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Cost Finding for Railroads

BY HAROLD D. KOONTZ

AFTER three decades of controversy over the merits of some kind of plan for systematic cost finding for railroads, the problem still remains unsolved. In the same period rapid progress has been made in industrial accounting, so that it is a rare plant indeed that does not incorporate in its accounting system some plan for routine computation of unit costs. In many cases, to be sure, industrial cost accounting does not go beyond calculation of manufacturing expense, i.e., cost of the actual fabrication of the product, before selling and administrative expense. Nevertheless, many industrial cost accounting systems do attempt to show a cost per unit of product which covers all costs, and hence is a better guide for mapping sales policies.

Attempts to introduce some kind of cost accounting in the railroad industry have in general met with failure. Some allocation of expenses between services has been made. Some statistical measures have been devised to guide railroad management in efficient expenditure for fuel, repairs and other special items. Many cost studies have been worked out to be used as evidence in rate and rate-division cases. Moreover, in some railroad shops standard costs have been used to advantage. But for railroad service as a conglomerate of commodity hauls for varying distances and weights, suggested plans for routine cost finding have not been well received.

In 1929 the Interstate Commerce Commission published a proposed report on general revision of accounting rules for railroads.¹ Much of the report was devoted to cost accounting for railways. Two plans for cost accounting had been submitted by representatives of a shippers organization and a state railroad commission. Both plans were subjected to searching criticism by the railroads, and the whole idea of cost accounting was deemed by railroad accounting officers to be "impractical," "valueless," and "inapplicable to railroad conditions." Because important defects were found in both plans, the proposed report, prepared by Commissioner J. B. Eastman, concluded that "it is suffi-

¹ Proposed Report in ex parte 91, *General Revision of Accounting Rules for Steam Railroads* (August 19, 1929).

ciently clear that neither . . . plan is in shape for final adoption by the commission." Without going into the plans in detail or into Mr. Eastman's report on the plans, one may say that the report did find cost finding to be worth additional study by shippers, railway accountants and the commission. The ensuing business depression and the cost-finding study undertaken by Mr. Eastman when Federal coördinator of transportation,² as well as the apathy of railroad accountants, halted the research.

Railroading is admittedly a complicated business and railroad accounting, even as now organized, is extremely intricate. The tremendous expenses occasioned by railroad-accounting work must have impelled many railroad accounting officers to ask themselves whether all this was producing the most useful results. One such officer remarked to this writer that, with all the expense his railroad incurred for accounting, whenever costs of transportation service were desired, special research, in which the accounts were none too useful, had to be undertaken.

Many railroad executives would say that no need exists for cost finding in rate making. Their attitude is that experience and judgment are the requisites for determining a freight rate, especially since value of service and other nonstatistical factors are of utmost importance in fixing rates for particular commodities and hauls. Other executives would admit that out-of-pocket costs are needed as a guide for setting the lowest level of rates, but would maintain that fixing rates higher than this direct cost is determined by value of service and other special factors. Where out-of-pocket costs must be found, they hold that special cost studies give the only reasonable results.

Nevertheless, routine costs can be useful for rate making in several ways. Cost is admittedly not the only factor to consider, but costs in which some confidence can be placed would be exceedingly helpful in determining the reasonableness of absolute rates on the host of commodities hauled by the railroads. Cost finding, uniformly applied, but taking into account special con-

² Mr. Eastman was appointed Federal coördinator of transportation in 1933, under the emergency transportation act. He was charged mainly with the task of suggesting means for bringing about economy through coördination of transport services. With expiration of the temporary portion of the act in 1936, Mr. Eastman returned to the Interstate Commerce Commission.

ditions, would also aid the commission in making a fair division of through rates between railroads. In cases involving discrimination, especially under the long-and-short-haul clause, some cost data seem almost essential. Moreover, as regulatory policy is further developed to give railroads the "break" they have asked for in regulating competitive transport rates, the determination of whether or not a rate is "fair" to competing carriers would surely require a knowledge of costs.

Reorganization of railroads under section 77 of the national bankruptcy act also demands determination of costs. If allocation of reduced liabilities and equities is to be made on productive value of sections of a railroad system, apportionment of costs, as well as revenues, is necessary. Even for financially successful railroad concerns, a knowledge of costs may cast much light upon profitability of branch lines and certain services, and upon wise terms for readjustment or renewal of leases and guaranteed mortgages.

