amounts receivable from other Class I motor carriers under a purchased transportation arrangement, for performing any portion of their intercity haul.

(1) Uniform System of Accounts for Class I Common and Contract Carriers of Property, published by the Interstate Commerce Commission, Effective January 1, 1948, page 57-60.

#3900 - Other Operating Revenue. This account shall include revenues not provided for in the above accounts, derived from the operation of property the investment in which is included in account #1200 - Carrier Operating Property.

Illustration VI on page 85 demonstrates the method to be used when computing a standard for the sales effort. First, compute the total of all expenses as found in the sales cost column of Illustration I, pages 52 and 53. Second, divide this cost by the total of account #3000, Operating Revenues. The result is the standard percentage to be used for future estimates of selling expenses.

H. Administrative Cost

The sixth and final standard concerns administrative expenses. Certain costs benefit an organization as a whole and cannot be allocated to any of the other five functions as being an expense identified with that function. Lawrence states, "Administrative expenses usually come within the classes that must be prorated to various activities instead of being charged directly to them, although in some instances certain of these expenses may be charged directly to accounts for specific activities." (1)

The largest single item of expense found in this classification is the cost of general officers, such as the president, general manager, and other corporate officers. It must be noted, however, that if officers and assistants supervise particular departments of carrier operations, or other operations, or are engaged in specific work other

(1) Cost Accounting, by W. B. Lawrence, C.P.A., published by Prentice-Hall, Inc., New York, 1946, page 304.

ILLUSTRATION VI

Schedule for Computation of Sales Cost

Sales Costs	
#4410	
#4420	
#4430	
#4450	
#4480	
#4540	
#5050	
#5240	
Total Sales Cost	
Balance of Account #3000	
Cost per Dollar of Gross Revenue	

than supervision of the entire transportation system, their pay and expenses shall be apportioned to the appropriate accounts.

The problem at hand will be solved when we have evolved a method of setting a standard for administrative costs. As the functions of the administrative department benefit all other departments of the carrier, even though indirectly, an equitable basis would seem to be one where administrative costs were based on the total of the other five operational costs. The following illustration indicates the method to be used in establishing a standard for administrative expenses.

Assume the following facts:

Cost Class	Amount of Cost
Mileage Cost	$ 50,000.00
Hourly Cost	80,000.00
Terminal Cost	30,000.00
Billing and Accounting Cost	15,000.00
Sales Cost	5,000.00
Total Operating Cost	$180,000.00
Administrative Cost	18,000.00
Percentage of Operating Cost	10%

Illustration VII on page 87 illustrates the same procedure as above. The total administrative cost is the total of costs for accounts found in the administrative cost column of Illustration I, pages 52 and 53.

I. Summary

Cost standards are as important to the motor carrier of property as they are to the manufacturer. In order to develop cost standards for the carrier, expenses must be allocated to the six groups of operational costs. After such allocation, the cost totals must be

ILLUSTRATION VII

Schedule for Computation of Administrative Cost

Administrative Costs	
#4540	_____
#4611	_____
#4621	_____
#4630	_____
#4640	_____
#4645	_____
#4650	_____
#4660	_____
#4670	_____
#4675	_____
#4680	_____
#5050	_____
#5240	_____
Total Administrative Cost	=====
Other Costs	
Mileage Cost	_____
Hourly Cost	_____
Terminal Cost	_____
Billing and Accounting Cost	_____
Sales Cost	_____
Total Other Cost	=====

$$\frac{\text{Total Other Cost}}{\text{Total Administrative Cost}} = \text{Administrative Standard Cost Percentage}$$

ILLUSTRATION VII

Schedule for Computation of Administrative Cost

Administrative Costs

Total Administrative Cost

Other Costs

Mileage Cost

Secretarial Cost

Travel Cost

Billing and Accounting Cost

Sales Cost

Total Other Cost

$$\frac{\text{Total Other Cost}}{\text{Total Administrative Cost}} = \text{Administrative Standard Cost Percentage}$$

divided by the carrier functions, giving rise to such costs. After calculations are completed, the following standards will be indicated:

1. A mileage standard for each size group of vehicles, representing cost per mile.

2. An hourly standard for each size group of vehicles, representing cost per hour.

3. A terminal standard representing cost of handling a hundred pound shipment.

4. A billing and accounting standard, representing cost of recording, accounting, etc. for each shipment.

5. A sales standard, representing percentage of sales cost found in gross receipts.

6. An administrative standard representing cost of administration as based on the other operational costs.

divided by the carrier functions, giving rise to such costs. After calculations are completed, the following standards will be indicated:

1. A mileage standard for each size group of vehicles, representing cost per mile.

2. An hourly standard for each size group of vehicles, representing cost per hour.

3. A terminal standard representing cost of handling a hundred pound shipment.

4. A billing and accounting standard, representing cost of recording, accounting, etc. for each shipment.

5. A sales standard, representing percentage of sales cost found in gross receipts.

6. An administrative standard representing cost of administration as based on the other operational costs.

CHAPTER VI

The Use of Standard Costs

A. Introduction

Up to this point, standard costs for the motor carrier of property have been developed for a past period of carrier operations. They are historical costs which, if accurate, can be used to forecast future operations. By themselves, these standards are useless. They must be applied to present and to future operations. If found to be incorrect, they must be adjusted so as to reflect the true status of the costs of present operations.

Therefore, it is necessary to apply the standards as computed to present carrier operations.

But before application of such standards, there must be a further review of motor carrier functions. Truck operators refer to two types of vehicular operations which have not been dealt with heretofore. They are the line haul operations and the pick-up and delivery operation. Ideally, the well organized carrier has his operational routes divided into line haul routes and pick-up and delivery routes.

B. Line Haul Operations

The movement of freight over the routes of a trucking company from one town or city to another town or city is the line haul function of a motor carrier of property. (1) With exceptions, line haul traffic is from terminal to terminal. Truckers try to consolidate freight at

(1) The Motor Truck Red Book, published by the Traffic Publishing Company, Inc., New York, N. Y., 1940, page 754.

their terminal so that line haul vehicles will always travel with a capacity load in order to maximize profits. It is also of great importance that there is a minimum of empty return trips. The skill of a traffic manager is indicated by the number of full truckloads that operate over line haul routes in relation to the empty returning vehicles. Where each mile of truck operation entails a certain amount of cost, it takes little imagination to understand why mis-management of traffic causes more than one operator to look to other fields of endeavor.

Two of the operational costs discussed previously are accumulating as the vehicle operates on a line haul function. As both time and distance is being consumed, mileage and hourly costs grow. In this type of operation, it is to be expected that mileage expenses accumulate at a greater rate than hourly costs, when compared to the vehicle that operates in and about a large community. By applying the standards to the miles traveled and the hours of operation, a cost of operation for line haul vehicles is computed.

In order to develop the necessary statistics concerning hours and miles of line haul operations, the drivers' reports must be studied once again. From the reports, the following figures must be computed:

1. Mileage of vehicles on line haul operations, by ton-size classes.

2. Operational hours of vehicles on line haul operations by ton-size classes.

The same weight classes which were used in Illustrations II and III must be utilized at this time.

All trucking concerns will not have the same line haul costs, and standards for the same items will vary between concerns, despite

the fact that the same prices may be paid for gasoline, tires and drivers. Many outside factors influence line haul costs; factors which are outside the scope of the accounting field, but which are of the utmost importance in determining what line haul costs will be. They are as follows:

1. Type of traffic management.
2. Conditions of roads over which the vehicles operate.
3. Skill of the drivers.
4. Climatic and weather conditions.
5. Traffic conditions.
6. Efficiency of the vehicles.

