

21686

187

Public Aids to Transportation.

(i) Volume I General Comparative
Analysis, and Public Aids to
Scheduled Air Transportation.

U.S. Govt. Prin. Office.

1940

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(ii) Volume II -

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PUBLIC AIDS TO TRANSPORTATION

VOLUME I

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PUBLIC AIDS TO TRANSPORTATION

VOLUME I

GENERAL COMPARATIVE ANALYSIS, AND PUBLIC AIDS TO SCHEDULED AIR TRANSPORTATION

Part I

GENERAL COMPARATIVE ANALYSIS

Part II

PUBLIC AIDS TO SCHEDULED AIR TRANSPORTATION

Published after expiration of Emergency Railroad Transportation Act, 1933

**SECTION OF RESEARCH
FEDERAL COORDINATOR OF TRANSPORTATION**

**UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1940**

XA-65.73
G9.1,2

PUBLIC AIDS TO TRANSPORTATION ¹

Vol. I. General Comparative Analysis, and Public Aids to Scheduled Air Transportation.

Foreword of Hon. Joseph B. Eastman, Chairman, Interstate Commerce Commission, and former Federal Coordinator of Transportation.

Part I. General Comparative Analysis.

Part II. Public Aids to Scheduled Air Transportation.

Vol. II. Aids to Railroads and Related Subjects.

Part I. Aids to Railroads.

Part II. The Taxation of Railroads.

Part III. Nonproductive Expenditures of Railroads.

Vol. III. Public Aids to Transportation by Water.

Part I. Waterway Improvements and Related Aids.

Part II. Government Transportation Operations on Inland Waterways—An Analysis of the Inland Waterways Corporation.

Part. III. The Panama Canal.

Vol. IV. Public Aids to Motor Vehicle Transportation—An Analysis of Highway and Street Costs and Motor Vehicle User Payments.

¹ The four volumes do not bear a common date. However, they have been released as a unit.

21686

FOREWORD

By JOSEPH B. EASTMAN, *Former Federal Coordinator of Transportation*

These reports are the result of an endeavor to discover and bring to light the basic facts necessary for the determination of questions which are among the most controversial and important in the transportation world, and to arrive from those facts at sound conclusions. The broad question is the extent to which public aid has been and is given to the various modes of transportation and is a factor in their competition with each other. It is a question which the railroads particularly have brought to the front. They complain bitterly that the competition of the motor carriers, many of the water lines, and the air carriers is unfair because it is "subsidized" at the expense of the public treasury. Counter complaints are made by the competitors.

In its forty-fifth annual report for the year 1931, the Interstate Commerce Commission discussed this subject as follows:

In another part of this report we have set forth certain facts in regard to the rapid development of competition with the railroads by motor carriers, water carriers, pipe lines, and airplanes. In connection with this competition, two contentions are advanced. One is that these competing transportation agencies, more particularly the motor, water, and air carriers, are in effect subsidized by the government, and that to the extent of such subsidy their competition is unfair. The other is that these transportation agencies should be subjected to a greater degree of public regulation than now exists, in the interest of public safety and convenience, the elimination of purely wasteful and destructive competition, stability in rates, and the proper maintenance and development of the national transportation system as a whole.

The claim that a subsidy exists, so far as the motor carriers are concerned, rests chiefly on the great public investment, by both the Federal and the State Governments, in highways and roads. It is asserted that the motor carriers do not contribute through special taxation their fair share to the support of this investment, so that part of the burden which they should carry is borne by other users of the highways or by general taxation. In the case of water carriers, a similar claim is made that they enjoy the benefit of a huge public investment, including the Panama Canal, the New York State Barge Canal, other waterways, and to some extent docks and terminals, without contributing their fair share to its support. With respect to the Inland Waterways Corporation, owned by the Federal Government and operating barge lines on the Mississippi and Warrior Rivers, it is also pointed out that the Government bears the burden of any deficit which it may incur in operation, and that its facilities are exempt from all taxation. In the case of the air carriers the claim that a subsidy exists is based on the contracts for the carriage of the mails.

As to the facts, there is no agreement, and the claims made with respect to these alleged subsidies are vigorously disputed. We are not in possession of the facts and therefore cannot report them to Congress. In our opinion the time has come to ascertain these facts by an impartial and authoritative investigation.

Until that is done it is impossible to determine whether there is anything to correct, or if so, how correction should be accomplished. It is clear also that such an investigation can best be made under Federal authority. We recommend that Congress provide for such an investigation.

This recommendation for an investigation under Federal authority was repeated in the annual reports of the Commission for the years 1932 and 1933, but was not adopted by Congress. However, the Emergency Railroad Transportation Act, 1933, which created a Federal Coordinator of Transportation for a temporary period, gave the latter very broad powers of investigation, so far as transportation was concerned. I was assigned to the position and at an early date concluded, among other things, to undertake an investigation of the so-called "subsidy" question like that which the Commission had recommended. To head this work, and other inquiries which were not directly concerned with railroad management and operation, I was fortunate in securing the services of Dr. Charles S. Morgan, who had for some years been attached to the staff of the Interstate Commerce Commission as a research economist and in whom I had every confidence.

Had I known at the time what would be involved in such an investigation, I doubt whether I would have had the courage to undertake it. The subject expanded far beyond our first conceptions as the investigation proceeded, and continually it was found necessary to explore into new and unanticipated phases. This was one of the reasons why my predictions, from time to time, as to when the inquiry would be completed were so grossly in error.

Another reason lay in the methods that were followed in the investigation. Realizing the need for the closest possible check on the facts, the reports—on railroads, on highway carriers, on motor carriers, and on air carriers—were first prepared in tentative form and sent for comment and criticism to those known to have given special study to any of the questions involved, including departments of the Federal Government and, to some extent, the States, associations of carriers, various organizations interested in transportation, university professors, and other individuals. The responses received were all carefully considered, and many of them were very helpful. Often they showed the need for pursuing lines of inquiry which had not hitherto been followed.

Another reason for delay lay in the need which developed, in view of the time taken for other reasons, for bringing underlying data up to date so far as possible.

