1955

Marketing of Diesel-electric locomotives: an analysis.

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Boston University

http://hdl.handle.net/2144/11708

Boston University
BOSTON UNIVERSITY
College of Business Administration
THESIS
Marketing of Diesel-Electric Locomotives:
An Analysis
by
Neil Arthur Maynard
(B.E.E. Northeastern University 1930)
Submitted in partial fulfillment of
the requirements for the degree of
MASTER OF BUSINESS ADMINISTRATION
1955
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INTRODUCTION

This thesis is an analysis of marketing procedures followed in sale of Diesel-electric locomotives to Class I railroads. These locomotives are the light, passenger-switcher class, and are 1200 horsepower. They are manufactured and sold by four major manufacturers located in the United States.

The problem has been localized to three railroads which terminate in Boston, for ease in obtaining data.

Attention will be given to market and sales planning; product application; distribution policies; pricing and terms of sale; sales programs and sales promotion.

Review was made of work done by others in this or allied fields. Mr. E. P. Eaton, Jr. wrote a thesis on the marketing of heavy power equipment* and Mr. Harrison G. Taylor, Jr. made contributions in the field of railroad equipment finance. **

This power equipment is purchased for the purpose of railway transportation. It is usually purchased out of earnings, hence the issue of terms of sale and finance. This problem is unique, however, in its analysis

* 8
** 22
of the railroad market.

Method of approach was to interview representatives of local railroads, the manufacturers, and to use facilities of the libraries. Listed in the Bibliography are the personnel of those companies who were most helpful. The author expresses appreciation, also to many others who in any way assisted in this solution.

Sample questionnaires are exhibited which served as the basis for discussion, but much more was gained from interviews than these samples will indicate. Included also is Bibliography of books, periodicals, and other references obtained from libraries of Boston University, Harvard Business School, Massachusetts Institute of Technology, and Boston Public Library.
MARKET AND SALES PLANNING

I. Objectives

Market and sales planning is important to a manufacturer of locomotives. The aims are to locate the buying groups; to analyze market requirements; to determine potentials and trends; to appraise competition. Railroad market is classified as a vertical industry market, but within the organizations of these railroads horizontal buying groups exist. A vertical industry market implies that the approach must pinpoint the problems of Class 1 railroads as applied to commuter transportation, and specifically shape the approach to meet those problems. A horizontal group of buyers implies that dealings are had with electrical engineers, master mechanics, storekeepers, operating vice presidents who are all-round specialists in the functions of their office.

Approach to these buyers is to show application of product for a particular problem, commutation service, but also to show diversified or multiple uses for freight, switcher, through-passenger service should the need exist and equipment be available.

To adequately cover the subject some space has been devoted to the Purchaser as the other party to this problem.
II. Knowledge of Competition

The manufacturers are rated in order of their influence in the industry.

A. Electromotive Division of General Motors Corporations

Electromotive division of General Motors Corporations is referred to in this paper as E. M. D. * This subsidiary was organized in 1935 with headquarters at LaGrange, Illinois, specifically to produce Diesel electric locomotive for Main-line passenger, freight, and switching service. They enjoy widespread acceptance. At this plant design, manufacturing, and service facilities for both mechanical and electrical components are provided. Sales and service offices are located in key railroad centers of the United States, with the nearest one to Boston being in New York City. At this location a complete stock of spare parts and replacements is maintained. Their sales of traction equipment are not segregated from the total net sales of General Motors, which was reported for 1950 as $7,531,086,846.

B. American Locomotive Company

American Locomotive Company-General Electric Company is a marketing combination which maintains headquarters in Schenectady, New York. Its backers rate as

* 35, p. 2751
the second largest competitor. This combination is under the direction of a vice president who has under him a West Districts Manager, an East Districts Manager, a Manager of Sales and Field Service Division, and a Manager of Renewal Parts. Also located in Schenectady are the parent organizations: the American Locomotive Company and the General Electric Company. Their pooled resources stand behind the Alco-G. E. product.

American Locomotive Company was incorporated in 1901 to manufacture steam locomotives but this activity was discontinued in 1949. They supply the engineering, research and manufacturing facilities for completion of the locomotive after the electrical components have been obtained from General Electric Company. Net sales billed of American Locomotive Company in 1950 were $138,869,197. On May 5, 1950 it was reported that sales would also be made through all General Electric sales outlets (for better coverage) to provide field service, parts, and shop repairs on a decentralized basis.

C. Baldwin-Lima-Hamilton Corporation

Baldwin-Lima-Hamilton-Westinghouse (B-L-H-Westinghouse)** is a marketing combination with headquarters in Eddystone, Pennsylvania, which was formed to compete

* 35, p. 2260
** 35, p. 2482

Baldwin-Lima-Hamilton was founded in 1831 by Mr. M.W. Baldwin. The company was then known as Baldwin Locomotive Works. On November 30, 1950 the name was changed to Baldwin-Lima-Hamilton Corporation on acquisition of Lima-Hamilton Corporation. This corporation is reported as one of the largest locomotive manufacturers of switching, all-service, and road units. They supply the engineering, research, and manufacturing facilities for the completion of the locomotive after the electrical components have been obtained from Westinghouse Electric Corporation. Consolidated sales, 1950, were 67% locomotives and parts both steam and Diesel; and 30% of locomotive sales were of the Diesel type. Net sales billed 1950, $94,386,752.

An interlocking directorate existed between B-L-H and Westinghouse Corporation until 1954. Three Westinghouse directors were on the B-L-H Board. On March 7, 1951 Westinghouse owned $575,000 or 12.1% of B-L-H shares of stock. This stock has since been sold as Westinghouse withdrew from the heavy traction field.
D. Fairbanks, Morse and Company

Fairbanks, Morse and Company, Beloit, Wisconsin was incorporated in Illinois in 1891. This is only one of their plants. It is devoted to manufacture of Diesel electric locomotives, also of other internal combustion engines. Total net sales billed in 1950 were $85,426,869, of which but a small part (4%, 1946) was contributed through sale of locomotives.

Fairbanks, Morse and Company builds the completed locomotive at Beloit after obtaining electric traction components either from Westinghouse or General Electric who ship to this location for assembly. Fairbanks, Morse and Company takes full responsibility in the field. What they are unable to service is performed by the original manufacturer on a contract basis.

III. Activities of Competitors

Type and degree of activity of competition is gauged by problems surrounding a particular negotiation. Purchase of an installation is planned. Assuming that it is an enlargement of an existing fleet of 1200 horsepower units, manufacturer of existing units will emphasize economy of parts interchangeability, reciprocity if possible, fast services rendered, or other points which are applicable

* 35, p. 2372
to the situation.

Competitors will be invited to bid. They may or may not have similar units on this railroad. Assumption that they do not, calls for a demonstration which may be performed by taking buyers to another railroad to see similar equipment in service, and to discuss with the users. Usually the manufacturer will obtain permission to place a demonstrator unit on the prospective customer's line. It will be subjected to all types of operating conditions; statistics of costs under actual conditions will be compiled; representatives of the manufacturer will be on hand to answer questions; officials of the customer will be given conducted tours; all forms of sales promotion will be brought into play for the demonstration. This may last for a few days, or a few weeks depending on what is to be proved, and the interest of the prospect. During this demonstration, personnel of the railroad will operate the unit and do all of the work, in order to simulate normal conditions.

A manufacturer who wishes to make his first installation will spare no expense, once he has been invited to bid. By demonstrations, entertainment, tours, brochures, trial installations he will attempt to establish proof of statements made to the buyer. As one writer
There is more than a single sale at stake.

1. The manufacturer has a machine to sell which supplies a customer's wants for a number of years.
2. Manufacturer produces a line of machinery who, after selling a customer one type will be in a position to sell him other types.
3. Satisfactory acceptance of a type of machine will result in the sale of many machines of that type to the same customer.
4. Sells materials and component parts used in production and which are purchased regularly.
5. Renders a service which is performed regularly.

It is estimated that the first ten locomotives, purchased of a particular design, require the equivalent of one additional locomotive as the investment in spare parts. This is an investment of approximately $130,000 as insurance for a fleet of ten 1200 horsepower locomotives. This relationship is not in direct proportion, however, as more units are added if standardization and the same manufacturer has been adhered to.

The manufacture of these Diesel-electric locomotives together with replacements and spare parts form a large part of the overall business of major engine builders:

* 10, p. 197.
Percentage of
total business

Electromotive Division of General Motors - 100%
Baldwin-Lima-Hamilton 60%
American Locomotive 60%

As applied to Baldwin-Lima-Hamilton and American Locomotive Company, the balance of their business is composed of the manufacture of machine tools and other supplies required by the railroad market, but not necessarily directly attached to the locomotive.

IV. Scope of the Market

For new installations, or additions to existing installations, the timing of purchases will be based upon impending wars, prosperity or depression. Railroads studied are affected by population growth, decentralization of industry, suburban home construction, industrial expansion. Any or all of these may lead to need for more commuter service.

For replacement of existing Steam or Diesel units the market is diminishing. Steam replacements are completed. Locomotives twenty years old are now becoming plentiful and should be replaced for maximum efficiency. Where wrecks or derailments occur, decision may be to collect insurance and apply it towards the purchase of new rather than repair the old locomotive. Plans have
been investigated whereby purchase and finance would be made easier and thus encourage modernization."

Following is a breakdown of Diesel electromotive power taken from a field survey made of the railroads under discussion:

**Diesel-Electromotive Power**

**Boston and Maine Railroad**

<table>
<thead>
<tr>
<th>Number of Units</th>
<th>Horsepower</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2250</td>
</tr>
<tr>
<td>21</td>
<td>1800 or 2000</td>
</tr>
<tr>
<td>34</td>
<td>1500</td>
</tr>
<tr>
<td>68</td>
<td>1350</td>
</tr>
<tr>
<td>71</td>
<td>1200 or less</td>
</tr>
</tbody>
</table>

Total - 195 units equivalent to 239,550 horsepower

**New York Central Railroad**

<table>
<thead>
<tr>
<th>Number of Units</th>
<th>Horsepower</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>2250</td>
</tr>
<tr>
<td>103</td>
<td>1800 or 2000</td>
</tr>
<tr>
<td>213</td>
<td>1600</td>
</tr>
<tr>
<td>343</td>
<td>1500</td>
</tr>
<tr>
<td>10</td>
<td>1250</td>
</tr>
<tr>
<td>550</td>
<td>1200 or less</td>
</tr>
</tbody>
</table>

Total - 1237 units equivalent to 1,548,160 horsepower

* Note: This is the entire New York Central figures, but for Boston and Albany Division the figures are not separated.