Illustration VIII demonstrates the formula to be used in computing line haul costs by the use of standards which have been developed for past operations. For each ton-size group of vehicles, the miles and hours of operation while performing line haul functions are listed by months. Addition of the mileage column, multiplied by the mileage standard for that particular class of vehicles, results in the mileage cost of operation for the line haul vehicle. The total of the hours column, multiplied by the hourly standard for that class of vehicle, results in the hourly cost of operation for the line haul vehicle. By adding the mileage cost and the hourly cost, the final result is the line haul cost of operation for the various size vehicles performing the line haul function.

C. Pick-Up and Delivery Operations

The carrier services of picking up the freight and delivering it are grouped as one class of operation because they tend to have the same costs, and are oftentimes accumulating simultaneously. The term

ILLUSTRATION VIII

Line Haul Cost Developed by Use of Standards

	Trucks (Pounds)												Tractor-Trailers (Pounds)									
	Under 3,000		3,000 to 5,000		5,000 to 7,500		7,500 to 10,000		10,000 to 15,000		Over 15,000		5,000 to 10,000		10,000 to 15,000		15,000 to 20,000		20,000 to 25,000		Over 25,000	
	Mi.	Hr	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H
*January																						
February																						
March																						
April																						
May																						
June																						
July																						
August																						
September																						
October																						
November																						
December																						
Totals																						
#Standards																						
Mileage	x		x		x		x		x		x		x		x		x		x		x	
Hourly		x		x		x		x		x		x		x		x		x		x		x
Operational Cost																						

*In this illustration twelve months are given. The standards could be used for one month, or even for one week, with equal success.

#By multiplying the standards by miles and hours, we arrive at operational costs.

"pick-up" is defined as follows:

> "The service of a carrier involved in calling for and collecting freight, and receipting therefor at wharves, docks, of the consignor's factory, store, or warehouse, and transporting therefrom to a freight concentrating depot." (1)

The term "delivery" is defined as follows:

> "The act of transferring possession, such as the transfer of property from consignor to carrier, one carrier to another, or carrier to consignee." (2)

Simply stated, it is the service performed by the carrier when freight is taken from the consignor to start it on its trip to the consignee, and to conclude its trip to the consignee or a connection carrier. The following diagram indicates when pick-up and delivery service and other services are being performed.

Boston	Boston		New York	New York
/Consignor/-	/Terminal/		/Terminal/-	/Consignee/
A	B		C	D

Pick-up costs accumulate from A to B.

Delivery costs accumulate from C to D.

Line haul costs accumulate from B to C.

Terminal costs accumulate at points B and C.

All other costs are increasing from A to D.

The smaller and more maneuverable trucks in the carrier's fleet are assigned to pick-up and delivery operations. Ideally, the routes to be followed by the drivers are numbered, and the same routes

(1) Ibid, page 755.
(2) Ibid, page 751.

are covered periodically. The vehicles leave the terminal at the beginning of the day with freight to be delivered to consignees, or to the terminals of connecting carriers, if the freight is going to a destination where the carrier is not authorized to operate. As freight is delivered, other freight may be picked up and brought back to the terminal. A truck may return to the terminal several times a day.

Nearly all of the vehicular operations are in congested areas when pick-up and delivery operations are being conducted. The trucks oftentimes have to be guided in and out of narrow alleys, and may get tied up on busy streets. Pick-up and delivery costs for carriers differ from place to place. Vehicles operating in and around Boston with its narrow streets, one way traffic, and general confusion, could be expected to deliver less freight per day than fleets operating within such well planned communities as Washington, D. C., and Miami, Florida.

In order to illustrate exactly how pick-up and delivery operations of the carrier are carried out, the following report is given of a carrier operating within the vicinity of Boston.

Orders to pick up freight are received from shippers either by phone, letter, the salesmen, or by a pre-arranged schedule of pick-up days. The majority of the orders are made by phone. Orders for the picking up of freight are assorted by the dispatcher. Oftentimes, a call will demand immediate handling of the freight, or another carrier will be called. In order to handle emergencies such as this, the drivers call in to the dispatch office periodically for instructions. The dispatcher routes the nearest truck to the freight.

Should a consignor desire to ship a large consignment, the freight is picked up by the vehicle that will haul it to its destination, thereby eliminating the cost of terminal handling. If any incoming shipments are full truckload consignments going to one consignee, the terminal is bypassed, and the freight routed directly to the consignee.

The small shipments picked up during the day's operations are brought to the terminal, unloaded to the platform, and assorted for shipment to their ultimate destination, or to the next terminal.

When the truck driver receives the freight from the consignor, he also receives a filled out bill of lading. The driver gives the bills to the receiving clerk when the freight is unloaded at the platform. Shipments are checked against the information given on the bills of lading. Waybills are prepared by the rate clerk from the bills of lading.

The operational costs of pick-up and delivery vehicles have different characteristics than those costs discussed in connection with line haul movements. Where the accent is on mileage cost for the line haul vehicles, it is on the hourly cost for pick-up and delivery vehicles. The following example illustrates how the two may vary, assuming the same size vehicle for each operation.

	Types of Operation	
	Line Haul	Pick-Up and Delivery
Mileage	200	75
Operational Hours	6	8
Cost Per Mile (Standard)	.06	.06
Cost Per Hour (Standard)	1.40	1.40
Mileage Cost	12.00	4.50
Hourly Cost	8.40	11.20
Operational Cost	20.40	15.70

Although the pick-up and delivery vehicle operated but 37½% of the distance of the line haul truck, due to the hourly factor, its costs equalled over 75% of the cost of the former. Cost per hour is always much greater than cost per mile, which means that efficient routing and planning of pick-up and delivery operations is of the utmost importance, if a reasonable rate of profit is to be made.

As was the case for line haul statistics in Illustration VIII, the following statistics must be obtained for pick-up and delivery operations:

1. Mileage of vehicles on pick-up and delivery operations, by tonnage size classes.

2. Operational hours of vehicles on pick-up and delivery operations, by ton size classes.

The same weight classes must be used herein which have been used in all other illustrations up to this point.

Illustration IX demonstrates the formula to be used in computing pick-up and delivery costs by the use of standards which have been developed for past operations. For each ton-size group of vehicles, the miles and hours of operations while performing pick-up and delivery functions are listed by months. The total of the mileage column, multiplied by the mileage standard for that particular class of vehicle, results in the mileage cost of operation for the pick-up and delivery vehicle. The total of the hours columns multiplied by the hourly standards for each ton-size class of vehicle results in the hourly cost of operation for the pick-up and delivery vehicles. By adding the mileage cost and the hourly cost, the final result will be the pick-up and

delivery cost of operation for the various size vehicles performing the pick-up and delivery function.

D. Terminal Operations

To determine the cost of terminal operations by the use of the standard developed in Illustration IV, page 77, multiply the standard by the number of hundred pound units handled across the platform of the carrier. As prior records concerning freight handled at the terminal may not have been maintained, this standard will probably have to be corrected after sufficient data is available.

The large operator will oftentimes own many terminals located at several shipping centers. By referring to the diagram on page 93, it can be seen that freight shipped by A was handled at two terminals, the one at Boston and the other at New York. The freight handled would be added into total freight handled at each terminal. Just as there are separate standard costs for the various sizes of vehicles, so is there a separate standard for each terminal.

E. Billing and Accounting Operations

By multiplying the number of waybills handled by the standard developed in Illustration V, page 80, the total cost of billing and accounting operations is computed. Illustration X-B, page 100, demonstrates the form to be used.

F. Advertising Operations

By multiplying the operating revenue (gross) by the standard percentage developed for cost of the sales effort in Illustration VI,

ILLUSTRATION IX

Pick-Up and Delivery Costs as Based on Standards

	Trucks (Pounds)												Tractor-Trailers (Pounds)									
	Under 3,000		3,000 to 5,000		5,000 to 7,500		7,500 to 10,000		10,000 to 15,000		Over 15,000		5,000 to 10,000		10,000 to 15,000		15,000 to 20,000		20,000 to 25,000		Over 25,000	
	Mi.	Hr	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H
*January																						
February																						
March																						
April																						
May																						
June																						
July																						
August																						
September																						
October																						
November																						
December																						
Totals																						
#Standards:																						
Mileage	X		X		X		X		X		X		X		X		X		X		X	
Hourly		X		X		X		X		X		X		X		X		X		X		X
Operational Cost																						

*In this illustration, twelve months are given. The standard could be used for one month, or even for one week, with equal success.