The office of Federal Coordinator of Transportation ceased to exist at the end of 3 years, on June 16, 1936. At that time the Research Department, in charge of Dr. Morgan, had largely completed the tentative reports in this investigation, although not all of them had as yet been sent out for comment and criticism. In connection with other departments, it had in a similar stage of approaching completion a series of reports on wages and labor standards in the various branches of the transportation industry, and also a report dealing with the problems of the short line railroads. Such a mass of valuable information had been accumulated that it seemed highly desirable to complete and issue all of these reports, if this could possibly be done.

The office of the Federal Coordinator of Transportation was supported, under the law, by assessments on the railroads paid into the Treasury of the United States. These assessments, as appropriations in Washington go, were not large, amounting to \$401,558, \$527,496, and \$522,259, in the 3 years, respectively. The law provided that any unexpended balance remaining at the termination of the office should be returned to the railroads. The sum so remaining was \$17,291.61. The railroads were requested and agreed, in general, to permit the use of this fund in completion of the research studies. It was returned to them, and of the total they placed \$15,115.36 at my disposal. My thanks are due the railroads for their cooperation in this respect.

However, this sum sufficed to complete only part of the work. Under the terms of the Emergency Railroad Transportation Act, 1933, I had been authorized, as Coordinator, to call upon the Interstate Commerce Commission for assistance, and such aid had been very generously furnished, especially in connection with the research work. The names of the persons who so assisted are given in the underlying reports. After the expiration of the office of Coordinator, the Commission again lent its aid, by permitting a small number of persons of its staff to continue participation in such work, and this included stenographic assistance and supplies. However, the reports could not have been completed except for the time which Dr. Morgan and others have devoted to them without compensation outside of the office hours. He has taken no vacation and has worked, almost continuously, nights, Sundays, and holidays, for the past 6 years. The last of the other reports, on wages and labor standards in transportation and on the short line railroads, was issued in August 1937. The reports now being issued complete the work.

Printing has also presented a problem. The sum of \$10,000 had been set aside for this purpose prior to the close of the office of Coordinator, but more proved to be needed. Permission to use approximately \$12,000 from unexpended National Industrial Recovery funds which had been allocated to the Coordinator was kindly given by the Bureau of the Budget.

In addition to the foregoing acknowledgments of financial and other assistance, I wish to thank various Federal and State departments and many individuals and organizations for information furnished and for commenting on and otherwise assisting in the development of the reports. The names of the individuals, including technical experts attached to universities, Government departments, and trade associations, have been set out in the underlying reports and need not be repeated here. The other acknowledgments I wish personally to make are indicated below. Obviously, however, there is no intention to imply that the agencies or individuals listed are in agreement with the facts and findings of the underlying reports.

Vol. I, part II (Public Aids to Air Transportation): Hon. James A. Farley, Postmaster General, and other officials of the Post Office Department; officials of the former Bureau of Air Commerce, Department of Commerce; and officials of the Civil Aeronautics Authority.

Vol. II: Officials of the Reconstruction Finance Corporation, of the former Railroad Division of Public Works Administration, and of the Quartermaster Corps of the United States Army; also officials of the Department of the Treasury for permission to use certain files of income tax returns. Special acknowledgment should be made of the important assistance given by the Bureau of Valuation of the Interstate Commerce Commission. (See vol. II, p. iii.)

Vol. III: Hon. Harry H. Woodring, Secretary of War, the Chief of Engineers, United States Army, and the Board of Engineers for Rivers and Harbors; officials of the Panama Canal; Major General Thomas Q. Ashburn, former president and chairman of the board, Inland Waterways Corporation; and officials of the United States Maritime Commission and the Department of Commerce.

Vol. IV: Hon. Thomas H. MacDonald, Commissioner of Roads, Public Roads Administration, Works Progress Agency, and Mr. H. S. Fairbank and other officials of that organization; the National Bureau of Standards of the Department of Commerce; and various State highway officials.

The responsibility for these reports is one which I assumed as Federal Coordinator of Transportation and which I continue to assume. The Interstate Commerce Commission has no responsibility, and its members, other than myself, have no acquaintance with even the contents of the reports. The work had gone much too far, at the time the office of Coordinator terminated, to permit any transfer of responsibility to the Commission, if, indeed, that could have been done under the law, which is very doubtful.

While, however, the responsibility for the reports is mine, the man to whom credit for them must be assigned is Dr. Charles S. Morgan. He has supplied the persistence, the industry, the intelligence, and the administrative ability which have brought these reports to completion. All that I have supplied is counsel and advice. He and I went into this investigation with the sole desire to ascertain and interpret all the pertinent facts as fully and fairly as possible, regardless of whom they might help or hurt. In my judgment, his reports furnish convincing evidence, if any were needed, that he has been faithful to that trust.

It is well to state the extent to which I personally accept and endorse the results reached in these reports. They cover a very wide range of matters and go into great detail. By reason of my many other duties, I have not been able to give to them anything like the same intensive consideration that Dr. Morgan has given. I have, however, kept in touch with them in the course of their preparation, read them in both tentative and final forms, and considered the comments and criticisms of those to whom they were submitted in tentative form. The final drafts incorporate many changes, major and minor, which I have suggested.

The reports may appropriately be considered from two standpoints. There are, first, the underlying facts. Many of these are capable of precise ascertainment or a near approach thereto, such as, for example, the areas and location of the lands which were donated to the railroads, the proceeds which they received from the sale of such lands, and the value of those still in their possession; costs of the construction and maintenance of highways and waterways; and the amounts spent from public funds for lands and facilities devoted to air carrier use. Others are not capable of precise ascertainment but must be based on conclusions drawn from the available evidence, such as the service lives of properties and the annual provision which should be made for depreciation or amortization. There are, second, the interpretation of these underlying facts and the conclusions to be drawn therefrom.

So far as the underlying facts are concerned, I am convinced that everything possible with the facilities at our command has been done to ascertain them fully and accurately. To some extent, approximations based on informed judgment have been used where precise ascertainment was theoretically possible, owing to the fact that such ascertainment would have required an investigation so extensive and expensive that it was beyond our resources, if, indeed, it would have been practicable at all. With respect to the facts not capable of precise ascertainment, the available evidence and the reasoning by which the ultimate result has been reached are in each instance fully stated.