* 13, pp. 137-138
** 45
*** 42
New York, New Haven and Hartford Railroad*

<table>
<thead>
<tr>
<th>Number of Units</th>
<th>Horsepower</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2400 or 2500</td>
</tr>
<tr>
<td>87</td>
<td>1800 or 2000</td>
</tr>
<tr>
<td>45</td>
<td>1600</td>
</tr>
<tr>
<td>62</td>
<td>1500</td>
</tr>
<tr>
<td>159</td>
<td>1200 or less</td>
</tr>
</tbody>
</table>

Total - 363 units equivalent to 459,420 horsepower

Due to Interstate Commerce Commission ceilings, placed on the price of this commuter service, it is unprofitable and is growing more so with the steady rise in service costs. Despite declining revenue and rising costs, the Boston and Maine Railroad recognizes a definite responsibility to communities served. The Boston and Maine is "trying to provide the best, most frequent and most comfortable service consistent with what the people will pay." They are trying to, ratewise "tailor tickets and rates to what the public will find convenient and not to obtain maximum revenues."**

In the early stages of conversion from steam to Diesel, a ratio of three steam units could be abandoned for every one Diesel electric unit placed in service. This high figure is an indication of the low percentage of availability of steam locomotives, compared to Diesel-electric. Consequently, early conversions and abandonments

* 41
** 47
of steam units were on a purely economic basis, and were applied to main-line trains where a high availability was imperative, and a constant operation with short periods of lay-over could be provided.

The Boston and Maine Railroad is heavily committed to the use of E. M. D. equipment. Delivery schedules of new units have been predicated on customer's plans for taking old equipment out of service. A definite delivery date was secondary to the requirements for equipment of standardized design, using parts which were already interchangeable with those of locomotives in operation. These factors were primary in the negotiation because the more units of a similar design, the lower the standby investment in spare parts.

Applying knowledge of business trends and taking advantage of buying motives in the purchase of locomotives for commuter service - still there must be a 10-15% saving over present transportation methods to induce the customer to change.

The importance of these Diesel electric acquisitions in the 1200 horsepower class, taken from a report in the January, 1953 RAILWAY AGE* gives purchases of Class 1 railroads in the United States for 1952 as

* 31, p. 228
follows:

<table>
<thead>
<tr>
<th>Company</th>
<th>Number of Units Purchased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baldwin-Lima-Hamilton</td>
<td>69 units</td>
</tr>
<tr>
<td>American Locomotive</td>
<td>0 units</td>
</tr>
<tr>
<td>Fairbanks, Morse and Company</td>
<td>37 units</td>
</tr>
<tr>
<td>Electromotive</td>
<td>130 units</td>
</tr>
</tbody>
</table>

Boston and Maine; New York, New Haven and Hartford Railroad; and Boston and Albany Division of New York Central did not place any orders during this period for units in this class.

The Boston and Albany is completely Dieselized. This has resulted in a maximum return from use of the modernized transportation units.

There will be no substantial additions to the Diesel fleet of this railroad for some time to come because Dieselization has so recently been accomplished, and the trend for this class of service is declining.

It would appear that the utilization factor, for locomotives in this service by the Boston and Albany, is more favorable than for the Boston and Maine. In the first place, long lay-overs on dead-ended lines are not a part of their operating problems. Terminal points in the commuter area are at the Boston terminal and in Milford.

* 36, p. 1047
** Refer to Map, Boston and Albany, p. 27.
Massachusetts. A train coming to Boston can be transferred to road, switching, or freight duty. One going to Milford will lay over until morning for a return-to-Boston run. In this instance the "dead-end" problem is minute compared to all the dead-end lines on the Boston and Maine. This, in part accounts for the more rapid changeover from steam than has occurred with the Boston and Maine.

The Boston and Albany uses eight B-L-H 1200 horsepower road-switchers geared for sixty-five miles per hour service on their commuter trains. A unit of this size costs approximately $120,000. It hauls four passenger cars of the light duty class having a capacity of ninety passengers each, or three hundred and sixty passengers per train. This amounts to a minimum of $335 per passenger investment in traction equipment.

On the main line or under extremely heavy traffic conditions on the Highland Branch, the 1500-1500 Alco-G. E. units are employed. They haul 700-1100 people per train and cost approximately $155,000 each. Here we have an investment of $140 minimum per passenger which is a more favorable investment than for the B-L-H units, if traffic warrants. An additional advantage of these larger units is when they are required for through runs to Springfield, Massachusetts, where
the steeper grades warrant the added power.

Investigation was made covering indications of demand for additional commuter service by the three railroads under discussion.

The Boston and Maine 120th Annual Report, pages 16-17 illustrate examples of industrial expansion made in 1952. Included are pictures of C. B. S. Hytron, Danvers, Massachusetts; Edgcomb Steel Inc., Nashua, New Hampshire; the Norton Company, Worcester, Massachusetts, and many others. These expansions mean more commuter service to and from their locations. Some of these expansions are moves for de-centralization and others towards centralization of industry. Therefore, their effects on traffic must be borne out with time. Replacements on this railroad of traction equipment to date have been to eliminate steam locomotives. Obsolescence or mileage replacement of Diesel units, in the opinion of the Boston and Maine management, is a long way off.

The New York, New Haven and Hartford Railroad is increasing both the number of trains and frequency of train schedules. They are optimistic relative to the future of this business. When the Chamber of Commerce of any town along their line petitions for improved service, the railroad makes a market survey to determine what is to be gained through better schedules. Knowing
the potential traffic and operating costs, which can be more accurately determined with Diesel electric traction than with steam locomotives, decision can quickly be made if additional service should be provided.

Through careful balance between capacity of service and demand, the New Haven is breaking even on its commuter business and through improvement in this service, they are increasing the main line of business. They are able to maintain this balance between capacity of service and demand by having three distinct types of service available. First is the Little Shore Liner or Frederick C. Dumaine (F. C. D.) 300 horsepower car. This is a 40 horsepower Mack bus-on-rails which is fitted with a Diesel electric drive, to be operated from either end so that turn-tables are unnecessary. Second in size is the Shore Liner or Budd 550 horsepower car, holding eighty-nine passengers each, and can be operated in multiple of as many as four cars per train from a single operator. Third from the Shore Liner the next in capacity are the 1200-1500 horsepower Alco-G. E. Diesel electric locomotives which haul 1,100 passengers. "Annual Report to the Stockholders 1952", page 26, states that in 1952 - 26,432,859 passengers or 61% of the total represented commuter traffic. The percentage of this which comes to Boston is undetermined. The heaviest density of commuter traffic on
this road is in the New Haven-New York area which has been completely electrified.

This railroad is completely Dieselized or electrified. Fifty of their units are thirteen years old or more and this railroad expects to keep its equipment modern. Sentiment is growing with top management to sell all locomotives when they are fifteen years in service and purchase new replacements. Should this become a policy it will provide a continual replacement market for a portion of their fleet, and will greatly reduce both the maintenance costs and maintenance facilities per locomotive provided.

An additional convenience was provided for the communities to the West of Boston in the building of "Route 128 Station" in Canton, Massachusetts. Success with the Worcester-New London run on the Norwich Branch where passenger service was abandoned in 1928 has been favorable. It resulted not only in an operating profit, but the through-feeder service greatly increased the plus business on the main line. Plans are under way on this railroad, through sales promotion and advertising, to feature the economies of rail patronage over travel by private automobile. They will feature all of the attendant advantages such as ease on the driver, elimination of traffic jams, parking problems and so forth. As a result,
the commuter service is growing more profitable. In 1952, when the Eastern Massachusetts Street Railway strike was settled, their fares were increased. For example, Braintree to Boston, using Eastern Massachusetts transportation plus the MTA cost of 45¢ but with the 12-ticket strip on the New Haven, the fare from Braintree to Boston remained $3.29 or $3.2741 per coupon. This is but one example of the forward looking management on this railroad.

V. Railroads Studied

A. Boston and Maine Railroad

Boston and Maine Railroad* terminating at the North Station are lines from Portland, Maine, via Portsmouth, New Hampshire, and via Dover, New Hampshire.** Lines from Woodsville, New Hampshire, White River Junction, Vermont, and from Claremont Junction, New Hampshire join at Concord, New Hampshire, and operate on a common track to Manchester, New Hampshire whence they separate: some going via Lawrence, Massachusetts; and others via Nashua, New Hampshire, and Lowell, Massachusetts. Note also the Maine line from Greenfield, Massachusetts, via Ayre and Concord; also the line from Worcester, Massachusetts, to Ayre or an alternate route via Berlin.

* 36, p. 171
Boston and Maine R.R.
Operating Divisions

Terminal:
Portland
New Hampshire
Fitchburg

Joint Operations:
Me. Gen. R.R.
Fitchburg
B & A R.R.

Map Showing Commuter Area Lines in Red
Massachusetts, and South Sudbury. Feeders and cross lines make this system a co-ordinated network. The red shaded area marks the "15-mile zone", and the blue area "beyond 15-mile zone". Within the area under discussion some lines are not colored which indicate "no passenger service".

B. Boston and Albany Division of New York Central Railroad

Boston and Albany Division of New York Central* terminating at the South Station, is the main line coming from Springfield, Massachusetts.** A four-track road starts at Framingham, with a feeder line operating from Milford to Framingham. On this map is also shown the Highland branch, which loops around Newton Highlands and connects with the main line at Riverside. The commutation area of this railroad extends as far as Milford and Framingham, and includes both the main line and the Highland branch. Within this area purchases are made on both the strip commutation tickets, and the monthly ride ticket books.

Comparing the Boston and Albany with the Boston and Maine and New York, New Haven and Hartford Railroad, it ranks third in commuter traffic. Like the Boston and Maine, the trend of fares has been on the increase, but

* 36, p. 1047  
** Refer to Map, Boston and Albany, p. 27.
the number of passengers has steadily decreased over the years. Increases in fares have been necessary due to the greater operating costs, but in each rate increase the railroad witnesses a drop in traffic; better roads, more private automobiles, and extended use of share-the-ride plans are responsible for drops.