#By multiplying the standards by miles and hours, we arrive at operational costs.

ILLUSTRATION IX

Pick-Up and Delivery Costs as Based on Standards

Mi. Br.	Trucks (Pounds)						Tractor-Trailers (Pounds)					
	Under 3,000	3,000 to 5,000	5,000 to 7,500	7,500 to 10,000	10,000 to 15,000	Over 15,000	5,000 to 10,000	10,000 to 15,000	15,000 to 20,000	20,000 to 25,000	25,000 to 30,000	Over 30,000
M												
R											

page 85, the cost of the selling operations is computed. Illustration X-C, page 100, demonstrates the form to be used.

G. Administrative Operations

The final standard, the standard for cost of administrative operations, is used in the following manner to arrive at the cost of administration:

1. Develop costs by use of standards for the following motor carrier functions:

   a. Line haul function.

   b. Pick-up and delivery function.

   c. Terminal functions.

   d. Billing and accounting function.

   e. Selling effort.

2. Add these costs to arrive at a total operating cost.

3. Multiply total operating cost by the standard administrative percentage found by using Illustration VII, page 87.

The form to be used in arriving at total administrative cost by the use of the standard is found in Illustration X-D, page 100.

ILLUSTRATION X

Various Expenses as Based on Standards

X-A Terminal Cost
Weight Handled at Terminal _____
Hundred Pound Units _____
Multiply by Standard (Ill.IV) _____
Terminal Cost Total _____

X-B Billing and Accounting Cost
Number of Waybills _____
Multiply by Standard (Ill.V) _____
Billing and Accounting Cost _____

X-C Sales Cost
Gross Revenue _____
Multiply Sales Standard (Ill.VI) _____
Sales Effort Cost _____

X-D Administrative Cost
Line Haul Cost (Ill.VIII) _____
Pick-Up & Delivery Cost (Ill.IX) _____
Terminal Cost (Ill.X-A) _____
Billing & Accounting Cost (Ill.X-B) _____
Sales Effort Cost (Ill.X-C) _____
Total Costs _____
Multiply by Standard per Ill. VII _____
Add to Total Cost _____
Administrative Expense _____

ILLUSTRATION X

Terminal Expenses as Based on Tonnages

CHAPTER VII

Problems in the Development of Standard Costs for Motor Carriers of Property

In the computation of standard costs for the motor carrier, many problems will be encountered that must be dealt with in some manner which appears to be equitable. The following discussion portrays some of the difficulties that arise.

A. The Problem of Charging the Correct Account With Costs Applicable to That Account

The majority of carrier operations can be positively defined as being one of the six functions that have been outlined herein. Wages paid to drivers of revenue vehicles are clearly an item of hourly cost. Light, heat, water, and power used at the terminal represent costs of the terminal. But oftentimes a clear distinction is difficult. For instance, if the driver of a vehicle has to load his own truck at the terminal, should a portion of his wages be included as a part of the terminal cost? The Interstate Commerce Commission has foreseen such problems, and states that they must be handled in the following manner. The pay and expenses of officers or employees engaged in activities of a varying nature, such as an officer who may be assigned to supervise transportation and terminal operations, shall be included in the appropriate accounts, based upon the basis of the actual time devoted to the respective class of work except that the pay and expenses of an officer or employee who performs substantially the same variety of duties from day to day may be distributed upon the

basis of a study of the time actually devoted by him to those duties during a representative period. The pay and expenses of officers or employees regularly assigned to specific duties who perform incidental services of a different nature involving small expense shall be included in the expense accounts appropriate for the duties to which such officers or employees are regularly assigned.

When it is necessary to apportion the pay and expenses of officers and employees among accounts or sub-accounts, the carrier shall be prepared to describe the basis of such apportionments. (1)

Oftentimes, even with this instruction as a guide, the problem is a difficult one to handle. The following case was related by the accountant of a carrier within the Boston area.

The drivers for a certain carrier, under instruction from their union, were told not to put their vehicles in the garage at the end of the day's operations, but to leave them outside in the yard. In order to bring them into the shelter for a daily checkup, the mechanics and other garage helpers had to perform the task. The problem of how to assign mechanics wages for time spent in parking the vehicles was solved by allocating an equitable amount of the mechanics' pay to the account for drivers' and helpers' wages. The carrier accountants must ever be on the alert for such deviations from the ordinary, and conduct themselves according to the wishes of the Interstate Commerce Commission. A problem that the accountant must solve for himself is the extent of refinement he wishes to give the

(1) Uniform System of Accounts for Class I Common and Contract Carriers of Property, Issue of 1948, Instruction 11, page 9.

breakdown of related expenses, when confronted with such a problem as that cited above. As such expenses as workmen's compensation insurance and social security taxes are based on wages, theoretically, they would also be allocated on an equitable basis.

B. The Problem of Maintaining Adequate Records

If standards are never developed for certain carriers, it is because of the unwillingness of the carrier to increase his costs of billing and accounting operations to include pay of a cost department. One carrier operator interviewed made the following statement:

> "To obtain statistics necessary to maintain the perfect costing system would mean allocating half of the pay of our drivers to an administrative expense."

This attitude was met with on several occasions. However, as was pointed out in a previous section, nearly all statistics necessary can be gleaned from drivers' reports, from waybill studies, and from manifests. Detailed studies can be made for a limited period of time concerning such items as number of minutes per stop for pick-up and delivery vehicles, etc. The average carrier must be satisfied with a system that is adequate for the intended purpose, even though inaccuracies may be present. A system that costs more than benefits received from it is worse than no system at all.

C. Problems of Unusual Items When Setting Standard Costs

When the standard costs of operation are being computed, certain items may appear unduly high as compared with the usual average. Such a thing might occur if a costly advertising program was being

conducted for a period of time. Such a program might be the only one to have ever been conducted and thus would be an unusual item of cost which would not be likely to occur during a normal operating period. Just the opposite could occur where the elimination of a lot of advertising was affected because it was thought that such cost did not produce greater revenue. To cope with problems such as these, the accountant must take all things into consideration and judge the situation according to its merits. Each concern must solve its own individual problems in any way which it thinks is wise.

D. The Problem of Adapting the Uniform System of Accounts to the Standards

As of January 1, 1948, a revised system of accounts was prescribed for Class I carriers by the Interstate Commerce Commission. In it, certain accounts are divided into more sub-accounts than the previous system, giving carriers, and the Interstate Commerce Commission, a better picture of operating costs. However, for the purposes of the standards suggested herein, there must be a further breakdown of certain accounts, as indicated in Illustration I. For this reason, it is not feasible to incorporate standard costs into the accounting system. However, they can be maintained separately. In fact, some authorities believe that standard costs should never be incorporated into the accounting system. (1)

(1) McFarland states, "Basic standards cannot well be used for financial statement purposes because these standards are merely reference points and are not costs at all in the sense that is required for financial statements." Accountants' Handbook (Third Edition), edited by W. A. Paton, published by The Ronald Press Co., New York, 1948, page 227.

CHAPTER VIII

General Conclusions

There is a parallel between the birth and growth of the motor carrier transportation industry in America, and that of the railroads. Railroads came into being because there was a need for transportation between distant points. As the nation grew, many localities were without transportation facilities for railroads did not always provide service. Therefore, it was inevitable that a substitute should be found. With the perfecting of the internal combustion engine, the answer was found in the motor truck. At the beginning motor trucks served communities not enjoying railroad services by serving as a connecting link between the nearest railroad depot and the consignee's door. As roads were improved, and the vehicles became more efficient, motor transportation became a serious competitor of railroad transportation. The competition of motor transportation could not be met by the railroads due to the fact that federal and state legislation had curtailed the rights of railroads to follow any policy they might desire. Because the motor shipping industry took unfair advantage of its position, and became involved in many illegal and unpopular practises, the Congress of the United States saw fit to restrain such activities by passing the Motor Carriers Act of 1935. This act placed the responsibility of policing the industry on the shoulders of the Interstate Commerce Commission.