In the interpretation of the underlying facts and in deriving conclusions therefrom, occasion has often arisen for the application of certain principles or theories, to some extent involving questions of public policy. I shall speak more particularly of some of these matters below. It is here that the greatest room for differences of opinion lies, and I make no claim of 100 percent validity for all of the conclusions, thus reached, that are presented in the reports. All that I can now say, subject to the comments below, is that it seems to me that they are well supported in the reports, and that I have as yet seen no criticisms which convince me that they are wrong.

It is because, however, of the room for *bona fide* differences of opinion with respect to some of these matters that I have favored the provision (sec. 53) in the general transportation bill, S. 2009, as it passed the Senate at the last session, which would create a temporary board of investigation and research, made up of three members appointed by the President, which would, among other things, investigate and report—

concerning the extent to which right-of-way or other transportation facilities and special services have been or are provided from public funds for the use, within the territorial limits of the continental United States, of each of the three types of carriers without adequate compensation, direct, or indirect, therefor, and the extent to which such carriers have been or are aided by donations of public property, payments from public funds in excess of adequate compensation for services rendered in return therefor, or extensions of Government credit.

The reports herewith presented would, I am sure, be of the greatest possible aid to such a board of investigation and research, because they would eliminate the need for an enormous amount of research into underlying data, and would also present the salient questions which are involved in the interpretation of these facts and in deriving conclusions therefrom. The proposed board would, however, constitute a tribunal before which those who are disposed either to contest or to support the statement of facts and the conclusions reached in the reports could present their evidence and views at length and from which they could obtain a further adjudication. The questions involved are so large and important that they merit such further consideration.

I shall now comment briefly on some of the questions which have arisen with respect to the different modes of transportation.

The railroads.—The principal public aid given to the railroads was in years past through the donation of public lands having a total area equal to about 9½ percent of the area of the continental United States (other than Alaska). An important question is whether this public aid shall be translated into dollars on the basis of the value of the lands to the Federal or State governments at the time of their donation, or on the basis of what the railroads realized from them in the way of proceeds from sales or value of tracts still held. The results of both of these methods are given in the report on the railroads, but the latter method is preferred. With this conclusion I agree. I do not believe that contemporaneous amounts received by the governments for the sale of similar land to settlers furnish any real measure of the potential value to the governments of the enormous tracts which were donated to the railroads. More important, however, is the fact that we are endeavoring to determine what the railroads received in the way of aid from the governments. The *aid* which they received is surely measured by what they were able to realize from the lands, rather than by

their value to the governments at the time of donation, even if a satisfactory estimate of such value were possible.

The report reaches the conclusion that the significance of the early public aids to the railroads many years ago has largely disappeared, by reason of the many changes in the ownership of railroad properties which have since taken place through bankruptcies and receiverships, and otherwise. The reasoning on this point is quite involved. It seems sound to me, but I have not been able to dispel some lingering doubts.

The same may be said of the study of railroad taxes and the conclusion reached that relatively little can be done by the Federal Government to help the railroads with their tax problems. Difficult legal and constitutional questions are here involved, which I have not thoroughly explored.

Water carriers.—It is clear that in the case of the waterways which have been constructed and are maintained at public expense, no direct or indirect payments are, with a single exception, made by the users by way of reimbursement for the annual costs thus incurred. The exception is the Panama Canal, where the users are charged tolls which cover such costs in large part. The indications are, however, that the proponents of the waterways will challenge some of the conclusions of the report on the water carriers.

If I understand their position aright, they contend that against the annual costs which are incurred by the Government and directly burden the taxpayers should be offset the savings in transportation costs which are realized by the users of the waterways and also by the users of other modes of transportation which reduce their rates to meet the competition of the waterways, and that the only real burden on the country is the net amount remaining after such offsets have been made.

As the report points out, this is a confusion of costs with benefits. An illustration in which the thought is carried to an extreme may be helpful in clarifying the matter. In an office building, no direct charge is ordinarily made for the use of elevators, but the cost of this transportation is borne by the tenants in their rentals. There are some who have urged that communities might well adopt a somewhat similar plan with respect to local street car or bus transportation, operating such facilities at common expense but making no charge for rides. In both instances, benefits are or would be received offsetting the costs. In the case of the office building, those benefits go very largely to those who bear the costs. In the case of the community transportation, there would be a considerable but far from complete identity of interest as between the beneficiaries and those who bear the costs. In the case of the waterways, there is no doubt some but probably comparatively little identity of interest.

Whether or not benefits so received can properly be regarded as sufficient justification for free use of facilities constructed at public expense is wholly a question of sound public policy. The answer to this question may be in the affirmative or in the negative, but it has nothing to do with the question of what the actual costs are. The situation with respect to the New York State Barge Canal is of interest in this connection. Unlike most other waterways, that canal, until very recently, was constructed and maintained at the sole expense, not of the Nation, but of the State of New York. The direct benefits went to the users, who may or may not be citizens of the State. The costs were, and largely still are, a burden on the taxpayers of the State. They may, however, be willing to bear these costs because of indirect benefits which they believe accrue to the commerce and industry of the State by reason of the canal. This is a matter of public policy for them to decide.

In the case of the waterways constructed and maintained at the expense of the Nation, there appears to be not only a lack of identity, in general, between those who receive the direct benefits and those who bear the costs, but also a similar lack of identity between those who receive the indirect benefits resulting from any increase in commerce and industry and those who bear the costs. The report undertakes to show what the costs actually are, and it also assembles and analyzes such information as was obtainable in regard to the benefits, direct and indirect, and to whom they accrue. Only from the consideration of such data can the question of public policy be wisely decided.

Another matter upon which the proponents of the waterways lay much stress is the alleged injustice of estimating total unit costs of transportation on the waterways, including the costs incurred in their construction and maintenance, in terms of the actual transportation performed thereon. They point out that when such a waterway is opened and water carriers begin to use it, immediately competing modes of transportation, particularly the railroads, reduce their rates, thus depriving the waterway of traffic which it would otherwise carry. They urge, therefore, that in estimating unit costs of transportation on the waterways, the volume of traffic which they would carry in the absence of such competitive reductions in rates ought to be taken into consideration, rather than the traffic which is actually carried.