The following is an example of what has taken place. An old 1916 time table of the Highland branch was inspected. Trains going west from Boston made the first run out of South Station at 5:15 A.M. and the last, on week days, at 11:45 P.M. In 1953 the first week-day run was made at 11:00 A.M. and the last at 6:05 P.M. East-bound to Boston, on the same branch, in 1916 the first train started at 5:59 A.M. and the last at 10:53 P.M. In 1953 the first train started east at 7:16 A.M. and the last at 3:45 P.M.

Eastbound traffic commenced in all cases earlier than westbound; also westbound carried passengers later in the afternoon. This is accounted for by the fact that this is a commuter traffic which flows into the Metropolis in morning and returns to the Suburbs at night.

The count of inbound morning traffic of a typical business day in 1953 was 7,567 passengers and for the same day the outbound evening traffic was 6,706. Differences between these two figures may be accounted for by those
who fail to return or use other forms of transportation.

Boston and Albany was granted a 25% increase on monthly tickets and 35% increase in 12-ride tickets at about the same time in 1952 as the Boston and Maine. After this increase took place a comparison of passengers and revenue for the month of July, 1951, was made with July, 1952, to note the effect of the fare increase. The change was as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Commutation Passengers</th>
<th>Total Revenue</th>
<th>Number of X-Commutation Passengers</th>
<th>Total Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 1951</td>
<td>227,574</td>
<td>$52,899.23</td>
<td>418,368</td>
<td>$361,843.19</td>
</tr>
<tr>
<td>July 1952</td>
<td>217,580</td>
<td>66,965.20</td>
<td>409,977</td>
<td>375,454.10</td>
</tr>
</tbody>
</table>

4% decrease 26% increase 2% decrease 4% increase

Note that raising commutation fares resulted in decrease in traffic and that this decrease reduced the total revenue compared to total received. On this basis the increased revenue was not commensurate with the percentage in increased fares. This conclusion is further strengthened when comparison is made with the X-commutation fares. A decrease in the number of passengers and an increase in the revenue is noted but the proportions are not as marked. Assuming a slight fare increase in this bracket, the relationship does not show as marked a change as in the previous comparison. Another conclusion to be drawn from the July 1952 figures is that 35% of all passengers accounted
for 15% of the total revenue. These comparisons being made for the month of July would tend to make the conclusions more favorable than during a month when more students are commuting and when the percentage of commuters to total traffic would be greater. The conclusion is that commuter service does not pay its way.

C. New York, New Haven and Hartford Railroad

New York, New Haven and Hartford Railroad* includes the Old Colony Railroad.** Terminating at the South Station are lines of the Old Colony Railroad. One line starts in Greenbush, Massachusetts, and comes in via Quincy; another starts at Plymouth, Massachusetts, and operates via South Braintree, Massachusetts. These towns, together with Bridgewater on the two-track line, mark the boundaries of commutation traffic on this road. Another road included in this discussion is the two-track line between New Bedford and Norton, Massachusetts, which branches into the Boston-Providence line at Attleboro and at Mansfield. The main line Boston-Providence is considered in the commuter area, also the line starting with Blackstone and coming in via Readville; as well as a line starting at West Medway and coming in via Forest Hills. Feeders and crosslines make this system a co-ordinated

* 36, p. 371
** Refer to Map, New York, New Haven, Hartford Railroad, p. 31.
network.

VI. Benefits To Railroads Through Commuter Business

There are no benefits: commuter traffic results in heavy losses; equipment and men must be employed on a standby basis to serve a peak intensity load at the two ends of the day. Fine commuter service promotes good public relations, which result in increased business of a profitable variety; but benefits do not compensate for the losses. Therefore, as a marketing problem, one cannot take increased commuter traffic as a plus index to sell more locomotives. Rather, the substitution of this new motive power has been made, primarily, to reduce losses or to relieve congestion on city streets. The important index of market demand has been a 10-15% saving over previous types of motive power. Units which have been in service for twelve or fourteen years are beginning to give a lot of trouble, and require increasing amounts of maintenance. Management should modernize before maintenance becomes excessive.

VII. Reasons For Conversion Delays

The reasons for conversion delays include factors such as commuter service on lines which dead-end at the end of the day. In such cases a train will be forced to lay over until the first return-run the next morning. This is
a non-revenue period and the railroad loses less money, by using a fully depreciated steam locomotive for such a train, than would be the case if a Diesel electric unit, purchased on time payments was applied. In spite of such disadvantages all lines to Boston on the Boston and Maine Railroad were scheduled for dieselization by 1955 at a cost of $16,000,000 for replacements.

VIII. Conclusions

Market and sales planning have received a qualitative appraisal. Potentials exist even though commuter traffic has become a "social problem". Sales policies require an understanding of the problems of the purchaser; and appraisal of where changes can be made to improve operating economies; abilities and techniques to prove that a competitive product is superior; and joint co-operation with all public authorities, both civic and governmental, to create a healthy condition of the market, for 1200 horsepower Diesel electric locomotives.

* 30, p. 1
TABLE I

COMMUTATION TRAFFIC ON CLASS I RAILWAYS
IN UNITED STATES IN REVENUE PASSENGER-MILES*

<table>
<thead>
<tr>
<th>Year</th>
<th>Miles</th>
<th>Year</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1916</td>
<td>Not available</td>
<td>1942</td>
<td>4,916,759,538</td>
</tr>
<tr>
<td>1922-25</td>
<td>6,382,895,000</td>
<td>1943</td>
<td>5,260,095,401</td>
</tr>
<tr>
<td>1926-30</td>
<td>6,689,560,000</td>
<td>1944</td>
<td>5,344,014,316</td>
</tr>
<tr>
<td>1931-35</td>
<td>4,718,608,400</td>
<td>1945</td>
<td>5,417,586,674</td>
</tr>
<tr>
<td>1936-40</td>
<td>4,059,019,705</td>
<td>1946</td>
<td>5,857,467,400</td>
</tr>
<tr>
<td>1941-45</td>
<td>5,005,433,291</td>
<td>1947</td>
<td>6,088,206,640</td>
</tr>
<tr>
<td>1946-50</td>
<td>5,636,705,542</td>
<td>1948</td>
<td>5,855,442,847</td>
</tr>
<tr>
<td>1939</td>
<td>4,012,418,676</td>
<td>1949</td>
<td>5,477,775,199</td>
</tr>
<tr>
<td>1940</td>
<td>3,995,504,749</td>
<td>1950</td>
<td>4,984,535,626</td>
</tr>
<tr>
<td>1941</td>
<td>4,087,820,527</td>
<td>1951</td>
<td>4,865,721,353</td>
</tr>
</tbody>
</table>


TABLE II

OTHER PASSENGER TRAFFIC ON CLASS I RAILWAYS
IN UNITED STATES IN REVENUE PASSENGER-MILES**

<table>
<thead>
<tr>
<th>Year</th>
<th>Miles</th>
<th>Year</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1916</td>
<td>Not available</td>
<td>1942</td>
<td>48,762,868,194</td>
</tr>
<tr>
<td>1922-25</td>
<td>24,014,818,000</td>
<td>1943</td>
<td>82,582,428,279</td>
</tr>
<tr>
<td>1926-30</td>
<td>25,045,346,000</td>
<td>1944</td>
<td>90,231,144,640</td>
</tr>
<tr>
<td>1931-35</td>
<td>13,525,431,409</td>
<td>1945</td>
<td>86,327,389,518</td>
</tr>
<tr>
<td>1936-40</td>
<td>18,258,157,021</td>
<td>1946</td>
<td>58,840,434,494</td>
</tr>
<tr>
<td>1946-50</td>
<td>38,098,544,360</td>
<td>1948</td>
<td>35,329,437,960</td>
</tr>
<tr>
<td>1939</td>
<td>18,644,824,749</td>
<td>1949</td>
<td>22,622,261,994</td>
</tr>
<tr>
<td>1940</td>
<td>19,775,102,854</td>
<td>1950</td>
<td>26,780,977,506</td>
</tr>
<tr>
<td>1941</td>
<td>25,272,074,901</td>
<td>1951</td>
<td>29,794,577,874</td>
</tr>
</tbody>
</table>


# Years prior to 1922 not available.
* 34, p. 36
** 34, p. 36
PRODUCT APPLICATION

I. Objectives

A locomotive manufacturer plans his product appeals to meet the operational and financial conditions of his prospective customer (railroad) coincident with the early stages of the railroad management’s planning relative to expansion: rejuvenation and/or replacement of the fleet. Joint conferences are held between designers, sales and sales promotion, and advertising where knowledge of the carrier, its management, train schedules, and operating conditions are discussed. A plan of action is formulated to guide the builder in his dealings with the client.

II. Commuter Service

Commutation passenger traffic, otherwise termed as suburban traffic, includes the riders who, on a national average basis, take a trip of 18 miles as compared to an average on the same basis of 128.4 miles per trip for all other passenger traffic.

Commutation passenger traffic of Class I railways in 1951 continued the decline that had been steady since 1947. Measured in passenger miles, the 1951 commutation volume was about 20% below the 1947 level.*

* Supra, p. 35
Passenger traffic of Class I railways in 1951, other than commutation, was slightly more than 11% greater than in 1950, measured in revenue passenger miles. It exceeded the 1949 volume, and though influenced upward by military movements, it did not reach the levels of either 1947 or 1948.*

Since World War II the nation's railroads have experienced a major transformation. Labor costs and increased demand upon the facilities of our common carriers, have forced the railroads to seek a prime mover with greater capacity, so that more ton-miles of freight, and more passenger-miles of commuter traffic could be handled with the same, or if possible, a smaller labor force.

Railroad modernization programs have taken place on all of the major railroads. Greater speed resulted in increased capacity. Faster commuter service became imperative to meet the inroads from competition posed by personal automobiles, buses and airplanes.

III. Engineering Details

In the late 20s or early 30s, manufacturers of stationary type Diesel engines began demonstrating Diesel electric locomotives on the nation's railways as a substitute for the steam locomotive. The earliest commercial

* Supra, p. 35
unit was the Burlington "Zephyr" which went into service in 1935. It had most of the characteristics of the electric locomotive, without some of its disadvantages. It carried its own power plant, a Diesel engine from which mechanical power was converted into tractive effort by electrical means. It had certain limitations compared to the electric locomotive in that while the electric equipment could withstand overloads for short intervals of time, the Diesel engine had a fixed maximum capacity which could not be overloaded. This type of locomotive could not supply, even temporarily, the large demands for power for rapid acceleration compared to the electric locomotive.