While a different kind of cost finding from that in which the Commission or the former coördinator of transportation has been particularly interested, budgetary cost analysis for expense control is certainly needed by any business as large and complex as that of the railroads. Through statistical analyses much is already being done by some railroads. But whether this field, so well developed in other industries, is well enough organized to meet the need for it in railroading is open to question.

Cost finding has returned to plague the railroad accountants as the result of the special report of the Federal coördinator of transportation on *Cost Finding in Railway Freight Service*, published in June, 1936. Made pursuant to instructions in section 13 of the emergency transportation act of 1933, the report is based upon study by accounting and cost experts of the Commission, railroads and other organizations. No action has been taken either by the railroads or the Commission on this report or on cost accounting in general, but so long as Mr. Eastman is a member of the Commission, the subject is not likely to lapse. For years Mr. Eastman has been recommending study of this subject to railway accounting officers, and his return from the coördinator's office to the Commission will probably serve to keep the subject alive.

Cost Finding Plan of the Former Coördinator of Transportation

The cost-finding plan advanced by the former coördinator of transportation is designed to find "over-all cost of railway freight services, stated in units corresponding to the rates which are charged for such service." Hence, the purpose of the plan is to provide cost analysis for rate-making purposes, from the viewpoint both of absolute rates on commodity groupings to shippers and relative rates as between competitive transportation services.

Over-all costs are selected rather than unit costs³ (ordinarily embraced in industrial cost accounting) for several reasons. In the first place, the accounting experts believed that "obviously, *average* costs are the *only* costs that properly should be used for price fixing." Moreover, the Commission is concerned primarily with costs as a guide for regulatory policy. Second, railroads have fairly adequate unit costs which can be used for expense control. The report held that, while exactness is imperative in unit-cost determination, averages of over-all cost, corrected for special conditions, would be much more useful in rate making.

The plan itself is resolved into several steps: (1) routine submission of certain cost data by the carrier as a supplement to annual reports now made to the Commission; (2) conversion of these data by parties so desiring into base costs with units comparable to freight rates; (3) modification of these base costs to conform to a particular rate; (4) adjustment of modified base costs to equalize maintenance as between years and to add and equalize return on investment. The report emphasizes that work of carriers need extend no further than the furnishing of basic data, computations of costs from these data to be made by the bureau of statistics of the Commission or other parties needing the costs. The report also holds that no change in accounting

³ The report distinguishes between these two types of cost as follows: Unit costs "represent expense immediately associated with and easily identified as applicable to a given item of expense, function, or service, that is less than the ultimate product or service in connection with which the expense is occasioned." Over-all costs "represent the *total* expense of producing a product or performing a service. . . . They cover a variety of conditions, apply over a period of time and involve some part of numerous items of expense much of which must be apportioned on a more or less arbitrary basis. They necessarily represent averages and cannot be determined with the same exactness as unit costs."

records is needed and relatively few additional statistics need to be gathered for the supplementary cost report.

The cost data to be furnished by the carriers are to be broken down by existing accounting divisions of each railroad, since it was felt that these adequately reflect geographical and other traffic conditions which bear upon separation of expense. The following list of schedules gives an indication of cost data which would be required from the carriers under the plan.⁴

EXPENSE SCHEDULES FOR RAILWAY FREIGHT COST FINDING

Separation of All System Expenses

- A-1 Operating expenses, taxes, equipment and joint-facility rents between services.
- A-2 Selected items of system freight-equipment expenses between types of equipment.
- A-3 Freight expense between accounting divisions.

Separation of Accounting Division Expenses

- B-1 Freight-car-maintenance expense between road, yard and other.
- B-2 Freight expense between road, yard, water transfer, station, special services and general overhead.

Separation of Road, Yard, Water Transfer and Station Expenses

- C-1 Road expense between through and way trains.
- C-2 Way-train-switching expense between terminal and line.
- C-3 Yard expense between terminal and line.
- C-4 Water-transfer expense between car floats and lighters.
- C-5 Station expense between terminal and line.

Separation of Terminal and Line Expenses

- D-1 Terminal expense between types of cars.
- D-2 Through and way train line expense between types of cars.
- D-3 Line expense (other than train) between types of cars.