It is true that the results of the construction or improvement of waterways are as they describe. Reductions in rates are made by competing modes of transportation, and the waterways are thus deprived of traffic which they would otherwise carry. The situation is also complicated by the fact that generally, although not always, the railroads or other competing carriers can demonstrate that it is financially better

for them to retain traffic through such reductions in rates rather than to lose it entirely.

Whether the railroads and other competing carriers retain the traffic at reduced rates or lose it entirely, in either event they are clearly hurt, and obviously this injury is something which must be taken into account in weighing the net public benefits. It may be conceded that the introduction of more efficient or economical means of transportation ought not to be prevented to save existing carriers from injury, for otherwise progress would be stopped. However, in determining whether a new means of transportation is actually more efficient or economical, plainly all the costs which are incurred in making it available must be taken into consideration, and not a part of them only.

I find, I confess, some difficulty in thinking this problem through. In determining whether a new waterway should be constructed, the essential question, it seems to me, is whether, assuming no reduction in the normal rates of competitors, it would make available new means of transportation which could function, taking *all* costs into consideration, more economically than existing means. I realize, however, that this would often be a most difficult question to answer. So far as existing waterways are concerned, I am much inclined to the opinion that tolls of some amount should be assessed for their use, upon condition that competitors increase their rates by like amounts. I would not at the start advocate, in most instances, fully compensatory tolls, but only such as it is believed the traffic will be able to bear, leaving future policies to be determined in the light of experience.

Highway carriers.—It is sometimes asserted that those who operate vehicles on highways pay nothing for the use of these rights-of-way which are constructed and maintained at public expense. The report on these carriers shows that these users of highways, unlike the users of waterways, do pay in one way or another very large amounts for such use. The railroads, who are the principal antagonists of the highway vehicle operators in this matter, recognize that such payments are made. The amount so paid is, I think, very conservatively estimated in the report, because only taxes or other assessments are included which are definitely designed for this purpose. The gasoline taxes which are paid to the Federal Government are, for example, excluded, on the ground that they are designed, like similar taxes on other industries, for general governmental purposes.

The question, therefore, is not whether the vehicle users of the highways pay at all, but whether they pay enough. The position of the railroads is that they pay nowhere near what they ought to pay. The conclusion of the report is that, in the aggregate and in the country as a whole, they have paid sufficiently for many years, although this is not true of all classes of users.

This difference of opinion again involves a question of public policy. Waterways often have public uses apart from their use for transportation purposes, as for flood control, irrigation, and the like. In the water-carrier report, the effort has been to segregate the costs incurred for these other purposes and to use only the costs clearly incurred for transportation purposes. The situation as to the highways is more complex. They have distinct public uses apart from transportation, as for pedestrians or for underground or overhead structures of various descriptions, but they have also always been regarded as having a general social and economic use which cannot adequately be characterized as a strictly transportation use. This subject is discussed at some length in the report, and I shall not undertake to repeat what is there said.

Because of this general social and economic use, which until recent years was predominant, the cost and upkeep of public highways were from time immemorial regarded as a proper burden upon general taxation, except for the occasional toll roads which were constructed for special transportation purposes and often were privately owned. Every one derived an immediate benefit of one kind or another from the highways, and hence they could appropriately be made a general public burden. This is well illustrated by the railroads, which made only a small direct use of the highways but gained a large benefit from them as feeders for the rail lines.

In recent years, however, with the development of the automotive vehicle and the paved road, the highways have come to have a large use not associated with the ownership of property subject to general taxation, and often for distinctly commercial transportation purposes and as a substitute for the railroads. So far as such uses are concerned, it is both logical and appropriate that the costs incurred in the construction and maintenance of the highways should be a direct charge on the users instead of a burden on general taxation.

The report endeavors to analyze this situation and to determine the extent to which the highways may still be regarded as serving general social and economic or like uses, and the extent to which they are used as a substitute for the railroads and for similar transportation purposes, dividing them into three groups, namely, "Federal and State highways," "county and local roads," and "city streets." From this analysis, percentages are derived indicating, for each group, the portion of the annual costs which would be assessed directly against the motor-vehicle users. The conclusion is reached that in the case of the Federal and State highways the great bulk of the costs should be so assessed, but that the percentages should be much less in the case of the county and local roads and the city streets.

Here is where the report diverges most widely from the contentions of the railroads. They have developed

what has come to be known as the "public utility" theory. Stated succinctly, this theory is that the highways should be treated as if they were owned and operated by a public utility company seeking to charge the users enough to cover all annual costs, including overhead charges on investment. However, they do not pursue this theory to its utmost logical conclusion, for they concede that a minor part of the costs of Federal and State highways and of rural roads, and a considerable part of the costs of city streets, may now properly be borne by general taxation. In the case of the State and Federal highways, the railroads and the report are in fairly close accord as to the percentage which should be assessed against the users. The great difference of opinion relates to the county and local roads and the city streets. In the case of the former, the railroads would assess the same percentage of the costs against the users as in the case of the Federal and State highways, and in the case of the city streets a percentage considerably higher than that developed in the report.

This is, of course, not a matter capable of mathematical demonstration. The report, however, gives very fully the reasons for its conclusions with respect to the division of costs between the users and the general taxpayers, and in my judgment they are good and sufficient reasons.

The users against whom the report and the railroads would, respectively, assess varying portions of the annual cost comprise, of course, all who operate automotive vehicles (in strict theory vehicles otherwise propelled might also be included, but this would be an undue refinement), including the owners of private automobiles, farm trucks, and the like. Both the report and the railroads undertake to assign responsibility for the highway costs as between the various classes of automotive vehicles. The railroads have developed a theory which would assign a very heavy responsibility for the costs, and hence a like proportion of the annual assessments, to the heavier vehicles, including the commercial trucks and busses with which they compete. Very briefly and inadequately stated, the theory is that highways would still be constructed on the standards of width, curves, grades, and depth of the pavement prevailing in the early period of modern road development, had it not been for the necessities created by these large, heavy vehicles, and therefore that the responsibility for all costs in excess of such standards must be assigned to such vehicles alone.