One of the first major installations, made in the United States, was on the Boston and Maine Railroad by the Electro-motive Division of General Motors. The "Flying Yankee" was installed in February, 1935, operating from Boston to Bangor, Maine. E. M. D. listed the following advantages which had been established through ten years of service. These advantages were in comparison with steam service which was replaced:

1. Faster scheduled operation.
2. Greatly decreased operating cost.

* 27, p. 6
5. Freedom from costly supporting services.
7. Uniform operation in all variations of weather.
8. Greater ease of service due to standardized parts.

The useful function of light passenger Diesel electric locomotives is commuter service. By this, reference is made to passenger train service covering a radius of approximately twenty-five miles from either the North or South Stations terminals in Boston. This service is unique in that frequent stops and starts are required throughout a single operating run. This type of service does not use a Diesel electric locomotive as economically as would be the case with a road-freight or road-passenger unit which could attain maximum operating speed, with maximum rated load, and run for fifty miles or more without stopping.

The commuter service class is a combination road and switcher, 1000-1200 horsepower Diesel engine. It can be adapted for either switcher service or commuter service. In the non-heating period of the year no changes are required. Then by simply igniting the "flash boiler", and maintaining a supply of water for steam, the locomotive is ready to heat passenger cars in winter service.
### TABLE III

**RAILWAY AGE**

Table of Advertising References

1. Volume 131, No. 7, August 13, 1951, p. 19
2. Volume 131, No. 10, September 3, 1951, p. 112
3. Volume 131, No. 14, October 1, 1951, p. 24

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*Railway Age*, Simmons-Boardman Publishing Corporation, Orange, Connecticut
IV. Buying Appeals

A basis of customer preference is established with the railroad's operating management and personnel by providing sales engineers who can explain buying appeals which lead to ease and economy of operation. Service policies of the builder while the units are in warranty, as well as the years that follow; operating economies over the equipment being replaced; design features; reciprocity policies and other patronage appeals; and all product appeals.

In the normal operation of Diesel electric locomotives certain of the major components reach a point, ranging from every year to twelve years of their life, in which they need to be completely torn down and rebuilt. This work is apart from regular repair and maintenance work on Diesel locomotives, which all carriers continue to do as they have on steam locomotives.

Baldwin-Lima-Hamilton advises use of genuine parts when replacements are made by the customer, either in his shop or on the line. The reason for this is that specialized design features improve performance and extend life. An example of these recommendations is a crankshaft which has been dynamically balanced to reduce vibration and give smoother power flow. Convenient
warehouses are provided to give quick deliveries. B-L-H Bulletin #302 is devoted to explanation of warranties, service policies, unit exchange plan, ordering instructions, repair and return and the B-L-H-Westinghouse Service Plan. Another example is the E. M. D.- Ten plus features in Electromotive's Life Long Service Program.** Fairbanks-Morse features the opposed-piston Diesel and explains its advantages.***

American Locomotive Company and General Electric Company have collaborated on operation and service manuals devoted to all classes of their units. Sections of these manuals are devoted to common problems of the operating man.

Transportation equipment is sold by engineers. Their functions include trouble-shooting, servicing the Account, and acting as manufacturer's consultants. They regularly call on the Account to promote good relations, and as they do this, they become completely familiar with the customer's problems.

One authority in Industrial Marketing has listed Patronage and Product Buying motives. Many of these are

* Refer to Table of Advertising References, No. 3, p. 40.
** Refer to Table of Advertising References, No. 2, p. 40.
*** Refer to Table of Advertising References, No. 1, p. 40.
applicable to equipment of this class.*

Examination of these patronage and product motives leads one to conclude that they might well form the basis around which the sales demonstrations, advertising, and the total sales approach could be built. Special emphasis, however, should be placed on accessibility of seller - his warehouses for supply of spare parts and his repair services; completeness of stock - of component parts to prevent lost time from revenue service; continuous supply under all conditions - have a supply of parts in warehouses should the manufacturing plant be tied up due to strikes; co-operation; easy replacement of parts; past services rendered - satisfactory relationship; quick repair service; reciprocal patronage; reliability of seller; reputation of seller; research and pioneering - carried on in the field by the seller; ability to increase the saleability of the user's product - which in this case is transportation service; dependability; ease of operation, ease of repair, economy - both in use of fuel and lubricating oil; productivity - absence of lost time due to repairs; quiet operation; replacement of complete units - to prevent depreciation and obsolescence of fleet; right quality - refers to quality

* 17, p. 50
control of original product and replacement parts over the life of the product; safety, simplicity, strength - placed where required to make the parts durable; uniformity - relates to customer's experience with manufacturer in past relationships.

Reciprocity plays a leading role in sale of this merchandise. For example, petroleum products hauled for a major refinery lead to the type of fuel oil that railroad purchased for its Diesels.* Another example is the revenue a railroad received from hauling automobiles, parts and accessories for a major builder who was also a manufacturer of Diesel-Electric locomotives. The road felt itself compelled to standardize on E. M. D. to strengthen customer relations.

Economy of operation is important. The Boston and Maine estimates that the operating costs of a Diesel are about one third those of a steam locomotive of equal capacity.

Final purchase decision covering the type of equipment, quantity, and the vendors will result from a conference of interested parties. Factors influencing the choice (a) in the operational category will be primarily the type of operating conditions, with lesser

* 45
weight given to financial factors; (b) in the non-operational category design and service of the manufacturer have first place. The customer is interested in continuity of a stable design. This allows for a minimum of employee training with each addition to the fleet, also for maximum interchangeability of parts. Fast services rendered by the vendor and his reputation for service will also be important.*

V. Product Planning

Competition in the sale of Diesel Electric equipment is keen. Numerous manufacturers are competing for a share of the market. It is necessary to continue a program of product planning, as well as market planning. Some elements of product planning are:

- Solicitation of suggestions from the field.
- Research and development.
- Check competitive trends.
- Engineering reports.
- Service reports.
- Changes in labor cost.
- Ways to save labor.

Capital goods are sold on the basis of economies to be affected by their purchase. A demonstrated savings of 10-15% over present methods of performing a task will motivate a railroad purchaser to change. Therefore, in product planning the manufacturer must constantly keep
the railroad and its objectives in mind in all product research.

An example of such product planning and its use as a basis for sales promotion was a program of E. M. D. in promotion of unit exchange of prime movers for their locomotives. General Motors recognizes the expense to a railroad of setting up and operating a repair shop. They capitalize on the disadvantage of this expense by emphasizing the economy of sending defective machinery back to the manufacturer. This program has been successful. Boston and Albany, division of New York Central, with a mixture of equipment of various makes, coming into their West Springfield shop, would benefit from the unit exchange plan. Boston and Maine are using the unit exchange, but they are in a period of transition; their service and number of units in use has expanded. They are exploring advantages of building and equipping their own shop. New York, New Haven and Hartford Railroad have large repair shops, both at Readville, and another in Connecticut. They have standardized Alco-G. E. traction equipment. Seniority of their men is a factor that continues to operate in their shop, and hampers changes if such changes mean curtailment of their work force.
VI. Labor Costs

All Class I railroads since World War II have been plagued by constantly rising labor costs. Reasons for increases came from inflationary forces; contract clauses requiring the upgrading to better jobs in cases of seniority; the need for training due to retirements, and new problems; and the need for graduate electrical engineers on their staffs.

The trend towards higher operating costs has been partly offset by Dieselization. Labor per passenger-mile has been saved, due to eliminating many functions required with coal burning steam locomotives. Examples are elimination of water towers; fire cleaning; round-houses to keep the locomotives from freezing in cold weather. A Diesel can be left out-of-doors with as little risk as with an automobile, as it can be similarly winterized.

VII. Continuing Income to the Manufacturer

Class I railroads spend heavily for maintenance each year. They spent a total of $1,945,021,768 for maintenance of equipment in 1951. This was an increase of $237,086,268 over 1950.* Figures in this table include maintenance to all rolling stock including passenger and freight cars as well as locomotives. Many of these

* Supra, p. 48
TABLE IV

MAINTENANCE OF EQUIPMENT-EXPENDITURES FOR CLASS 1 RAILWAYS*

<table>
<thead>
<tr>
<th>Year</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1916</td>
<td>$595,566,336</td>
</tr>
<tr>
<td>1921-25 Av.</td>
<td>1,297,801,696</td>
</tr>
<tr>
<td>1926-30 Av.</td>
<td>1,178,252,454</td>
</tr>
<tr>
<td>1931-35 Av.</td>
<td>670,879,176</td>
</tr>
<tr>
<td>1936-40 Av.</td>
<td>774,225,226</td>
</tr>
<tr>
<td>1941-45 Av.</td>
<td>1,475,776,302</td>
</tr>
<tr>
<td>1946-50 Av.</td>
<td>1,608,996,333</td>
</tr>
<tr>
<td>1939</td>
<td>765,935,141</td>
</tr>
<tr>
<td>1940</td>
<td>818,975,489</td>
</tr>
<tr>
<td>1941</td>
<td>992,612,936</td>
</tr>
<tr>
<td>1942</td>
<td>1,211,036,981</td>
</tr>
<tr>
<td>1943</td>
<td>1,440,340,831</td>
</tr>
<tr>
<td>1944</td>
<td>1,587,484,850</td>
</tr>
<tr>
<td>1945</td>
<td>2,147,405,914</td>
</tr>
<tr>
<td>1946</td>
<td>1,468,758,090</td>
</tr>
<tr>
<td>1947</td>
<td>1,558,010,454</td>
</tr>
<tr>
<td>1948</td>
<td>1,702,944,385</td>
</tr>
<tr>
<td>1949</td>
<td>1,607,333,234</td>
</tr>
<tr>
<td>1950</td>
<td>1,707,935,500</td>
</tr>
<tr>
<td>1951</td>
<td>1,945,021,768</td>
</tr>
</tbody>
</table>