Under the guiding eyes of the Interstate Commerce Commission, a carrier is not allowed to charge a rate for the shipment of freight

CHAPTER VIII

General Conclusions

that is below the cost of such service. There can be no more granting of preferential rates to obtain business. As the industry is highly competitive, costs of providing the services are of the utmost importance. In order to obtain a thorough knowledge of the structure of the cost of services, certain standards have been discussed in this thesis. These standards of operating expenses are based on the functions of the carrier causing such costs.

The writer interviewed personnel of several firms operating in southeastern Massachusetts and Rhode Island, and representatives of the Interstate Commerce Commission and the New England Motor Rate Bureau. Their cooperation with the writer is greatly appreciated. Without their aid, this project would have been impossible.

In order to insure beneficial results from the utilization of the procedures outlined herein, particular attention must be given to the accumulation and analysis of supporting data and records underlying the prescribed system of accounts. According to Dickson of the New England Motor Rate Bureau,

> "Any successful cost study in motor transportation and the resultant benefits depend largely upon the adequacy and use of the data found in the carriers' accounts." (1)

(1) Basic Principals of Expense Distribution Applicable to Motor Transportation, by J. Frank Dickson, The New England Motor Rate Bureau.

Appendix

Title	Page
1. Uniform System of Account for Class I Motor Carriers of Property, Profit and Loss Operational Accounts, as Prescribed by the Interstate Commerce Commission. .	108
2. Prescribed System of Accounts for a Class I Carrier of Property, Profit and Loss Accounts	110
3. Form of Income Statement for a Class I Motor Carrier of Property	114
4. Chart Showing Proportion of Wages Paid Out of Gross Revenue by Carriers of Freight	116
5. Chart Showing Average Wage Per Employee Paid to Employees of Motor Carriers of Property.	117
6. Chart Showing For-Hire Truckloadings by Months, 1937 through 1946	118
7. Motor Truck Glossary	119
8. Sample Bill of Lading	125

Appendix

Table	Page
1. Uniform System of Account for Class I Motor Carriers of Property, Profit and Loss Operational Accounts, as Prescribed by the Interstate Commerce Commission.	109
2. Prescribed System of Accounts for a Class I Carrier of Property, Profit and Loss Accounts	110
3. Form of Income Statement for a Class I Motor Carrier of Property	114
4. Chart Showing Proportion of Wages Paid Out of Gross Revenue by Carriers of Freight	116
5. Chart Showing Average Wage Per Employee Paid to Employees of Motor Carriers of Property	117
6. Chart Showing Per-Mile Truckloadings by Months, 1937 through 1946	118
7. Motor Truck Glossary	119
8. Sample Bill of Lading	125

Uniform System of Accounts

for Class I Motor Carriers of Property

This uniform system of accounts for motor carriers is issued and prescribed under the following provisions of the Interstate Commerce Act:

> "Sec. 204 (a) It shall be the duty of the Commission -
>
> "(1) To regulate common carriers by motor vehicle as provided in this part and to that end the Commission may establish reasonable requirements with respect to continuous and adequate service, transportation of baggage and express, uniform systems of accounts, records, and reports, preservation of records, qualifications, and maximum hours of service of employees, and safety of operation and equipment.
>
> "(2) To regulate contract carriers by motor vehicle as provided in this part, and to that end the Commission may establish reasonable requirements with respect to uniform systems of accounts, records, and reports, preservation of records, qualifications, and maximum hours of service of employees and safety of operation and equipment.
>
> "Sec. 220 (a) The Commission is hereby authorized to require annual, periodical, or special reports from all motor carriers, brokers, and lessors, to prescribe the manner and form in which such reports shall be made, and to require from such carriers, brokers, or lessors, specific and full, true, and correct answers to all questions upon which the Commission may deem information to be necessary. Such annual reports shall give an account of the affairs of the carrier, broker, or lessor in such form and detail as may be prescribed by the Commission.
>
> "Sec. 222 (g) Any motor carrier, broker, or other person, or any officer, agent, employee, or representative thereof, who shall willfully fail or refuse to make a report to the Commission as required by this part, or to make specific and full, true, and correct answer to any question within 30 days from the time it is lawfully required by the

Commission so to do, or to keep accounts, records, and memoranda in the form and manner prescribed by the Commission, or shall knowingly and willfully falsify, destroy, mutilate, or alter any such report, account, record, or memorandum, or shall knowingly and willfully file with the Commission any false report, account, record, or memoranda of all facts and transactions appertaining to the business of the carrier, or person required under this part to keep the same, or shall knowingly and willfully keep any accounts, records, or memoranda contrary to the rules, regulations, or orders of the Commission with respect thereto, shall be deemed guilty of a misdemeanor and upon conviction thereof be subject for each offense to a fine of not more than $5,000. As used in this subsection, the words 'keep' and 'kept' shall be construed to mean made, prepared, or compiled, as well as retained."

Prescribed System of Accounts

for a Class I Carrier of Property

Profit and Loss Accounts

4100 - Equipment Maintenance.
- 4110 - Supervision.
- 4120 - Office and Other Expenses.
- 4130 - Repairs and Servicing - Revenue Equipment.
  - 4131 - Line Haul Equipment.
  - 4135 - Pick-up and Delivery Equipment.
- 4160 - Tires and Tubes - Revenue Equipment.
  - 4161 - Line Haul Equipment.
  - 4165 - Pick-up and Delivery Equipment.
- 4180 - Other Maintenance Expenses.
- 4191 - Joint Garage Expense - Debit.
- 4196 - Joint Garage Expense - Credit.

4200 - Transportation.
- 4210 - Supervision.
- 4220 - Drivers and Helpers.
  - 4231 - Line Haul Equipment.
  - 4235 - Pick-up and Delivery Equipment.
- 4250 - Fuel for Revenue Equipment.
  - 4251 - Line Haul Equipment.
  - 4255 - Pick-up and Delivery Equipment.
- 4260 - Oil for Revenue Equipment.
  - 4261 - Line Haul Equipment.
  - 4265 - Pick-up and Delivery Equipment.
- 4270 - Purchased Transportation.
  - 4271 - Purchased Transportation - Intercity.
  - 4275 - Purchased Pick-up and Delivery.
- 4280 - Other Transportation Expenses.

4300 - Terminal.
- 4310 - Supervision.
  - 4311 - Supervisory Salaries
  - 4312 - Salaries and Fees - Billing and Collection.
  - 4313 - Other Office Employees.
- 4320 - Office and Other Expenses.
- 4340 - Salaries and Wages - Platform Employees.
- 4350 - Other Terminal Employees.
- 4360 - Commission Agents.
- 4380 - Other Terminal Expenses.
- 4391 - Joint Terminal Facilities - Debit.
- 4396 - Joint Terminal Facilities - Credit.

4400 - Traffic.
- 4410 - Supervision.
- 4420 - Office and Other Expenses.
- 4430 - Tariffs and Schedules.
- 4450 - Advertising.
- 4480 - Other Traffic Expenses.

4500 - Insurance and Safety.
- 4510 - Supervision.
- 4520 - Office and Other Expenses.
- 4530 - Public Liability and Property Damage.
- 4540 - Workmen's Compensation.
- 4550 - Cargo Loss and Damage.
- 4560 - Fire, Theft, and Collision.
- 4570 - Other Insurance Expense.
- 4580 - Other Insurance and Safety Department Expenses.