Speaking from the standpoint of a mere lay observer who has had some opportunity to note the demands

which private automobiles make upon modern highways and the standards which have been followed in the construction of some which are devoted to their use exclusively, this theory of the railroads seems to me to be patently unsound. However, the report discusses at great length this question as to the responsibility for highway costs of the various classes of highway vehicles, and gives very full and explicit reasons for its conclusions. It assigns a proportionately high share of the responsibility to the heavier vehicles, but one that falls considerably short of the railroad contentions. There is much technical discussion in this part of the report which goes beyond my depth, and I am not in a position to express any very intelligent personal opinion as to whether it is right or wrong. However, I know that Dr. Morgan has had, with respect to this matter, the benefit of the comments and criticisms of a number of men who have eminent technical qualifications, and I believe that the conclusions of the report, involving as they do a partial compromise with respect to the most controversial of the cost elements, are well supported. For the use of those who may differ, the results of applying other theories, including those of the railroads with respect to the assignment of responsibility for highway costs, are given in the report.

I may add that the railroads have had the opportunity to express to me, both orally and in writing, their views on the highway carriers. Their contentions impress me as being carried to extreme limits.

Air carriers.—The criticisms which seem likely to be made of the report on these carriers will, I believe, reflect the same confusion between costs and benefits as is mentioned above. It is quite probable that there was and is justification for extending public aid to the air carriers in the period of their development, as no doubt there was in the case of the railroads. In this connection it may be remarked that the public aid given to the latter, while it now seems comparatively small in comparison with the size of the industry, was of much greater relative magnitude at the time when it was extended. The fact that public aid may have been and be justified because of the general benefits realized in the public interest does not, however, in any way cancel or eliminate the fact that it was and is extended.

I am not satisfied with the formula which has been used in determining the cost to the air carriers of carrying mail for the Government. However, so far as it has imperfections, my judgment is that they tend to reduce rather than to enlarge the estimate of public aid received through the Government payments for such carriage.

PREFATORY NOTE

Part I of this volume explains the steps taken in determining the public aids received by the several forms of transportation, summarizes the underlying reports, compares the aids as to amounts and kinds, discusses the benefits they have conferred and the problems they have created, and offers suggestions intended to facilitate the appraisal of proposals which may call for the granting of additional public aid in the future. The report on Public Aids to Scheduled Air Transportation, relatively small in size, has been incorporated as part II of this volume.

Grateful appreciation is expressed to Hon. Joseph B. Eastman, Chairman of the Interstate Commerce Commission and former Federal Coordinator of Transportation, for the highly beneficial comments and criticisms which he offered upon reading the reports at one or another stage of their progress toward completion, and for the opportunity afforded to carry these studies to completion after the expiration, on June 16, 1936, of the Emergency Railroad Transportation Act of 1933.

It is perhaps unnecessary to state that the reports could be improved upon in many particulars. Despite the unusual patience shown by Commissioner Eastman in the face of repeated delays and the long interval which has elapsed since the studies were instituted, it is recognized that there are aspects of the subjects treated which could advantageously have been investigated further.

The reports constitute an organic whole and, so far as the subject matter has permitted, have been prepared along uniform lines.

No apology is made for the length of volumes II, III, and IV. The complexities and range of the questions there treated, the desire to give the reader a complete statement of the facts and reasoning employed, and the need for appraising the merits of the diverse views held by those who were given an opportunity to examine the reports before they were finally made ready for publication, provide sufficient explanation of the extensiveness of the material presented. The summary given in chapters III and IV below will suffice for some readers. It has been made as brief as possible.

The foreword of the former Federal Coordinator of

Transportation acknowledges the assistance given by the Interstate Commerce Commission, other Government departments, and various outside organizations and individuals. The prefatory notes found at the outset of each report or the reports themselves set out the names of many of these departments and others and also the names of the individuals, on the staff of the Federal Coordinator of Transportation and of the Interstate Commerce Commission, who cooperated with the undersigned in the preparation of various parts of the underlying reports. It is appropriate at this point, however, especially to mention M. M. Caskie, Jr., Douglas L. Cullison, Hon. Robert E. Freer (now a member of the Federal Trade Commission), James O. Riley, R. M. Stockman, Paul G. Thompson, Warner Tufts, and Henry C. Wilson. The valuable work each has done is greatly appreciated. Allen W. Hagerty, former executive assistant to the Federal Coordinator of Transportation, has aided materially in handling the printing of the reports. Particular thanks are due Mr. Riley, whose able and intelligent cooperation on many parts of the reports and whose devotion of much of his own time to the work over a long period require this expression of gratitude. It would be inappropriate, however, not to acknowledge the zeal shown by all who have been associated with this undertaking. Appreciation also is expressed for the cooperation given by those who served in clerical or stenographic capacities.

It is hoped that these reports will contribute to the disposition of at least some of the controversies which have characterized public discussions of the "subsidy" question and that, where they fail to accomplish this much, they will serve to direct these discussions into more profitable channels and to point the way to further fact finding of a sound character. The reader must, of course, be the judge of the success of the effort made to present as complete a statement of facts as was practicable, to reason disinterestedly, and to draw conclusions that are sound from the viewpoint of the public interest.

CHARLES S. MORGAN,
Director, Coordinator's Section of Research

**GENERAL COMPARATIVE ANALYSIS, AND PUBLIC
AIDS TO SCHEDULED AIR TRANSPORTATION**

PART I

GENERAL COMPARATIVE ANALYSIS

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APPENDIX A

[Reproduction of]

NONPRODUCTIVE RAILWAY EXPENDITURES, 1927-31

(Report to Association of Railway Executives, Washington, D. C., Oct. 24, 1932)

The Interstate Commerce Commission, in its decision in Ex Parte 103 (the Fifteen Per Cent Case, 1931), suggested among other things that—

The railroads * * * have been and are being called upon to invest great amounts of capital in alterations of their properties which are often, from a strictly railroad point of view, very largely nonproductive * * * the question arises whether this burden is being apportioned fairly. To the extent that it is caused by other than railroad needs and does not increase the traffic of the railroads or save them expense, it may be that this burden should justly be shifted from the shoulders of railroad users.

On November 28, 1931, the Advisory Committee of the Association of Railway Executives directed that an intensive study be made of those expenditures by the carriers, which do not result in additional revenues or decreased operating costs.

Statistical information was obtained through a questionnaire sent to the chief executives of each class I railway. Replies were received from carriers representing 98.1 percent of the total miles of road.