* 34, p. 58
<table>
<thead>
<tr>
<th>Year</th>
<th>Equipment</th>
<th>Roadway and Structures</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921-25 Av.</td>
<td>$415,766,000</td>
<td>$317,912,000</td>
<td>$733,678,000</td>
</tr>
<tr>
<td>1926-30 Av.</td>
<td>$305,900,000</td>
<td>$505,027,000</td>
<td>$811,927,000</td>
</tr>
<tr>
<td>1931-35 Av.</td>
<td>$59,254,000</td>
<td>$147,559,000</td>
<td>$206,813,000</td>
</tr>
<tr>
<td>1936-40 Av.</td>
<td>$200,537,000</td>
<td>$144,843,000</td>
<td>$345,380,000</td>
</tr>
<tr>
<td>1941-45 Av.</td>
<td>$323,187,000</td>
<td>$207,872,000</td>
<td>$531,059,000</td>
</tr>
<tr>
<td>1946-50 Av.</td>
<td>$712,617,000</td>
<td>$303,017,000</td>
<td>$1,015,634,000</td>
</tr>
<tr>
<td>1939</td>
<td>$133,388,000</td>
<td>$128,641,000</td>
<td>$262,029,000</td>
</tr>
<tr>
<td>1940</td>
<td>$271,906,000</td>
<td>$157,241,000</td>
<td>$429,147,000</td>
</tr>
<tr>
<td>1941</td>
<td>$367,568,000</td>
<td>$175,453,000</td>
<td>$543,021,000</td>
</tr>
<tr>
<td>1942</td>
<td>$349,374,000</td>
<td>$185,523,000</td>
<td>$534,897,000</td>
</tr>
<tr>
<td>1943</td>
<td>$255,981,000</td>
<td>$198,301,000</td>
<td>$454,282,000</td>
</tr>
<tr>
<td>1944</td>
<td>$328,231,000</td>
<td>$231,881,000</td>
<td>$560,112,000</td>
</tr>
<tr>
<td>1945</td>
<td>$314,779,000</td>
<td>$248,201,000</td>
<td>$562,980,000</td>
</tr>
<tr>
<td>1946</td>
<td>$319,017,000</td>
<td>$242,940,000</td>
<td>$561,957,000</td>
</tr>
<tr>
<td>1947</td>
<td>$565,901,000</td>
<td>$298,788,000</td>
<td>$864,689,000</td>
</tr>
<tr>
<td>1948</td>
<td>$917,449,000</td>
<td>$356,035,000</td>
<td>$1,273,484,000</td>
</tr>
<tr>
<td>1949</td>
<td>$981,320,000</td>
<td>$330,880,000</td>
<td>$1,312,200,000</td>
</tr>
<tr>
<td>1950</td>
<td>$779,399,000</td>
<td>$286,443,000</td>
<td>$1,065,842,000</td>
</tr>
<tr>
<td>1951</td>
<td>$1,050,849,000</td>
<td>$363,122,000</td>
<td>$1,413,971,000</td>
</tr>
</tbody>
</table>

* 34, p. 16

expenditures were dictated by I. C. C. requirements to insure safety; others are to better maintain train schedules. Some examples would include high maintenance costs on remaining steam locomotives; rebuilding of Diesel engines; rehabilitation of electrical components; turning of car wheels; painting. It is interesting to note a comparison of the figures in this chart* with those in the chart covering capital expenditures.** In every year maintenance costs were higher than capital expenditures and in 1939 more than $5.00 was expended in repairs for every $1.00 spent for new equipment. This serves to emphasize the continuing revenue to the engine builder after the installation is made: he sells unit replacements, renewal parts, carbon brushes, electrical equipment, rewinds and engineering services. In poor business years such as 1939, when capital expenditures were at a minimum, the engine builder continued to keep his factories busy and continued his customer contacts through maintenance work.

Maintenance costs given above include sub-contracted labor, labor employed within the railroad’s force, and all types of material purchased, both as finished and semi-finished parts, and as raw material which fed the manufacturing line of the railroad plants.

*Supra, p. 43  
**Supra, p. 49
In 1951 for the fourth consecutive year, capital expenditures by Class 1 railways exceeded a billion dollars. The $1,413,971,000 spent by the railroads for additions and improvements in 1951 raised the total for the 31-year period, 1921-51 inclusive, to $19,636,423,000 and to $6,492,143,000 since the end of World War II.

VIII. Conclusions

Product application has been covered in its broader aspects as applied to the nation's Class 1 railroads. Where possible, it was localized to the manufacturers, type of product, and customers under discussion. The paragraph headings have general application, and with a multiplying factor are applicable to local conditions.
DISTRIBUTION POLICIES

I. Objectives

Every manufacturer of commuter type Diesel electric locomotives, covered by this paper, was found to use the direct selling form of distribution. This type of selling is accomplished both by direct factory representation and through local sales branches. This pattern is a carry-over from the era of steam locomotives. Size of order, services required by customer, complexities of selling, economies in use of sales force, and need for centralized responsibility for Account are some of the reasons for the pattern followed.

The United States is divided into regions with a sales manager in charge of each. Reporting to him are junior executives and sales engineers.

II. Manufacturers Studied
A. Electro-Motive Division of General Motors Corporation

The largest competitor in this field is General Motors Corporation. Their Electro-Motive Division took an early lead with the first installation in this country.* They were in a favorable position to do this since the power plant was an internal combustion engine, and General

* 35, p. 2751
Motors Corporation was a pioneer in this field. Their resources, customer contacts, factory know-how, diversity of products, size and location of plants, general interests and public acceptance have placed them in an enviable position.

An authority in economics who has made a study of the heavy industry production and marketing policies advises* that a firm securing a large proportion of all the business can influence the policies of its rivals. Its superior size may enable it to compel rivals to accept its lead or rivals may be willing to do so.

Leadership tends to replace pressure to reduce costs, by pressure to keep prices comfortably above cost. Pressure upon the less efficient to adopt the methods of the more efficient is reduced. Each is protected from the risk that rivals, finding better methods of production, will seek to benefit from them by cutting prices and improving their relative position in the industry.

The criteria of bad intention have moreover, been loose and conventional. It is agreed that the Act# was intended to maintain a competitive regime in industry, yet the Courts have also held that the mere size of a firm is no offense against the Act. It cannot be denied,

* 6, p. 141
# Sherman Anti-Trust Act
however, that the increasing size and diminishing number of firms are among the major immediate causes of the decline of competition.

The policy of the leader depends upon his estimates of the reactions of his rivals, and potential rivals, to each possible line of policy. There are limits of policy within which rivals are likely to be loyal and potential competitors discouraged. Among the potential competitors, however, must be numbered industrial purchasers who may produce their own materials if they believe the prices charged them are too high.

Sales promotion activities have clearly played a part in facilitating the utilization of large scale methods of production. They are one means by which a firm may increase the volume of its business. The resulting economies in production are frequently cited as one of the great benefits of sales promotion. It is clear, however, that sales promotion is not the only means of obtaining this end; price competition is a more effective means to the same end, but the approach to large scale production appears to involve a retreat from price competition. The outstanding characteristics of trade association policies have been their attempt to restrict price cutting.

Through their production and know-how, pressure
to reduce costs continues. They established the price pattern; the number of firms is diminishing with the most recent change being Westinghouse Electric Corporation policy of 1954 to withdraw from the Diesel Electric traction field, and the Fairbanks Morse concentration on their largest capacity unit, thus gradually taking them out of the commuter field. Advertisements from Railway Age show E. M. D. policy of discouraging their railroad customers from performing maintenance work in their shops, which logically should be performed by the manufacturer. Their leadership in sales promotion and advertising has resulted in large scale production with resulting benefits to the transportation industry.

B. **American Locomotive Company - General Electric Company**

The second largest competitor is American Locomotive Company. Direct selling is their policy; but in addition on May 5, 1950* it was reported that their units would be sold through General Electric Company's sales outlets in all leading railroad centers to increase United States distribution. Their electrical components are purchased from General Electric, and this change in the pattern of distribution was made to give better service to customers, as well as economies in use of sales force.

* 35, p. 2260
Cooperative sales coverage between Alco and General Electric simulated to the customer undivided responsibility which E. M. D. is able to present.

C. Baldwin-Lima-Hamilton Corporation

Next in importance is Baldwin-Lima-Hamilton Corporation who combined with Westinghouse Electric Corporation through an interlocking directorate. Their electrical components were purchased from Westinghouse until 1954, when this Company sold its financial interests in Baldwin-Lima-Hamilton and withdrew from the Diesel traction field. Until Westinghouse withdrawal, however, the pattern of undivided responsibility for service to units on a customer's lines was in a state of fluctuation; the original policy was for customers to purchase all electrical replacement parts through Baldwin-Lima-Hamilton. This lengthened the distribution channel with consequent delays and was later changed to permit customer placing orders on the manufacturer.

D. Fairbanks Morse Manufacturing Company

The smallest of the manufacturers investigated is Fairbanks, Morse and Company.** Their distribution patterns have followed those of Baldwin-Lima-Hamilton

* 35, p. 2482
** 35, p. 2372
Corporation. The differences being that they did not have an interlocking directorate with a major electrical manufacturer, because they are manufacturers of electrical equipment. They do not manufacture electric traction components however, and these were purchased from Westinghouse or General Electric Company. Their parts distribution policy also resembled Baldwin-Lima-Hamilton, and was changed at the same time to permit customer the privilege of direct purchase if he chose.

III. Direct Selling

Direct selling is the accepted method of distribution for equipment of this nature. Many services are required, as well as the frequent purchases of wearing or renewal parts; and past services rendered are important in negotiations, for additions to a fleet. Service brings the salesmen closer to the customer and gives him opportunity to exert pressure on new negotiations as well as know what developments are being planned.

Direct selling is reported to be the most expensive type of distribution; it is the most direct form; and is most effective in the sale of heavy capital goods which are purchased on specification.

* 24, p. 96
IV. Objectives of Personal Selling

Personal selling is the accepted approach. Rational buying requires an individual presentation. Equipment is purchased on specifications and the salesman can assist the customer in writing the specifications. He is looked upon as the Company. His aim is not only to convince, but to make sales.

Labor-turn is small in this industry, and the complete customer organization must be cultivated or contacted. Salesmen must be alert to additions or changes in personnel and always remember that the "Operator Today Will Be Executive Tomorrow".

V. Conclusions

Distribution has been covered to show why present practices persist. The aim has been to show the need for the closest working relationship between the customer on the one hand, and the manufacturer on the other.
PRICING AND TERMS OF SALE

I. Objectives

Pricing and terms of sale should be a boon to the commuter transportation industry. Manufacturers desire to make a profit through sale of initial installations and through repeat orders. Maximum production schedules make the best use of labor, and overhead; and the desire on the part of manufacturers is to take locomotive manufacturing out of the class which is associated with high peaks and deep valleys of production.