4600 - Administrative and General.
- 4610 - Supervision.
  - 4611 - Salaries - General Officers.
  - 4612 - Salaries - Revenue Accounting.
  - 4613 - Salaries - Other General Office Employees.
- 4620 - Office and Other Expenses.
  - 4621 - Expenses - General Officers.
  - 4622 - Expenses - General Office Employees.
  - 4623 - Expenses - Other General Office Expenses.
- 4630 - Law Expenses.
- 4635 - Outside Auditing Expenses.
- 4640 - Communication Service.
- 4645 - Employees' Welfare Expenses.
- 4650 - Management and Supervision Fees.
- 4660 - Uncollectible Revenues.
- 4670 - Regulatory Expenses.
- 4675 - Purchasing and Store Expenses.
- 4680 - Other General Expenses.
- 4691 - Joint Operating Expense - Debit.
- 4696 - Joint Operating Expense - Credit.

5000 - Depreciation Expense.
- 5010 - Depreciation of Structures.
- 5020 - Depreciation of Revenue Equipment.
  - 5021 - Line Haul Equipment.
  - 5025 - Pick-up and Delivery Equipment.
- 5030 - Depreciation of Service Cars and Equipment.
- 5040 - Depreciation of Shop and Garage Equipment.
- 5050 - Depreciation of Furniture and Fixtures.
- 5060 - Depreciation of Miscellaneous Equipment.
- 5070 - Depreciation of Improvements to Leasehold Property.
- 5080 - Depreciation of Undistributed Property.
- 5100 - Depreciation Adjustment.

5150 - Amortization Chargeable to Operations.
  5151 - Amortization of Carrier Operating Property.
  5155 - Extraordinary Property Losses.

5200 - Operating Taxes and Licenses.
  5210 - Gasoline, Other Fuel, and Oil Taxes.
    5211 - Line Haul Equipment.
    5215 - Pick-up and Delivery Equipment.
  5220 - Vehicle License and Registration Fees.
    5221 - Line Haul Equipment.
    5225 - Pick-up and Delivery Equipment.
  5230 - Real Estate and Personal Property Taxes.
  5240 - Social Security Taxes.
  5250 - Other Taxes.

5300 - Operating Rents - Net.
  5310 - Equipment Rents - Debit.
  5320 - Other Operating Rents - Debit.
  5340 - Joint Facility Rents - Debit.
  5350 - Equipment Rents - Credit.
  5360 - Other Operating Rents - Credit.
  5390 - Joint Facility Rents - Credit.

5400 - Lease of Distinct Operating Unit - Debit.

5500 - Lease of Distinct Operating Unit - Credit.

6100 - Income From Non-carrier Operations - Net.

6300 - Interest Income.

6400 - Dividend Income.

6500 - Other Non-operating Income.

7100 - Interest.

7300 - Amortization of Debt Discount and Expense.

7400 - Amortization of Premium on Debt - Credit.

7500 - Other Deductions.

8100 - Extraordinary Income Credits.

8200 - Extraordinary Income Charges.

8400 - Delayed Income Credits.

8600 - Delayed Income Charges.

8800 - Income Taxes.
8810 - Federal Income Taxes.
8820 - State Income Taxes.
8830 - Other Income Taxes.

Form of Income Statement for a Class I Motor Carrier of Property

I. Carrier Operating Income:

Revenues:

3000. Operating Revenues

Expenses:

4000. Operating and Maintenance Expenses.
5000. Depreciation Expense.
5100. Depreciation Adjustment.
5150. Amortization Chargeable to Operations.
5200. Operating Taxes and Licenses.
5300. Operating Rents - Net.

Total Expenses

Net Operating Revenue

5400. Lease of Distinct Operating Unit - Debit.
5500. Lease of Distinct Operating Unit - Credit.

Net Carrier Operating Income

II. Other Ordinary Income:

6100. Income from Non-carrier Operations - Net.
6300. Interest Income.
6400. Dividend Income.
6500. Other Non-operating Income.

Total Other Ordinary Income

Gross Ordinary Income

III. Deductions from Ordinary Income:

7100. Interest.
7300. Amortization of Debt Discount and Expense.
7400. Amortization of Premium on Debt - Credit.
7500. Other Deductions.

Total Deductions from Ordinary Income

Net Ordinary Income

IV. Extraordinary Income:

8100. Extraordinary Income Credits.
8200. Extraordinary Income Charges.
8400. Delayed Income Credits.
8600. Delayed Income Charges.

Total Extraordinary Income

Net Income Before Income Taxes

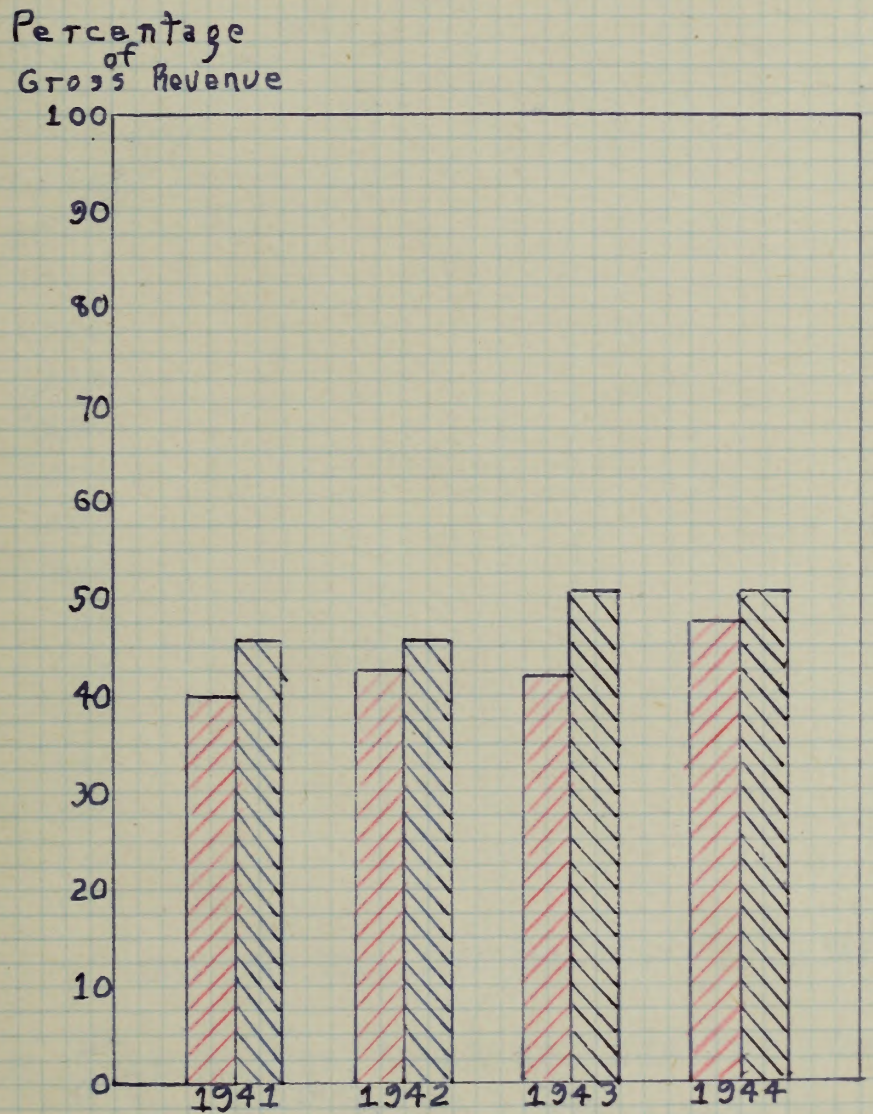
8800. Income Taxes.

Net Income (or loss)

CHART 1.