The information falls in two distinct classes, that concerning expenditures for changes in property (shown in table I), and that concerning expenditures for the maintenance and operation of property (shown in table II).

The tabulations cover the years 1927 to 1931, inclusive. They show for this period a total nonproductive expenditure for changes in property of \$223,866,627

and nonproductive charges for maintenance and operation of \$212,871,438.

The cost of complying with the Valuation Act was \$141,683,506 up to December 31, 1931, of which 70.6 percent or \$100,029,116 was reported as nonproductive.

Carriers have reported waterway projects imminent but not yet accomplished that will cost them somewhat more than \$142,000,000, with attendant added costs for maintenance and operation.

It has been recognized that some expenditures do not result in any increased revenue or decreased operating expenses, while others do either or both in varying degrees. Even the identical class of expenditures may produce different results under different conditions on the same railroad. In order to determine how much should be included within the particular class under investigation it was necessary for each carrier to designate that part of the expenditure for any item which it regarded as nonproductive. In most cases this must be a matter of informed judgment, but the comparative uniformity of the result when groups of carriers are compared with each other indicates that this allocation has been carefully done and fairly represents the true situation.

A few expenditures of considerable amount are inevitably in the twilight zone of doubt. No instructions or suggestions were given to the carriers which might influence their judgment as to the inclusion or exclusion of an item, the attempt being to put before them clearly the fundamental idea underlying the classification and to depend upon their individual judgment for final decision concerning each item.

As an example, automatic train control installations, some of which have been made under order of the Interstate Commerce Commission, and some by carriers on their own initiative, were reported by 20 roads as a nonproductive expenditure of \$9,564,000. Owing to the fact that many installations were not reported, in the interest of conservatism the amount mentioned above was not included in the tabulations.

Included within the \$145,023,840 under the caption "Grade separation and elimination of highway and street crossings" is an amount reported by certain carriers as due to projects required by Federal-aid highways, which is 95 percent nonproductive, while total expenditures for all projects under the caption are 85 percent nonproductive. This fact emphasizes the effect of expenditures imposed by general regulation, as compared to those treated individually through negotiations, and at least partial agreement, with the immediate communities benefited.

The amounts tabulated are direct costs and do not include taxes, interest, insurance, or other overhead expenses.

The special committee responsible for this report consisted of J. R. Leighty, chairman, H. M. Bassett, C. S. Duncan, F. G. Jonah, J. H. Parmelee, Frank Ringer, and L. E. Wetling.

The Bureau of Railway Economics assembled, classified, and compiled the data.

TABLE I.—Nonproductive proportion of cost of property changes—
Class I railways of the United States¹

[Calendar years 1927 to 1931, inclusive]

Item	Cost of property changes		Nonproductive proportion		
	Charges to road and equipment	Total charges	Charges to road and equipment	Total charges	Percent
Grade separations and elimination of highway and street crossings:					
Eastern district.....	\$84,940,489	\$97,268,912	\$72,894,175	\$84,115,853	86.5
Southern district.....	12,740,354	13,895,901	12,111,926	13,154,530	94.7
Western district.....	29,788,529	33,859,027	22,309,112	25,587,385	75.6
United States.....	127,469,372	145,023,840	107,315,213	122,857,768	84.7
Other crossing protection:					
Eastern district.....	5,222,326	5,678,860	4,433,742	4,704,748	84.4
Southern district.....	1,337,930	1,544,688	1,335,129	1,541,479	99.8
Western district.....	3,646,926	4,075,151	3,391,129	3,798,262	93.2
United States.....	10,207,181	11,298,699	9,160,000	10,124,519	89.7
Grading, paving sidewalks, etc.:					
Eastern district.....	1,246,177	1,486,397	1,109,080	1,303,317	87.7
Southern district.....	919,534	1,034,851	867,872	976,720	94.4
Western district.....	3,624,079	4,369,519	3,567,226	4,293,504	98.3
United States.....	5,790,390	6,890,767	5,543,678	6,573,541	95.4
Track elevation:					
Eastern district.....	19,042,293	21,023,941	14,085,279	15,470,833	73.6
Southern district.....	2,162,461	2,498,481	1,161,452	1,435,763	57.5
Western district.....	6,936,701	7,808,115	6,781,428	7,607,436	97.4
United States.....	28,141,455	31,330,537	22,028,157	24,514,032	78.2
Civic and public improvements:					
Eastern district.....	8,110,643	8,498,067	7,918,504	8,255,478	97.1
Southern district.....	3,815,960	4,316,555	3,791,459	4,288,950	99.4
Western district.....	11,624,175	12,979,413	11,330,900	12,582,466	98.9
United States.....	23,550,778	25,794,035	23,040,863	25,126,894	97.4
Navigation requirements: ²					
Eastern district.....	15,071,482	17,254,541	10,730,015	12,327,781	71.4
Southern district.....	245,726	268,751	219,367	238,563	88.8
Western district.....	7,778,870	8,351,216	6,738,120	7,166,033	85.8
United States.....	23,096,078	25,874,508	17,684,511	19,732,377	76.3
Other items:					
Eastern district.....	9,978,631	10,456,989	7,878,489	8,507,090	70.4
Southern district.....	941,141	1,024,644	929,242	1,004,505	98.0
Western district.....	6,650,038	7,851,736	4,758,065	5,615,901	71.5
United States.....	17,569,810	19,333,369	13,565,796	14,927,496	77.2
Grand total:					
Eastern district.....	143,621,341	161,667,707	119,049,284	134,575,100	83.2
Southern district.....	22,162,736	24,583,851	20,415,947	22,640,510	92.1
Western district.....	70,050,907	79,294,177	58,872,987	66,651,017	84.1
United States.....	235,835,084	265,545,735	198,338,218	223,866,627	84.3

¹ Data cover class I roads operating 98.1 percent of the total class I mileage of the United States.

² Projects imminent but not accomplished will require an expenditure of \$142,100,000 of capital with the attendant increases in current costs.

NOTE.—Certain similar and related expenditures, separately reported on the questionnaire, have here been consolidated for the purpose of simplified tabulation.