Railroads desire trouble-free performance, and maximum profit from sale of transportation services. The railroads can keep manufacturers busy if their fleets are kept modern. The difficulty in the past has been that obsolescence depreciated the fleets much faster than Interstate Commerce Commission accounting procedures would permit. A sad commentary on our railroad system is the fact that World War II demonstrated that our National Defense had been greatly weakened through overaged fleets of locomotives on most of the railroads. Steps were then taken for rapid modernization programs, but delays were inevitable through rationing of critical materials.

The purpose of this chapter is to demonstrate how price is established; to explain traditional methods
of purchases; financing; why these methods do not give maximum production schedules for manufacturers; and lastly, to explain a comparatively new method of finance, and demonstrate its possibilities for modernizing our transportation system.

II. Pressure of Inter-Industry Competition

The leader in this field is Electromotive division of General Motors. It has been shown how the leader establishes prices.* His size and resources enable him to excel in research; his engineering and factory know-how combined with his ability to purchase most efficiently, and to manufacture for the least, has issued a challenge to all competitors to reduce costs, to market more efficiently, or to specialize in narrow segments of the market if they wish to survive.

Final selling price consists of well known factors including material, labor, overhead and profit. Integrated industries like General Motors Corporation may obtain material more efficiently than competition; their labor costs are governed by union contracts, and all manufacturers fall under similar bargaining arrangements. Morale of workers contributes to productivity, and here is an area for the small manufacturer to outdistance the

* Supra, p. 53
larger competitor. Overhead consists of such factors as land, buildings, and machinery which increments may be large or small, depending upon efficient use of such overhead. Lastly, profit is that margin which is left after all of the foregoing plus marketing costs have been deducted.

The prime competitor has no monopoly on secrets for reducing marketing costs.

III. Repeat Sales Predominate

American Locomotive Company and Baldwin Locomotive Company were originally manufacturers of steam prime movers. They have been in business a great number of years and have earned a reputation for quality service through the original installations purchased by these railroads. These units have required component parts and services, which were regularly performed; and the personnel of manufacturers and railroads had friendly relationships. Likewise, Fairbanks Morse enjoyed a fine reputation for many supplies which they manufactured, an example being the "hand-car" used by section crews of all railroads.

These services merited repeat sales and, even with slightly higher prices for units which possessed equal functions, customers were willing to modernize from
the original manufacturer.

Examples of this practice were found on the Boston and Maine, the Boston and Albany Division of New York Central, and on the New York, New Haven and Hartford Railroad.

IV. Patented Designs

Fairbanks Morse has a patented design covering their Diesel engines different from other designs studied. It is called "Opposed-Piston" horsepower; and it enjoys such plus advantages as shorter length of locomotive per unit of horsepower, lower fuel consumption, and fewer wearing parts. These and other unique features have earned for this maker orders against competition, and in spite of lower prices. They claim that a higher original price is justified over the life of the unit through economies in operation. This is another method by which a small manufacturer can compete.

They have made special market studies to determine where the features of their design are most acceptable. That field being in the Rocky Mountain region where the demand is for the shortest possible wheel base, and for the greatest horsepower. They feel that this is their natural field of sales, and indications are that their advertising is directed toward this end.
V. Terms of Sale

Open terms of sale, or cash in thirty days, is common in this business. The railroads seldom are in position to take from working capital the large amounts required for purchase, so that some form of finance is used. Usually they make a down payment of twenty-five per cent to the manufacturer on placing of the order.

VI. Methods of Finance

The following paragraphs will be devoted to the oldest methods of finance. They are the Philadelphia Plan and the New York Plan. Both of these plans have shortcomings, which have worked to the disadvantage of railroads, attempting to regularize their policy of retirements and modernization. More recently a plan called the Equitable Plan has come into the foreground. It appears to overcome disadvantages of the better known methods and if generally accepted for locomotives, should be instrumental in fleet modernization.

A. Philadelphia Plan*

This plan has been used as a basis for reasonably long-term credit and is applied to rolling stock. The plan was evolved about 1868 and is a lease-agreement plan to be used anywhere in the United States. An

* 13, p. 137
equipment obligation on security is issued with rolling stock as collateral. The obligation of the railroad is direct. The issuing corporation or railroad, while not directly liable, has an obligation which is actual and ultimate.

The object is to prevent the creation of possible prior claims against the equipment which is purchased.

In order to escape the "after-acquired-clause," title to the property must not pass to the railroad, but at the same time the railroad must assume final responsibility. This is accomplished by selling the property to a third party, usually a Trust Company which issues certificates of interest in the property instead of direct obligations of the railroad.

These certificates are sold to the public and to make them more marketable, they are guaranteed by the railroad buying the equipment. The trustee then contracts with the railroad under a Lease Agreement. Three parties participate in the transaction: the vendor of the equipment; the trustee; and the vendee, which is the railroad.

When the negotiations between the equipment manufacturer and the railroad are complete as to the details of equipment, the manufacturer is instructed to

* 13, p. 136
sell the property to a properly designated trustee. 
In turn, the trustee leases the equipment to the railroad who, in consideration of the lease, promises to pay an initial deposit plus accrued rentals.

With title vested in the trustee, certificates of interest are issued and sold to the public. As a result, the holder of a certificate becomes a partial owner of a locomotive.

The proceeds from the sale of certificates plus initial deposits made by the railroad equal the purchase price of the equipment. The funds are used to pay the equipment manufacturer. This permits the manufacturer to drop out of the negotiations and only two parties remain: the railroad and the trustee, as agent for the certificate holders.

Annual rentals are sufficient to pay the interest on outstanding certificates (known as Equipment Trust Certificates) and to liquidate a part of the principle. Amortization of the principle is accomplished by making the certificates of serial maturity.

The following is a summary of the Philadelphia Plan:

1. The Philadelphia Lease Plan is valid in all states.

2. It was the first to be accepted.
3. Under it, the sale is made to the trustee and not to the railroad.

4. It is the most popular plan.

B. New York Plan*

This plan is also used as a basis of reasonably long-term credit and is applied to rolling stock of railroads. A security is issued with rolling stock as collateral, but under this plan the obligation is direct. It was the first plan used.

The vendor sells property directly to the railroad, on a conditional sales agreement. Title does not pass to the railroad, but remains with the vendor, or equipment manufacturer. Taxes and all risks are paid by the railroad. Title is then assigned to a trustee in consideration of the purchase price. This is a concurrent agreement between the manufacturer and a lending institution. Purchase price, in turn, is raised by the initial deposit of the railroad plus the sale of equipment obligations to the public. The builder assigns title to banks or insurance companies who combine to lend the money.

These equipment obligations are the direct liability of the railroad. In event of default the lender

* 13, p. 138
is entitled to repossess and may sue. They are equipment bonds, not equipment trust certificates as under the Philadelphia Plan.

To meet the purchase price of the equipment, the railroad advances its initial deposit in cash. The balance is in long-term promissory notes, that is, equipment bonds. These bonds have serial maturity and are secured by the equipment.

This plan is not legal in Pennsylvania, where the Philadelphia or Lease Plan must be used.

There are several shortcomings under the Philadelphia and New York Plans. Both plans depend upon market conditions for sale of equipment bonds or certificates. Railroad purchaser must get permission to purchase new equipment under Interstate Commerce Commission rulings, and the plans are not conducive to keeping fleets modern.

Railroad equipment depreciates in periods of depression as rapidly, due to obsolescence, as in periods of prosperity. Interstate Commerce Commission rules of depreciation do not consider technological advancements, only the traditional "straight-line" method of depreciation, and because locomotives are a capital purchase, which enters into the structure for rate-making purposes, it is necessary to obtain approval from the Interstate
Commerce Commission before purchases can be made.

C. The Equitable Plan*

Insurance Company investments are regulated by the laws of states and are administered by Commissioners appointed by these states.

Both a moral and a practical obligation, as well as a legal obligation, is placed on Insurance Companies to maintain high quality of invested funds. They must preserve liquidity in times of crisis so that when policy holders demand return of their reserves in the form of cash surrender or policy loans, the money will be available.

The Equitable Life Assurance Society announced, in 1947, its desire to invest its funds in railroad locomotives and freight cars. A rental plan had been agreed upon between Equitable, the Pullman-Standard Car Manufacturing Company, and certain railroads whereby Equitable would purchase equipment from the manufacturer and lease it under a "rental agreement" to the railroads.

Under this plan, two agreements are entered into by the Insurance Company: (1) Manufacturing Agreement. The manufacturer agrees to build and sell equipment to Equitable. A metal plate for identification purposes
is affixed to the equipment. Eighty per cent of purchase price is paid by Equitable to the manufacturer on delivery. The balance is divided over a five year period with interest. (2) Lease Agreement. Equitable enters into a lease agreement with the railroad who becomes the user of the equipment. The railroad pays equipment rentals of sufficient amount to amortize investment made by the insurance company over a fifteen year period, plus interest.

The railroad under terms of agreement must keep up its rental payments. Failure to do so allows Equitable the right to seize the equipment and lease it to another railroad. It is reported that in 1950 the Baltimore and Ohio Railroad purchased locomotives under this plan.

The advantages of this plan are that Interstate Commerce Commission permission need not be obtained to enter into rental agreements; amortization is accelerated through payments to Equitable so that the railroad takes possession while equipment still has substantial value; working capital is not tied up; the equipment earns payments out of savings made through modernization. This is a more economical method of financing than either the New York Plan or the Philadelphia Plan.

VII. Conclusions

Pricing and terms of sale have been demonstrated
in order to show factors which establish price. This
is not the only basis of choice; the plus features
which competition provides to justify a higher price
also feature in final decisions. Methods of finance
were covered in effort to show steps taken; shortcomings
of traditional methods; and to demonstrate a better way
not only to purchase equipment, but also to modernize
our transportation systems, and to provide orderly work
schedules for the manufacturers.
SALES PROGRAMS AND SALES PROMOTION

I. Objectives

Capital goods are not purchased as so many fixtures in a plant; rather on the basis of the services they will render to the purchaser - either by rendering the same services at lower cost or additional services at an overall cost conducive to the added investment in purchase of the equipment.