WAGES TAKE HALF OF GROSS REVENUE

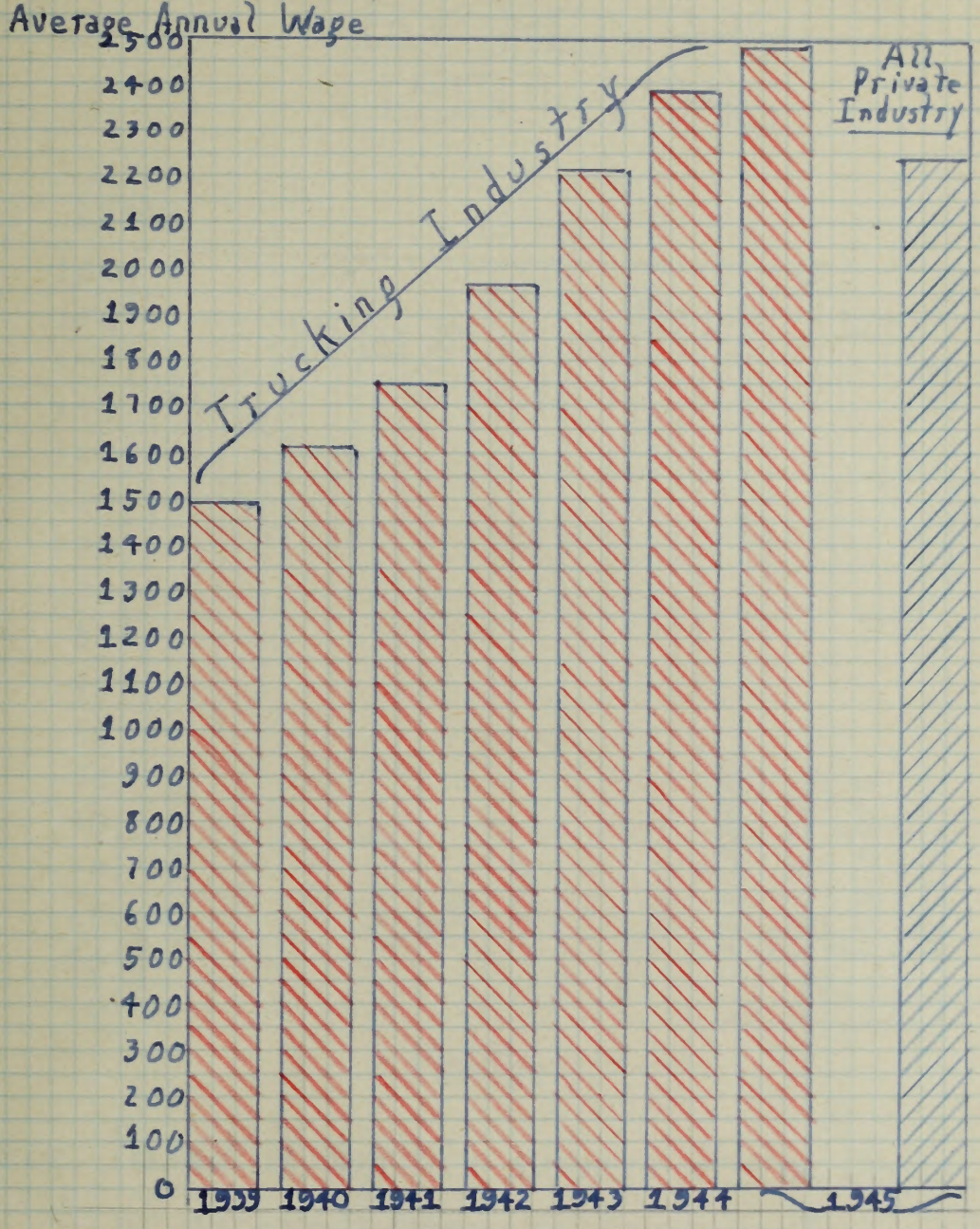
Showing the Percentage Relationship of Truck Wages to Total Truck Revenue



Source: Based on Interstate Commerce statistics for Class I motor carriers of property.

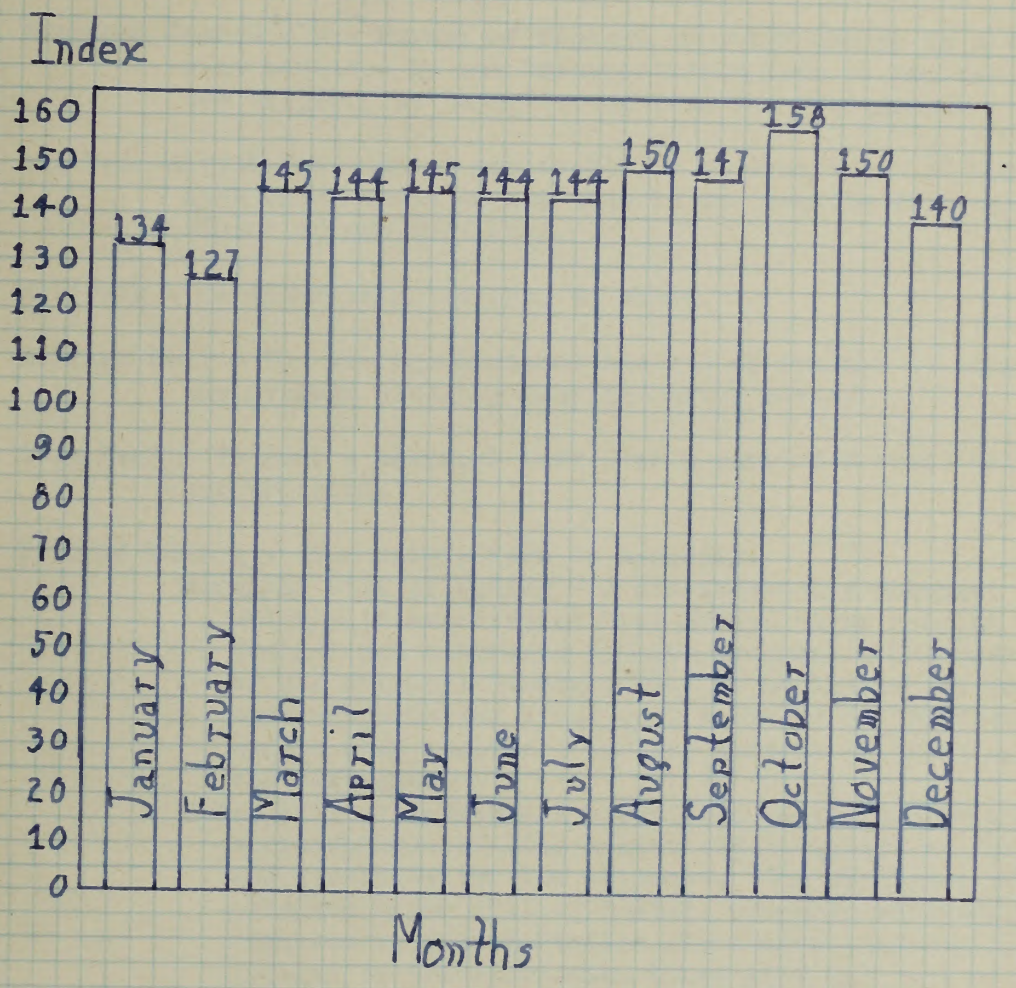
CHART 2

AVERAGE WAGE PER EMPLOYE



Source: Figures for trucking industry compiled by A. T. A. Department of Research from data contained in reports to the Interstate Commerce Commission by Class I motor carriers of property. The figure for all private industry from U. S. Department of Commerce.

CHART 3
FOR-HIRE TRUCKLOADINGS BY MONTHS 1937-1946



Source: Based on monthly surveys of the Department of Research, American Trucking Associations, Inc. The montly average for the three years, 1938-1940 represents 100 The index figure shown for each month is an average for the nine years 1937-1946

Motor Truck Glossary

Act to Regulate Commerce - An act of Congress regulating the practises, rates and rules of transportation lines engaged in handling interstate traffic (now known as the Interstate Commerce Act.)