TABLE II.—Nonproductive charges to operation and maintenance—
Class I railways of the United States¹

[Total charges for 5 years, 1927 to 1931, inclusive]

Item	Eastern district	Southern district	Western district	United States
Nongrade highway and street crossings.....	\$23,169,118	\$2,531,353	\$4,201,282	\$29,901,753
Other crossing protection.....	66,018,417	7,821,271	25,437,805	99,277,493
Grading, paving, sidewalks, etc.....	1,905,403	4,672,634	7,879,579	14,457,616
Track elevation.....	1,842,062	79,302	865,303	2,786,727
Civic and public improvements.....	1,037,000	2,830,735	5,909,936	9,777,671
Navigation requirements.....	1,798,494	1,528,166	2,229,925	5,556,585
Train limit and full crew laws.....	13,761,142	560,633	18,988,931	33,310,706
Other items.....	9,095,092	1,637,023	8,570,742	19,302,857
Total.....	117,126,728	21,661,207	74,083,803	212,871,438

¹ Data cover class I roads operating 98.1 percent of the total class I mileage of the United States.

NOTE.—Certain similar and related expenditures, separately reported on the questionnaire, have here been consolidated for the purpose of simplified tabulation.

Total cost of valuation (from passage of the Valuation Act to Dec. 31, 1931)

District	Amount	Nonproductive proportion	
		Amount	Percent
Eastern district.....	\$56,442,569	\$35,389,489	62.7
Southern district.....	21,063,108	15,067,763	74.1
Western district.....	64,177,632	49,031,864	76.4
United States.....	141,683,306	100,029,116	70.6

APPENDIX B

TAXATION OF GRADE SEPARATION STRUCTURES

Reference was made in the text of this report (pp. 282-283) to the question of taxation of grade separation structures. This question may be explored further in this appendix. The issue is clearly raised in *People ex rel. New York Cent. & H. R. R. Co. v. Purdy et al., Com'rs of Taxes and Assessments*, 149 N. Y. S. 315, in which Blanchard, J., said:

* * * but whether, after the erection of such structures, the ownership thereof can be fastened upon the railroad company for purposes of taxation, where, as in this case, they do not rest upon any tangible property of the company and are not an essential and necessary part of the railroad, is another matter.

Under the circumstances, it is difficult to establish definitely what the practices of the assessing agencies have been. The majority of States assess right-of-way facilities on a blanket or per mile basis. The consideration given to the individual structures is therefore not determinable by recourse to the records, and for the same reason petitions for injunctions are exceptional. The problem assumes more clear-cut terms in metropolitan areas where extensive reconstruction of facilities has occurred. A review of the leading cases will throw some light on general practices.

It has been held that a tunnel or other structure constructed by a railway under or over city streets, used exclusively by and necessary to the operation of the railway, is taxable as real property, even though the public uses the street supported by the tunnel or other structure.¹ This rule applies even though the city, county, or State has paid a portion of the cost of construction.

In those cases, however, where the railroads have been compelled by law to separate grade crossings by overhead structures or underpasses, and where the structures are not essential to the operation of the railway, it has been held that the structures are not taxable as railway property. The railroad's share in the cost

¹ *People ex rel. New York & H. R. Co. v. Com'rs of Taxes & Assessments of the City and County of New York*, 101 N. Y. 222, 4 N. E. 127. The court said, in part:

"The premises, therefore, upon which these structures are placed are in the exclusive use of the relator, and they are for the accommodation of the public in no other sense than is the railroad itself for public use. . . . It can make no difference, in respect to taxation, whether the rail is laid upon the surface of the road or placed on pillars, or carried through a covered way or tunnel. In either case, the structures adopted to sustain it, or facilitate and protect its use, are within the meaning of the law, land; and for them, as described by the commissioners, the relators were liable to be taxed."

of the construction of such structures is considered a contribution to the general public welfare, but, so far as the structures confer advantages on the railroads, the railroad's share may be considered by the taxing authorities in ascertaining the intangible taxes to be assessed against the railroads.³

See also *People ex rel. B., L. & E. T. Co. v. Tax Comm'rs*, 209 N. Y. 496, 103 N. E. 776. It was there held that the paving in a street not assessable as real estate could be taken into consideration in determining intangible taxes.

In the leading case of *People v. Purdy*, 149 N. Y. S. 315, an attempt was made by the Board of Tax Commissioners to assess taxes against the railroad for the value of 57 grade crossing elimination structures on the theory that such structures were realty of the railroad. Some of these structures were built by the railroads and some by the city, but under the then existing laws, the city could have compelled the railroads to build all of them.⁴ The Court of Appeals, in holding that taxes on the crossing structures were not assessable against the railroads, stated that since the railroads had a mere easement over the fee of the city in the street and the erection of the structures was on the land of the city and for the benefit of the public, the structures became part of the fee and therefore property of the city.⁴ The court touched on the question of whether ownership of the fee by the railroad with an easement for a highway by the city would affect the ownership of the viaduct or underpass, but outside of stating that a structure could be in aid of an easement and therefore an exception to the general law of fixtures, it refrained from any comment. This last point, although undeveloped by the court in the instant case, is fairly well settled,⁵ so that the police power of a city may be exercised to compel a servient tenant to protect one who passes over the land from recurring danger. The

³ *People ex rel. New York, O. & W. Ry. Co. v. State Board of Tax Comm'rs*, 215 N. Y. 434; 109 N. E. 547. The railway company for many years had possessed a franchise and operated its railroad through Schuyler Street in the city of Oswego. It was required to separate three grade crossings by the construction of an underpass and two overhead bridges. The question was whether these structures should be assessed against the railway as real estate. The court said, in part:

"But, because the prior location of the tracks was thus adjusted to the construction of the subway, which was forced upon the relator, it would be far-fetched to assume or hold that the subway was constructed in the interest of the railroad for the purpose of carrying its tracks. Moreover, this assessment was for the cost of the construction of the subway, and not for the value of the relator's rails which might be laid on top of it. . . . They were thus located for the sake of convenience or safety, and not with any idea that they would thereby become a fixture belonging to the relator. . . . As has already been stated, the subway and the overhead bridges were not constructed to enable the railroad to operate its road, which could have been done perfectly well without either, but they were constructed for the benefit and safety of the public and were part of the public street, and the relator was compelled to contribute to the cost of their construction, not to the end of acquiring a property in them, but as a burden which it might be justly called on to bear. If it be true, as asserted, that the subway was indirectly for the benefit of the relator in securing an avoidance of the dangers of a grade crossing, that benefit, just as was said in the paving case and in the power canal case, may be taken into account in estimating the value of the intangible special franchise."