Manufacturers of locomotives attempt to solve a number of problems through their sales programs; present users must be assisted in obtaining greater usefulness from equipment in use; new buyers must be educated to what the manufacturer has to sell; prospective buyers must be known as to interests and requirements, so that effort may be intelligently applied.

Sales programs consist of individual selling; and sales promotion. Individual selling is the more expensive type. Its efficiency is regulated by the job to be done and the amount of manpower. The function of sales promotion is to assist individual salesmen to make their work easier and to make the prospect conscious of the manufacture; also to determine the purchaser's needs when the salesman is not present; to pave the way for the message the salesman will present; and to develop and
maintain sales outlets, as well as to make sales.

Sales programs, then, function to coordinate the work of individual salesmen with that of sales promotion for the most economical performance of a given task.

II. Determination of the Selling Program

The sales manager's function is to choose selling methods, or combinations of individual selling and sales promotion, which will be properly blended to maximize results with a given sales budget. Long-range viewpoint must govern his policies because he must not be inconsistent with good methods based on tradition of the industry, and of practices of competition.

There are many forms of advertising from which to choose; also, there are many functions which the individual sales engineer may perform. It is the purpose of this chapter to outline practices of the manufacturers studied.

III. Personal Selling

The oldest form of selling effort is that form of personal selling in which the goods were sold on a bulk basis. That is, the actual goods offered for sale were delivered immediately from the stock displayed to
the buyer. Historically, personal solicitation or personal selling has been the prime form of selling effort; and continues to be the most important part of the selling programs of these manufacturers.

Sales managers are undecided as to proper relationship between personal selling and advertising. A manager has no way of knowing the results of his particular combination when the annual program is formulated. He relies on his experience of previous years, having similar problems as a guide. He cannot know in advance what competition will do. Therefore, as the year progresses a reappraisal, of results and future plans, is made in order to decide where emphasis is to be placed.

Personal selling effort is exerted, not only by those in positions of salesmen, but also by other members of the business enterprise, particularly by those men in executive positions. In addition to the regular types of salesmen, special types are intrusted with such specialized duties as making field surveys; acting as field service engineers; and missionary salesmen. A salesman who makes field surveys acts in the capacity of consultant to the management of the railroad. His duty is to recommend to the loaded salesman proper types of equipment. If the problem is too involved for the line

* 24, p. 311
salesman, he has discretion to call in the consultant to make recommendations. Field service engineers live with the mechanical department of the railroad. If a locomotive is not performing in satisfactory manner, improvements to existing equipment may be available; it is the duty of the field service to satisfy the customer. Missionary salesmen have no particular negotiations to discuss with the customer, but may make regular calls to discuss any problems the customer may have, and while on the customer's premises will be prospecting for creative selling opportunities. He can educate the customer on increased uses of product to render it more efficient.

New business comes from two sources: replacements to the old fleet due to retirements, and additions to existing fleet. Demand for locomotives is a derived demand for transportation. Hence, a locomotive salesman must know the limitations of his equipment and requirements for a particular job in order to promote additional uses and thereby to keep the fleet occupied at maximum efficiency.

A Diesel electric locomotive is a production tool. It is a functional part of a train; it pulls the train and in that position it renders a service. The service rendered by the locomotive is a saleable product
of the railroad, and upon the net return from the capital initially invested plus the maintenance, upkeep, operating supplies, and labor required to render this service, decision is made regarding the type of locomotive. Secondly, having decided that purchase is to be made of a Diesel electric locomotive, attention must be given to the rating or class. This decision is influenced by the length of train; the schedule, which is governed by such factors as acceleration, speed, grades and other technical items applied to the track terrain or density of stations. Answers to these and other questions must be coordinated by means of a survey. Having agreed on the class rating to be purchased, the manufacture or manufacturers are invited to submit quotations and preliminary specifications. The field is further narrowed until such factors as comparative specifications, prices, and reputations of vendors are balanced, and final decision is made on the vendor from whom the purchase will be made. Reciprocity plays a big part in final purchase.*

The sales engineer acts as consultant to his customer. It is his duty to present the technical features of his product. His analysis must be specific and impersonal.

* Supra, p. 44
The sale of capital goods which are purchased for the purpose of rendering a service as their end product, requires selling techniques peculiar to that type of product. A purchase by an individual user is seldom made. Decision from whom to purchase depends on the history of that customer's previous experience with the vendor.

The sales engineer is looked upon as a consultant who is marketing his services. The challenge to the engineer is always to increase his prestige, both with his associates and with his customers. His best tools are knowledge of the product, knowledge of the customers and their requirements, and prestige of his employer in the field. He should be a member of Engineering societies, common to his customers, and take a leading role in their activities. He should also broaden his influence through contributions to magazines and delivery of papers before engineering and trade organizations.

IV. Sales Promotion

Diesel locomotive manufacturers combine personal with printed salesmanship to more efficiently bring about the sale of their products. Advertising of this equipment can never be a substitute for salesmanship, due to the complexities of presentations and final closing of the
order. Certain portions of the selling process may be accomplished more cheaply and effectively by this means however. To list: it is a starting point for sales discussions; it develops good will for the manufacturer; through services rendered by periodical publishers in supplying names of readers, it reduces marketing costs in aiding the manufacturer in compiling good mailing lists; by constantly placing a manufacturer’s name and trade mark before the reading public, it enables prospects to recognize the product and increases their interest in the product; in-so-far as sales are increased by advertising as an aid to salesmanship, advertising aids in developing economy of distribution of locomotives.

Choice of media is between periodicals and direct mail. Both methods are used. This being a market in which most effective promotion may be obtained through vertical publications; the Railway Age and other publications of Simmons-Boardman Publishing Corporation find wide acceptance. Direct mail is in the form of letters, circulars, tear sheets from periodical releases, and bulletins.

V. Advertising Aims

When the industrial salesman coordinates his sales presentation with his firm's advertising releases,
he is more effective and his sales morale is improved. Part of his work has been done for him, and his confidence is increased in the knowledge that what he is saying has already been given through the advertisements. Other aims of industrial advertising are: prestige, the salesman and company are identified with the user and with his products; contact is maintained between purchases with those who are conveniently contacted by the salesman, as well as with those buyers who may also be important, but who are out of range geographically for the salesman’s calls; prejudice is overcome on the part of those who are continually being exposed to the manufacturer’s trademark and to his messages; interest is aroused with those who read the releases and latent problems are brought into the foreground of discussion.

VI. Advantages of Advertising in Business and Trade Papers

The company benefits by advertising media which comes to the professional audience he wishes to reach. Trade papers come into offices, and serve as buying directories. They arrive where the problems are being discussed at a time when the buyer is open to suggestions. To be most effective, however, the advertisement should be in some way coordinated with the editorial policy of the paper. That is, if the paper stresses finance and
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List of Publications by
Simmons-Boardman Publishing Corporation
Orange, Connecticut

**Railway Age**
- Railway Mechanical and Electrical Engineer
- Railway Engineering and Maintenance
- Railway Signaling and Communication
- Railway Engineering and Maintenance Cyclopedia
- Locomotive Cyclopedia
economics, then the advertisements should be similarly directed; if the magazine is of the how-to-do-it type, which is aimed at mechanical or electrical operating audiences, then the advertiser's message should be of the same instructive emphasis. These trade papers cover a huge market; professional audiences welcome technical language; the appeal is intimate; coverage in proportion to the audience reached is economical; these trade papers are held in high esteem and it is a common sight to find stacks of back numbers piled in a corner of the office of a busy executive.

VII. Simmons-Boardman Publishing Corporation

The accepted business and trade papers of the railroad industry are published by Simmons-Boardman Publishing Corporation. They distribute a great many magazines,* some of which do not have specific application to buyers of Diesel locomotives. The most pertinent to these people are: Railway Age, which finds greatest acceptance with administrative and managerial functions; and Railway Mechanical and Electrical Engineer, which is directed to the technical or professional segments of the railroad's personnel.

Inspection of copy by manufacturers studied

* Supra, p. 79
shows certain points that all of them have in common: the product is illustrated; in many instances the products' uses are also illustrated; benefits or results from use of product are covered, which creates an atmosphere of acceptance with the reader. Color advertising is more common than black-and-white copy. This serves to arrest attention of the reader and to beautify the layout.

VIII. Institutional or Service Advertising

The marketing profession holds divergent opinions concerning the value of institutional or service advertising as an instrument to gain patronage for a manufacturer. Reason for this divergence comes from a lack of real facts concerning effectiveness of such advertising to motivate the buyer, to do something about what he reads. This type of advertising is engaged in telling what the advertiser sells; how to get the most out of the advertiser's products; or the extent of research and development along a particular line that has been carried by the manufacturer. Such advertising is "blunt-edged" in that it promotes abstract ideas in place of tangible things; it usually addresses a more heterogeneous audience than business or trade papers; it has yet to establish widely accepted generalizations concerning techniques of persuasion;
and the results of institutional advertising are considerably more difficult to evaluate."

Advertising of this type is engaged in by all locomotive manufacturers. It usually devotes a part of the space to some how-to-do-it item with the balance given over to general subjects. Perhaps this type of advertising is used because all competitors are engaged in it; and no one wants to be the first to discontinue the practice even if he believes that the investment is unwarranted.

IX. Direct Mail

Manufacturers feel that they obtain the most satisfactory results from their direct mail advertising. They can use it when and where it serves a need and does the most good. Each mailing piece carries its own reader interest, or may be presented to arouse reader interest. Manufacturer arranges a schedule for its mailing department to follow so that mailings will be continuous; with correct timing; and arranged so as to obtain economy of the reader's time and space given to each mailing. Included in the class of direct mail are personal letters, catalog data, small folders, booklets, handbills, and postcards.

* 33, p. 82
X. Conclusions

Sales managements have responsibility for proper blending of individual sales with sales promotion. On a long-range basis and on a "task" basis, this blending must conserve the sales budget to obtain the greatest return per dollar invested. Instruments in use have been discussed in this chapter.
SUMMARY

The problem of marketing Diesel-electric locomotives to railroads for use in commuter service has been localized to three railroads which terminate in Boston; and to four manufacturers who represent equipment used on these roads and applied to uses studied. By questionnaires put to these manufacturers and railroad representatives, the aim has been to analyze techniques of sale and buying practices, and to arrive at conclusions which can be generalized for any railroad having commuter problems such as face this area.

Samples of questionnaires are submitted. Persons interviewed were most cooperative in supplying data to be used in this study.