Separation of Special Service Expenses

- E-1 Special service expense between kind of service and commodity.

While these schedules provide for computation of a mass of cost data, all schedules, except schedule A-1, which is already

⁴Source: Coördinator of Transportation, *Cost Finding in Railway Freight Service*, appendix, exhibit III.

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included in carriers' annual reports to the Commission, are based upon A-1, after application of various statistical factors. These apportionment factors, the keys to the whole plan, are to be prepared by the Commission from statistics gathered for the purpose. The statistical data used as apportionment factors and their source are shown below:⁵

STATISTICAL DATA USED FOR APPORTIONMENT FACTORS

<i>Schedule</i>	<i>Description</i>	<i>Source</i>
X-1	Annual summary of cars loaded, unloaded and interchanged.	Car distributors and interchange records
X-2	Analysis of freight train statistics by types of cars.	Car records and tests
X-3	Study of switch engine time and switching car miles.	Tests
X-4	Distribution of switching locomotive hours and switching car miles for year.	Schedule X-3
X-5	Study of water transfer vessel hours, vessel miles and car days.	Tests
X-6	Annual summary of equated car miles and active car days.	Schedules X-2, X-4 and X-5

From these data eighteen factors would be computed. Although these factors are too numerous and their use too extensive to be shown in full here, a few examples may indicate their application. From schedule X-1 would be calculated the ratio of loaded and empty cars interchanged between carriers (separated between box, refrigerator, stock, open top, tank and flat cars), which would be used for separating interchange expenses between kinds of cars and carriers. With freight-train hours divided between through trains and way trains (data from schedule X-2), road expenses, such as dispatching, interlockers and drawbridges, would be similarly divided.⁶

For a very few accounts the report suggests that subdivision be made for the purpose of cost finding. But in the absence of these subdivided accounts, formulas are given for separation, or

⁵ Coördinator of Transportation, *Cost Finding in Railway Freight Service*, appendix, exhibit III.

⁶ For further analysis of these factors and their use, see *Cost Finding in Railway Freight Service*, supra, appendix.

separation may be made by special analysis. Thus, "station and office buildings" account is to be separated by subdividing the account or by allocating the expense between station buildings and office buildings on the basis of space occupied.

Given the data provided in the schedules above, the commission would be able to summarize it for a determination of base costs in terms of base cost per car for any individual commodity for various distances over particular hauls. From base cost per car would be obtained base cost per net ton and per hundred pounds for carload and less-than-carload service.

As the report indicates, base costs would reflect average cost for a particular commodity in the type of car ordinarily used for its haul, over the prescribed route, taking into account the following: (1) bulk of the commodity relative to its weight; (2) average tare weight of car used; (3) average empty movement of car used; (4) length of haul as divided between through and way trains; (5) average cost per loaded car-mile for all traffic, for intermediate interchanges, yardings and water transfer, and average of origin and destination terminal handlings.

Certain special services, such as lighterage, refrigeration, weighing car, storage and racking flat cars, would not be accounted for in the base cost. Therefore, when a particular rate was considered, the base cost would have to be modified by the cost of these services. Likewise, modification for unusual operating, loading and unloading, or geographical and traffic conditions would have to be made. The extent to which and grounds upon which these modifications might be made seem open to question. But the writers of the coordinator's report feel that this difficulty would fairly easily be surmounted, especially after experience with the plan.

Final adjustment of modified base costs would involve equalization of maintenance and return on investment. In neither case is it expected that changes would be made in carriers' records. Maintenance expense differs over years according to financial and operating requirements and because of differing equipment, as well as geographical conditions, rather than according to volume of business alone. The report suggests using averages of years and adding to or deducting from modified freight cost to adjust for these variations in maintenance expense.

Return on investment would also have to be added. This return

would be computed by applying a certain percentage, say $5\frac{3}{4}$ per cent., to the depreciated value of the railway or railways in question as furnished by the Commission's bureau of valuation. The ratio of return on investment to average annual operating expense would be calculated and the resultant percentage added to modified freight cost as a surcharge. This final adjustment would avowedly give over-all cost for use in rate making.