Advanced Charge - The amount of freight or other charge on a shipment advanced by one transportation line to another, or to the shipper, to be collected from the consignee.

All Commodity Rates - Rates applicable on an assortment of merchandise which moves on one time in one vehicle from one consignor to one consignee.

Allocate - To distribute, assign, or allot.

Average Haul - The average distance one ton of freight is moved or the average distance that the truck moves.

Back Haul - To haul a shipment back over a part of a route which it has traveled.

Bill of Lading - (See Sample Form in Appendix)

Straight Bill of Lading - A non-negotiable document by which a transportation line acknowledges receipt of freight and contracts for its movement. The surrender of the original Straight Bill of Lading is not required by transportation lines upon delivery of the freight, except when necessary for the purpose of identifying the consignee.

Order Bill of Lading - A negotiable instrument by which a transportation line acknowledges receipt of freight and contracts for its movement. The surrender of the original Order Bill of Lading, properly endorsed, is required by transportation lines upon delivery of the freight by transportation lines upon delivery of the freight in accordance with the terms of the Bill of Lading.

Break Bulk Point - A point at which a portion or all of the contents of a truck are unloaded and distributed.

Bulk Freight - Freight not in packages or containers.

Bureau of Motor Carriers - That bureau of the Interstate Commerce Commission that specializes and has jurisdiction over motor carriers as shown in the Motor Carriers Act.

Cargo - The lading of a truck.

Carload - The quantity of freight required for the application of a carload rate. A car loaded to its carrying capacity.

Carrier - An individual or corporation engaged in the business of transporting goods.

Cartage - The charge made for hauling freight on trucks.

Certificate of Public Convenience and Necessity - A formal statement, issued by a regulatory commission, approving the operation of a truckman.

Claim - A demand made upon a transportation line for payment on account of a loss sustained through its negligence.

Classification Rating - The class to which an article is assigned for the purpose of applying class rates.

Common Carrier - A transportation line engaged in the business of handling persons or goods for compensation and for all persons impartially.

Compensatory Rate - A rate that produces a profit over costs to the carriers.

Concentration Point - A point at which less than carload or less truck load shipments are brought together to be reforwarded as a carload.

Consignee - The person to whom articles are shipped.

Consignor - The person by whom the articles are shipped.

Delivery - The act of transferring possession, such as the transfer of property from consignor to carrier, one carrier to another, of carrier to consignee.

Filing of Tariffs - The placing of common carrier's tariffs or charges in files of federal or state commissions in accordance with established regulations.

Initial Carrier - The transportation line to which a shipment is delivered by the shipper.

Interline Freight - Freight moving from point of origin to destination over the lines of two or more transportation lines.

Interstate Commerce - Is defined by section one of the Act, covering transportation from one State or Territory of the United States, or the District of Columbia, to any other or from any place in the United States through a foreign country to any other place in the United States, or from or to any place in the United States to or from a foreign country, but only insofar as such transportation takes place within the United States.

Intrastate Traffic - Traffic having origin, destination, and entire transportation within the same State.

Lading - That which constitutes a load. The freight of a truck, car, or vessel.

Lawful Rate - A rate constructed and published in accordance with the law and the rules prescribed by the Interstate Commerce Commission as to interstate traffic or by State commission as to intrastate traffic.

Less Truck Load - A quantity of merchandise or other commodity which does not occupy the space of the usual motor truck body or which does not equal the normal carrying capacity of a truck, such as is usually used in motor freight service.

Load Factor - The percentage of the total carrying capacity of a truck utilized on a trip. General application is to use the results from a round-trip movement.

Minimum Charge - The least charge for which a shipment will be handled.

Motor Freight Terminal - A shipping and receiving terminal for highway freight which may be used by one or more highway freight operators.

Motor Truck Carrier - A carrier transporting property for compensation over a highway.

Motor Vehicle - A highway vehicle, self-propelled.

Operating Expense - The cost incident to the actual handling of traffic.

Operating Ratio - The relation of operating expenses to gross revenue.

Operating Rights - Authority issued by a regulatory body to a carrier to engage in transporting property or persons.

Out-of-Pocket Cost - The direct costs of operating vehicles; does not include charges for interest, amortization, etc.

Pick-up - Service of a carrier involved in calling for and collecting freight, and receipting therefor at wharves, docks, or the consignor's factory, store or warehouse, and transportation therefrom to a freight concentrating depot.

Point of Origin - The place at which a shipment is received by a transportation line from the shipper.

Posting (Tariffs) - Filing of tariffs for common carriers and schedules for contract carriers with regulatory commissions and posting tariffs so as to make same available to the public.

Prepaid - A term denoting that transportation charges have been or are to be paid at the point of shipment.

Private Carrier - One that is not a common or contract carrier, and who transports property of which he is the owner, bailee or lessee.

Property Damage Insurance - Insurance that is issued to cover damage to property of others; does not cover cargo protection.

Public Liability Insurance - Insurance that is issued to cover injury or death of person or persons.

Rate Basis - A formula of the specific factors or elements which control the making of a rate.

Return Loads - Any individual load of merchandise or other commodity which is offered for transportation to a truckman who has delivered his truck load and would otherwise return to his destination empty.

Revenue Waybill - A waybill showing the amount of charges due on a shipment.

Seasonal Traffic - Goods that are transported only during certain seasons or periods of the year.

Shipper - Originator of the freight, also known as consignor.

Shipping Order - Instructions of shippers to carrier for forwarding of goods; usually the triplicate copy of the bill of lading.

Split Pick-up and Delivery - the pick-up services on goods at more than one address at point of origin and delivery to more than one consignee at destination.

Storage - A charge made on property stored.

Storage in Transit - The stopping of freight traffic at a point located between the point of origin and destination to be stored and reforwarded at a later date.

Tariff - A schedule of rates charged by transportation lines, together with governing rules and regulations.

Tariff Circular - (I.C.C.) A circular issued by the Interstate Commerce Commission prescribing rules and regulations to be observed by transportation lines in publishing tariffs.

Terminals - Extremities of a carrier's route. Points or places at which carrier maintains facilities for the receipt, dispatch, and handling of goods.

Through Rate - A rate applicable through from point of origin to destination. A through rate may be either a joint rate or a combination of two or more rates.

Tonnage - The number of tons of freight handled.

Tracer - (a) A request upon a transportation line to trace a shipment for the purpose of expediting its movement or establishing delivery. (b) A request for an answer to a communication, or for advice concerning the status of a subject.

Tractor - A short wheelbase truck equipped with a fifth wheel, designed to pull semi-trailers.

Traffic - Persons and property carried by transportation lines.

Trailer - A truck body mounted on a chassis but having no power plant or driving mechanism, and designed to be hauled and controlled by a separate truck or tractor.

Transportation - The movement of traffic from one place to another.

Truck - A self-propelled highway vehicle having a load capacity of from one to twenty tons, used in the transportation of bulk merchandise freight.

Truck Load - A quantity of merchandise or other commodity which occupies the full body space or equals the normal carrying capacity of a truck such as is usually used in motor freight service.

Variable Costs - Motor truck operating costs which depend largely upon the number of miles operated. These include gasoline, oil, tires, repairs, depreciation, etc.

Waybill - A document prepared by a transportation line at the point of origin or a shipment, showing the point of origin destination, route, consignor, consignee, description of shipment, and amount charged for the transportation service.

Warehouse Receipt - A receipt given for goods placed in a warehouse (may be issued as a negotiable or non-negotiable document.)

UNIFORM STRAIGHT BILL OF LADING

ORIGINAL — NOT NEGOTIABLE — DOMESTIC

Shipper's No._____

Agent's No._____

HALL TRUCKING CO.