Commuter service is the least profitable of services supplied by these railroads. There is no single cause of its unprofitableness, but since it has become a "social problem"* it is recommended that special study be made with a view to coordination of services supplied by the Boston and Maine, New York Central, and New York, New Haven and Hartford Railroads, together with that supplied by the Metropolitan Transit Authority. It is felt

*30, p. 1
that policies of Interstate Commerce Commission, and of Local, and State Governments are working at cross purposes to put this service on a self-supporting basis.

Light passenger locomotives were studied to learn how they are applied to a specialized market. Engineering details of equipment, past services of a manufacturer, and interchangeability of parts are a few of the details which lead to product acceptance on a repeat sales basis.

Rising labor costs; and depreciated steam locomotives promoted rapid conversions on the Boston and Albany, as well as the New York, New Haven and Hartford Railroad. Whereas changeover programs were delayed on the Boston and Maine, due to problems of dead-end lines, combined with periods of inactivity or non-revenue service. Competition from automobiles which provide commuter service from this area, and for those who work in Boston, has been given consideration.

Financial problems are due to railroads being regulated by Interstate Commerce Commission in what they can charge for their services. These problems have acted as deterrents to modernization. It was shown that raising rates does not bring more revenue;* rather the increases

* Supra, p. 18
lead to substitute forms of transportation, and further aggravate traffic congestion on city streets.

Under existing forms of equipment finance, modernization is regulated by Interstate Commerce Commission rules of retirement; and the market for equipment bonds. A plan of finance was outlined by the Equitable Assurance Society which would allow railroads to keep equipment in a modernized condition; to pay for its use out of earnings; and remove the necessity for obtaining permission from Interstate Commerce Commission when the units are to be added, or to increase capitalization.

Repeat sales predominate for the suppliers of this equipment. They make large initial installations, which require many services to insure continued operation, and satisfactory performance of an installation leads to the sale of related products produced by this company.

Programs of selling were analyzed to show relationship between personal salesmanship, sales promotion, periodical advertising, direct mail, and institutional publications. It was shown that sales management has responsibility for properly blending the various sales tools to accomplish a given objective in the most efficient manner, and at a cost to be governed by the sales budget.

The railroad industry as a market was analyzed
to determine advertising media which finds widest acceptance. Magazines of Simmons-Boardman Publishing Corporation are favorably received. This publisher is held in wide esteem by key personnel; and is relied upon by suppliers to advertise their products. This publisher regularly, and efficiently, conducts readership surveys; acts as marketing consultant to advertisers; and as a forum for resolution of problems of operation and management for their railroad readership.
QUESTIONNAIRE DIRECTED TO RAILROAD PERSONNEL

1. What is your opinion of Commuter Service?
   a. Is it growing more profitable?
   b. Is it growing less profitable?
   c. Does it promote public relations?
   d. Are community trends encouraging?
      1. Extended service
      2. As solution to parking problems

2. What are the uses of equipment in commuter class?
   a. Commuter service
   b. Local freight service
   c. Road passenger
   d. Road freight

3. Are the demands for commuter equipment increasing?

4. What factors influence buying choice?
   a. Operational
      1. Operating conditions
      2. Financial factors
      3. Time elements
   b. Non-operational
      1. Design and service
      2. Reliability of seller
      3. Training of operators

5. Have you reached the replacement stage?
   a. Considerations
      1. Obsolescence
      2. Mileage
      3. Age

6. Map of commuter area

7. Are there trade shows for this equipment?

8. What plan of financing is used in purchase of equipment?
   a. Equipment Trust Certificates
   b. Equitable Assurance Company Plan

10. Discussion of unit-exchange plan.
QUESTIONNAIRE DIRECTED TO MANUFACTURERS' PERSONNEL

1. What written material have you which I can use to introduce the subject of "Light Duty Passenger Locomotives"?
   a. What is the importance of this type of business to the locomotive manufacturer as a percentage of his overall business?
   b. Value of these locomotives per unit in dollars?
   c. Continuing revenue to the engine builder after the installation is made?
      Through replacements, renewal parts, engineering service?
   d. Who is encouraging the growth of railroad commuter travel?
      The railroads themselves?
      City fathers to reduce traffic congestion?
      The commuting public to save time?
   e. Ways in which the railroad benefits through the development of this type of business?
      Better public relations?
      Leading to more freight business?
   f. Other?

2. Market Trends
   a. What has been the trend of Class I railroads towards Dieselization over the last ten year period?
   b. Exhibit of chart or graph to show this trend?

3. Indices of Market Demand
   a. In a market survey which precedes the sale or negotiation of light duty or commuter service type locomotives? What indices of demand are significant?
      Long trend type?
      Short trend type?
b. How are purchases made?
   On basis of mileage depreciation?
   On basis of age depreciation?
   To replace steam?
   To reactivate partially abandoned services?
   To improve existing passenger service?

c. What significant business trends information do you see?

d. How do you interpret this information in relation to the future sales of commuter service type locomotives?

e. What marketing studies do you make?

4. Channels of Distribution?
   Direct sale to the railroad user?
   Through manufacturer's agent or other intermediary?

5. Characteristics of the Market?

   a. Buying influences concentrated or scattered?
      How to find the real buyers?

   b. Are buyers price conscious?

   c. Are buyers service conscious?

   d. Is sealed bidding common?
      Other types of bidding?

   e. What do these buyers expect and demand from the manufacturer's salesman?

   f. What are the functions of the manufacturer's salesman?
      1. Service representatives?
      2. Represents the manufacturer at Trade Shows?
      3. Making surveys?
      4. Other?

   g. What is the size of the commuter type locomotive market?
      Average life of a locomotive?

   h. How active is competition?

   i. Who are the competitors?
6. What is the organization of the equipment purchasing function?
   a. Who determines the need?
   b. Who requests the manufacturer to make the survey?
   c. Who writes the specifications?
   d. Who decides on the bidders?
   e. Basis of purchase decision?
      1. Price?
      2. Adherence to specifications?
      3. Reciprocity?
      4. Past performance?
      5. Service facilities?
      6. Influence of brand name?
      7. Other?
      8. Operational?
         a. Types of operating conditions?
         b. Finance factors?
         c. Time element?
   9. Non-Operational?
      a. Service?
      b. Reliability of Seller?
      c. Training of Operators?

7. Terms of Sale and Financing
   a. What are the terms of sale governing this type of equipment?
   b. How is equipment financed?
      1. Philadelphia Plan?
      2. New York Plan?
      3. Insurance Company Plan?
      4. Exhibit of plan used?

8. Manufacturer's Service Policy
   a. What is the importance of service in the sale of this type of equipment?
      1. How important is the past service record of the manufacturer in determining the purchase of the equipment?
         a. Determining factor
         b. Important factor
b. What types of services does the user require?
   1. From the locomotive builder as prime contractor?
   2. From the manufacturer of the electrical equipment?

c. What service facilities do you provide for?
   1. Boston and Maine Railroad?
   2. New York, New Haven and Hartford Railroad?
   3. Boston and Albany Division of New York Central Railroad?

d. Exhibits of Maps or Charts showing service shops.
   Do you capitalize on these facilities in connection with sales promotion with further elaboration on what these shops are equipped to do?

e. What service literature do you supply to the customer user?
   1. Instruction books?
   2. Renewal parts information?
   3. Other?

9. Advertising and Sales Promotion

a. Advertising and Sales Promotion Program

   1. Exhibit of 1952 Schedule of Advertising
      a. a. Institutional
         Magazines, Circulation, Space, Number of Insertions, Measure of Effectiveness
         b. Trade Campaign
         Magazines, Circulation, Space, Number of Insertions, Measure of Effectiveness

   2. What is the problem which your advertising policy aims to solve?
   3. Do you object to the use of the manufacturer's name in connection with this exhibit?
   4. List of primary buying appeals and frequency of emphasis on each as used in 1952 campaign
   5. Exhibit from magazine publisher's report showing who in the specific railroad's management read the particular magazines in which advertising was placed
b. Schools for Education of Operators
   1. How operated?
      a. At customer's expense?
      b. At manufacturer's expense?
      c. Divided costs?
   2. Frequency of operating these schools
   3. Exhibit of subjects covered
   4. What is the trend regarding these schools?
      More or less frequent?

c. Salesman's Kit - What the salesman takes onto the job
   1. Sales Manual
      Description of its make-up
   2. Visual Presentation
      a. To whom are they made?
      b. Frequency?
      c. Type?
      d. Measure of Results?
   3. Trade Shows
      a. Where?
      b. What is exhibited?
      c. Frequency of these shows?

d. How do you regard service as a tool of sales promotion?

10. Lost Business
    a. Any tabulation of why sales are lost?
    b. What use is made of lost business reports?

11. Product Planning
    a. What are the elements which go into product planning?
       1. Engineering efficiencies?
       2. Overall appearance?
       3. Simplicity of service and repair?
       4. Any written information on this subject?
BIBLIOGRAPHY

I. BOOKS


8. Eaton, E. P., Marketing of Heavy Power Equipment in the Boston Area, Boston, Boston University, College of Business Administration, 1948.


II. BOOKLETS AND PAMPHLETS


III. NEWSPAPERS AND PERIODICALS


IV. PUBLICATIONS OF GOVERNMENT AGENCIES, ASSOCIATIONS, ETC.


V. PERSONAL SOURCES OF INFORMATION

Persons Interviewed

40. Assistant General Passenger Agent, Boston and Albany Railroad, Boston, Mass.

41. Assistant to General Mechanical Superintendent, New York, New Haven and Hartford Railroad, Boston, Mass.

42. Division Engineer, Boston and Albany Railroad, Boston, Mass.


44. General Passenger Agent, Boston and Albany Railroad, Boston, Mass.

45. Mechanical Superintendent, Boston and Maine Railroad, Boston, Mass.

46. Operating Superintendent, Boston and Maine Railroad, Boston, Mass.

47. Passenger Traffic Manager, Boston and Maine Railroad, Boston, Mass.

48. Service Engineer, Electro-Motive Division of General Motors Corporation, Boston, Mass.

49. Transportation Sales Manager, General Electric Company, Boston, Mass.

50. Transportation Sales Engineer, Fairbanks, Morse and Company, New York.

51. Transportation Sales Manager, Fairbanks, Morse and Company, New York.

52. Transportation Sales Manager, Westinghouse Electric Corporation, Boston, Mass.