Note that several principles stand out in the cost-finding plan. All freight expenses are separated among types of cars, for particular hauls and particular services. Through this cost per type of car, commodity costs are figured, based upon the kind of car ordinarily used for the commodity. After various corrections, the cost per ton or hundred pounds is worked out. It is this cost to which freight rates are applicable. Underlying the plan are the apportionment factors. On the accuracy of these statistical ratios, much depends.

Objections to the Coördinator's Plan

The plan for cost finding advanced by the former Federal coördinator of transportation may be open to objection at several points. In the first place, no separation is made between out-of-pocket, or direct, costs and over-all costs. Because value of service affects rate making so extensively, knowledge of out-of-pocket costs is held to be of tremendous importance in setting the lowest limits of the compensatory rate. In such cases as long-and-short-haul rates, out-of-pocket costs appear to be most useful as a guide. Why the plan makes no separation for cost finding is not clear. Perhaps those who formulated the plan felt that to introduce this separation would complicate the process, especially while cost finding is in the experimental stage. However, it is to be hoped, if cost finding is ever developed in railway accounts and statistics, out-of-pocket costs will be considered.

One of the main objections to the plan voiced by railroad executives is the provision of cost finding as a routine matter. These executives apparently do not object to cost investigation. But they believe that, when cost determination is necessary, special studies may be undertaken with much less expense and to equal or better advantage. The railroads have long made special studies for determining costs whenever a particular rate was contested. In many cases, apportionments of certain costs have

been made in accordance with statistical factors widely accepted by railroads. This, it seems, would lead to some uniformity in cost finding. But most cost studies have differed in some respects from others. Moreover, since they have been undertaken to support some position in regard to rates, they have not always commanded the confidence of the Commission.

The ordinary cost study is made for relatively short selected periods and all expenses are seldom apportioned. Since most of the studies are based on special conditions and are handled by special staffs of the carriers concerned, widely varying treatment of cost has resulted. For example, formulas developed for separation of line haul and terminal expenses have differed so much that they have been properly criticized in most cases by opposing parties. Moreover, in some cost studies cost is determined in great detail after months of work, while in other studies costs have been lumped together and divided by very general statistical factors to get expense of a certain haul. In one case where cost was to be determined for a particular haul and commodity, the carrier used, for a ratio for dividing operating expense, net ton-miles of the commodity haul to net ton-miles hauled by the railroad. Obviously, such a rule-of-thumb method, omitting special conditions surrounding the haul, was not acceptable to the Commission.

It is quite true that the railroads have had extensive experience with cost finding through special studies. This experience has led to a remarkable improvement in methods and results. Recent cost studies indicate that more and more research has been undertaken on this subject, until fairly accurate bases of apportionment are being employed in many instances. With all this improvement, these cost studies do not give results adequate enough or comparable enough for the Commission to give them very much weight in rate making.

The railroads probably would not object to the Commission's establishing uniform formulas and methods for these special cost studies. This would, of course, improve the accuracy of special studies. Nevertheless, routine cost analysis has many advantages. Study and comparison of costs in connection with rates can be made currently, without resort to special studies made over short selected periods. Consequently, more reliable data can be had without delay for guiding Commission and railroad rate policy.

Continuing experience may be helpful in revising methods with a view to increasing accuracy and decreasing effort. That management know costs of this sort as a current matter seems almost as important as currently knowing net income. Certainly no one would suggest that net income be decided by special study, and routine accounting to this end dropped. Unless routine methods and more generally acceptable bases of apportionment can be worked out, continuing uncertainty as to applicability of results of special studies is inevitable.

The element of expense in routine cost finding is an objection which one cannot pass over lightly. Regulatory schemes have so often resulted in increasing carrier operating expenses without particularly increasing efficiency that one cannot avoid some sympathy with this objection to the cost-finding plan. The research staff of the coördinator of transportation's office estimated this increased cost at \$2,000,000 for the first year for class I railways, and approximately \$500,000 annually after the plan is in operation. If we assume the average annual cost to be \$1,000,000, the increase in accounting department costs is approximately 2 per cent.⁷ Even this cost is not insignificant for the railroads. However, if the Commission should consider, along with cost finding, the possibility of revising accounts and statistics, cost determination might well be introduced without increasing accounting and statistical costs. Some of the accounting and statistical reports made by the railroads are of dubious usefulness. In the opinion of this writer, revision of railroad accounting and statistical requirements for the purpose of showing costs of service could be undertaken and cost finding introduced with, perhaps, a reduction in the accounting budget. The plan is only partly subject to criticism on the score that such revision is not recommended, since those formulating the plan felt revision of accounts and statistics to be outside the scope of the cost-finding study.