TAUNTON, MASSACHUSETTS

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

From_____, Date_____, 194__

At_____Street,_____City,_____County,_____State

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to_____

Destination_____Street,_____City,

_____County,_____State

Routing_____

Delivering Carrier_____Vehicle or Car Initial_____No._____

Collect On Delivery $_____and remit to:_____

_____Street_____City_____State

C.O.D. charge to be paid by ☐ Shipper ☐ Consignee

No. Packages	DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (Subject to Corr.)	Class or Rate	Check Col.

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

_____
(Signature of Consignor.)

If charges are to be prepaid write or stamp here "To be Prepaid."

Received $.....
to apply in prepayment of the charges on the property described hereon.

_____
Agent or Cashier

Per.....
(The signature here acknowledges only the amount prepaid.)

Charges Advanced:

$.....

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight."
NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding.....per.....

_____Shipper

Per_____

_____Agent.

Per_____

Permanent Address of Shipper:_____Street,_____City,_____State

Form MT-2 Rev.

PRINTED BY A. T. HOWARD CO., 10 BLANDFORD ST., BOSTON 16, MASS.

1

SAMPLE BILL OF LADING

TABLE 1

Operating Ratios by Quarters

Class I Motor Carriers of Property - All Types

	1939	1940	1941	1942	1943	1944	1945	1946
First Quarter	94.8%	96.5%	93.1%	95.8%	94.6%	95.6%	96.5%	99.4%
Second Quarter	93.8%	93.5%	91.5%	92.8%	94.0%	95.6%	95.9%	93.9%
Third Quarter	93.2%	94.0%	93.8%	90.7%	95.1%	96.3%	99.7%	94.7%
Fourth Quarter	98.2%	98.3%	101.6%	97.9%	101.1%	101.2%	106.1%	N.A.*
Full Year	95.1%	95.6%	95.1%	94.2%	96.2%	97.2%	99.3%	96.1%

*Not Available

NOTE: The operating ratio is the percentage relationship of expenses to gross revenue. Thus, the operating ratio of 94.8 in the first quarter of 1939 means that the expenses of the carriers absorbed 94.8 percent of their revenue, leaving 5.2 cents net revenue out of each dollar of gross revenue, with income taxes still to be paid.

SOURCE: Based on Interstate Commerce Commission statistics for Class I motor carriers of property.

TABLE I

Operating Ratios by Quarters

Class I Motor Carriers of Property - All Types

	1979	1980	1981	1982	1983	1984	1985	1986
First Quarter	94.8%	96.5%	93.1%	95.8%	94.6%	95.6%	96.5%	99.1%
Second Quarter	93.0%	93.5%	91.3%	93.8%	94.0%	95.6%	95.9%	93.0%
Third Quarter	93.2%	94.0%	93.8%	90.7%	95.1%	96.3%	99.7%	94.7%
Fourth Quarter	96.2%	96.1%	101.6%	97.9%	101.1%	101.2%	106.1%	N.A.*
Full Year	95.1%	95.8%	95.1%	94.2%	96.2%	97.6%	99.3%	96.1%

*Not Available

NOTE: The operating ratio is the percentage relationship of expenses to gross revenue. Thus, the operating ratio of 94.8 in the first quarter of 1979 means that the expenses of the carriers absorbed 94.8 percent of their revenue, leaving 5.2 cents net revenue out of each dollar of gross revenue, with income taxes still to be paid.

SOURCE: Based on Interstate Commerce Commission statistics for Class I motor carriers of property.

TABLE 2

The Motor Carrier Revenue Dollar and Where It Goes

Based on I.C.C. Reports for Class I Carriers of General Freight

	1939	1940	1941	1942	1943	1944	1945	1946
Gross Revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Net Revenue	4.9	4.4	4.9	5.7	3.9	2.8	d 0.3	3.6
Expenses:								
Equipment Maintenance and Garage Expense	10.5	10.1	10.2	11.0	14.4	16.0	16.4	14.1
Transportation Expense	36.8	36.9	35.5	32.4	27.0	28.0	22.5	20.7
Terminal Expense	15.1	16.5	19.2	19.4	19.0	17.5	23.0	24.5
Sales, Tariff and Advertising Expense	3.2	3.5	3.2	3.0	2.5	2.4	2.8	2.8
Insurance and Safety Expense	5.5	5.3	5.0	5.0	5.2	5.4	6.0	5.9
Administrative and General Expense	9.7	9.6	9.0	9.2	9.5	9.3	9.2	8.4
Depreciation Expense	4.6	4.3	4.0	4.0	3.6	3.6	3.5	3.3
Operating Taxes and Licenses	6.9	7.2	7.1	6.7	6.6	6.5	6.6	5.9
Operating Rents, Net	2.8	2.2	1.9	3.6	8.3	8.5	10.3	10.8

SOURCE: American Trucking Trends, published by American Trucking Associations, April, 1947.

Table 6A.1.0. Expenditure for Claims I Centers of General Practice

Gross Revenue	1969	1970	1971	1972	1973
Net Revenue	100.0	100.0	100.0	100.0	100.0
Expenses:	4.9	4.4	4.9	5.7	5.8
Employment Maintenance and Operation Expense	17.1	17.5	17.2	17.0	17.4
Depreciation Expense	26.8	26.9	25.5	25.4	27.0
Rental Expense	15.1	14.5	14.2	13.4	13.0
Sales, Realty and Advertising Expense	3.5	3.5	3.2	3.0	3.4
Insurance and Surety Expense	5.5	5.3	5.0	5.2	5.4
Administrative and General Expense	9.7	9.5	9.0	8.5	8.3
Depreciation Expense	1.8	1.3	4.0	3.6	3.4
Operating Taxes and Licenses	0.9	1.5	1.4	0.7	0.6
Operating Rents, Net	2.8	2.5	2.9	3.0	3.3
Operating Profit	10.0	10.1	8.3	8.5	8.3

SOURCE: American Dental Association, Department of Economic and Practice Analysis, 1972.

Bibliography

American Trucking Associations, Inc., American Trucking Trends, American Trucking Associations, Inc., Washington, D.C., April, 1947.

Ashby, William T.; Aebischer, Walter E.; Powelson, John J.; Weller, Walter W.; and Fagg, Charles J., The Motor Truck Red Book, Traffic Publishing Company, Inc., New York, New York, November, 1940.

Daggert, Stuart, Principles of Inland Transportation (Third Edition), Harper and Brothers, New York, New York, 1941.

Dickson, Jr., J. Frank, Basic Principles of Expense Distribution Applicable to Motor Transportation, The New England Motor Rate Bureau, Boston, Mass.

Donald, W. J., Handbook of Business Administration, McGraw-Hill Book Company, Inc., New York and London, 1931.

Edwards, Ford K., The Use of Costs in Making Rates, National Committee on Accounting, American Trucking Associaton, Washington, D.C., October 11, 1948.

Interstate Commerce Commission, Explanation of the Development of Motor Carrier Costs with Statement as to Their Meaning and Significance (Revised Edition), Interstate Commerce Commission, Bureau of Transport Economics and Statistics, Cost Section, Washington, D.C., February, 1949.

Interstate Commerce Commission, Uniform System of Accounts for Class I Common and Contract Motor Carriers of Property, Interstate Commerce Commission, United States Government Printing Office, Washington, D.C., 1948.

Lasser, J. K., C.P.A., Handbook of Accounting Methods, D. Van Nostrand Company, Inc., New York, New York, 1948.

Lawrence, W. B., C.P.A., Cost Accounting, Prentice-Hall, Inc., New York, New York, 1946.

Neuner, John J. W., Ph.D., Cost Accounting, Principles and Practise, Richard D. Irwin, Inc., Chicago, Illinois, 1947.

Sherwood, J. R. and Chase, Franklin T., Principles of Cost Accounting, South-Western Publishing Co., New York, New York, 1942.

Stocker, H. E., B.S., Motor Traffic Management, Prentice-Hall, Inc., New York, New York, 1938.

Wilson, G. Lloyd, New Departures in Freight Rate Making, Simmons-Boardman Publishing Corp., New York, New York, 1948.