Various objections may be made to details of the plan itself. The use of averages is properly open to criticism, although their employment is probably unavoidable in any cost-finding scheme. Seasonal variation and peak-load requirements are notably given inadequate weight by use of averages. Modifying and ad-

⁷ On the basis of present payroll of accounting staffs of class I railways of \$60,000,000. See *Cost Finding in Railway Freight Service*, supra, at p. 95.

justing base costs, as projected in the plan, may easily undermine the accuracy of costs, no matter how well base costs are determined, if these adjustments are not carefully studied and supervised. Statistical factors for apportionment of various expenses will also need constant study in order to gain the greatest possible accuracy.

The railroads apparently fear cost finding because of the possible effect on rates, as much as anything. They are afraid that, when, due to high value of service, rates are high relative to over-all costs, the Commission will be pressed by shippers to reduce these rates. But when rates are low relative to over-all costs, due to low value of service, the railroads would be unable to raise rates. The validity of this objection depends on the Commission's administration of rate-making policy. Even though Commission rate policy has not been very liberal in the past, if past policy in regard to costs is any indication for the future, the railroads do not have much to fear on this score. Time and again the Commission has held that, even where costs are unusually comprehensive and exact, they should not be the "sole basis for fixing rates"; that value of service to the shipper and many practical considerations may be of equal or greater importance.⁸

The Cost Finding Problem

When one considers the need for cost data in the railroad industry, further question may be raised about the plan. It would not be of much aid to systematic managerial expense control. Moreover, profitableness of branch lines, leases, special services or particular stations or trains could not be ascertained without special study. Nor could costs so found be of direct use in tracing values (through cost and revenue) for reorganization purposes or for other adjustment of mortgages and guaranteed securities. Perhaps determination of costs for all these purposes is impracticable. But further study should be made to find out if routine cost finding may not be designed to aid managerial policies other than those immediately associated with rate making.

Whether improved methods of cost finding will ever be introduced into railroad accounting and statistical organization or

⁸ *Switching at St. Louis*, 120 I. C. C. 216, 220 (1926). See also *Burch v. Rwy. Exp. Agcy. Inc.*, 197 I. C. C. 85 (1933), affirmed by *Rwy. Exp. Agcy. Inc. v. U. S.*, 6 Fed. Supp. 249; and *American Fruit Growers v. So. Pac. Co.*, 144 I. C. C. 639, 659 (1928).

whether the coördinator's plan is ever put into effect, determination of costs of railway service will continue to be a problem to railway executives, shippers and regulatory commissions. Railroad accounting now does little more than show how net income is computed. Some progress for cost determination has been made in the development of railroad statistics. Dr. M. O. Lorenz of the Interstate Commerce Commission's bureau of statistics has made studies along these lines for many years, and new statistical requirements have reflected his research. Criticism cannot be made that the railroads are spending inadequate amounts for accounting and statistics, but the question can be raised whether this expenditure is bringing results most useful for railroad managers, investors, shippers and regulators.

This writer cannot support plans which might increase outlay without contributing to efficiency. Nor has he sympathy with the attitude of those railroad accountants and executives whose criticism of cost-finding plans is not constructive. Cost accounting of the kind in wide use in industrial concerns is not wholly applicable to the railroad industry. Job cost accounting is definitely not useful, except in case of railroad shops. Process cost accounting depends to a great extent on ability to departmentalize an industry. This can hardly be done in the railroad business. Nevertheless, it should be apparent that better knowledge of costs is highly desirable. To this end the plan of the former Federal coördinator of transportation is perhaps the best that has been offered. It is surely worth experiment with selected railroads under the guidance of the American Association of Railroads.

If efficient cost finding is to be accomplished, the real solution lies in constructive research by railroad accountants and statisticians. They have had much experience in distribution of costs in cost studies for rate purposes and for expense control. They should be able, if they can be convinced of the desirability of so doing, to revamp railroad accounting and statistics so that expenditures now going into these activities will be no greater but much more fruitful.