⁴ *No. Pacific v. Duluth*, 208 U. S. 583, *Bris. R. R. v. F. U. C.*, 254 U. S. 304. ⁵ *Tiffany's Real Property—Fixtures. L. & N. v. Muncey*, 17 S. W. (2d) 423 (Ky. 1928).

⁶ *Reeves on Real Property*, vol. 1, p. 260, "Easements", *Tiffany, Real Property—Easements.*

theory that bridges are parts of the roads crossing them is upheld in many recent cases.⁶

In the case of the *City of Texarkana v. Texas & Pacific R. R.* (1917), 198 S. W. 804, the railroad objected to an assessment of taxes against it for a viaduct built by the railroad at its own expense. The tax was assessed by the city under the assumption that the viaduct was personalty.⁷ The majority opinion, after holding the viaduct to be realty and therefore included in the assessment against the railroad's realty in the city, stated that since the personalty tax, as assessed, was invalid, there was no need to decide whether the viaduct was property dedicated to public use and therefore exempt from taxation. This statement was followed by a few citations which evidenced an opinion by the court that the viaduct was so dedicated.⁸

At common law, and generally throughout the United States today, a dedication to the public is accomplished by an offer to the public to use certain property, followed by acceptance through user by the public, whereupon, although the fee remains in the donor, the beneficial use is in the public. Such property is exempt from taxation.⁹

An attempt by the city of Oswego to include in an assessment for a special tax on tangible property of a railroad two viaducts and a subway which had been constructed under compulsion by the railroad, resulted in the case of *People v. Bd. of Tax Commrs.*, 109 N. E. 547 (1915).¹⁰ The court ruled the assessment against the railroad was invalid on the ground that the viaducts and the underpass were the property of the city. The dictum in the opinion follows that of the *Purdy* case in stating that the benefits accruing to the railroad through avoidance of grade crossing accidents could be taken into account in assessing the special franchise tax. That the building of a grade crossing separation structure does not render the railroad entirely free from liability for personal injuries sustained at the crossing is evidenced by the case of *L. & N. v. Muncey*, 17 S. W. (2d) 422 (Ky. 1928).¹¹

From the above-mentioned cases and authorities, it appears that viaducts and underpasses are parts of the streets passing over or through them, and therefore the property of the governmental agency controlling the road, under the theory that they are property dedicated to public use, or that they are fixtures attached to the road, or that they are structures in aid

⁷ *Lemoine v. Thomas*, 157 So. 170 (La. 1934); *Schesser v. Manor Tp. Armstrong County*, 142 Atl. 323 (Pa. 1928); *City of Stamford v. Town of Stamford*, 124 Atl. 26 (Conn. 1924); *Geltesch et al. v. Van Syckle et al.*, 255 N. W. 245 (Mich. 1934).

⁸ L. R. A. 1916B, p. 1238 Anno.; 57 A. L. R. 865 anno. The decided weight of authority is to the effect that such structures are taxable as realty.

⁹ 8 R. C. L. 583, 4 R. C. L. 195-222.

¹⁰ 8 R. C. L. 910, *Iowa L. & Trust Co. v. Bd. of Supervs.*, 187 Iowa 160 (1919). Anno. 5 A. L. R. 1637. ¹¹ The decision in this case is quoted in part in footnote 2.

¹² This was an action brought against the city and a railroad for personal injuries sustained as a result of negligent repair of an overpass. The court held that the overpass was part of the city street system and it was the duty of the city to repair it, yet the common law liability of the railroad for injuries sustained by the public, due to negligent maintenance of the crossing, would operate to make the railroad jointly liable with the city.

of the easement for the street. Therefore, they are not assessable to the railroad as realty. Since they are realty they cannot be taxed as personalty.

It appears reasonable to conclude that, in the large, railroads pay little in the way of taxes on their share of the cost of grade crossing or related types of structures.

APPENDIX TABLES

TABLE III-5.—Costs incurred by railroads since dates of basic valuation in altering or reconstructing bridges over navigable waters in compliance with orders of War Department ¹

[Source: Compiled from records of the Bureau of Valuation, Interstate Commerce Commission, and the Office of Chief of Engineers, War Department]

System Present company Original company	Description	Costs affecting the investment account		Costs charged to operating expenses	Value of salvage recovered	Net money outlay to the carrier in making the change	Remarks
		For property installed (1)	For property retired (2)				
Atlantic Coast Lines: Atlantic Coast Lines R. Co. Wilmington Ry. Bridge Co.	Altering bridge over Okahumpka Run, between Lake Harris and Lake Dunham, Fla. ¹	\$3,110		\$420	(*)	\$3,530	The Wilmington Ry. Bridge Co. is operated jointly by Atlantic Coast Line R. R. Co. and Seaboard Air Line Ry. Co. Operating companies own entire capital stock, one-half each. Operating expenses shown, aggregating \$16,958, were absorbed by the operating companies.
	Installation of new lift bridge at Hilton, N. C., over northeast branch of Cape Fear River. ¹	32,842		16,958	\$1,595	48,205	
	Total—System.....	35,952		17,387	1,595	51,744	
Atchafalaya, Topeka & Santa Fe: Gulf & Interstate Ry. Co. of Texas.	Altering bridge over Mud Bayou near High Island, Tex.				(*)		Costs were paid for by the Federal Government.
Boston & Maine: Boston & Maine R. R.: Proprietors of Portsmouth Bridge.	Altering bridge over Piscataqua River between Portsmouth, N. H., and Kittery, Maine, by replacing 36-foot 9-inch railroad draw span with 57-foot span; replacing 38-foot 9-inch draw span, highway section of bridge, with 57-foot span; and installing machinery to operate. (Project completed in 1920.)	45,324	\$10,406	53,361	127	98,558	This bridge is a combined structure consisting of two pile bridges built side by side. Costs shown include the following applicable to the highway section of the bridge: Miscellaneous physical property: Costs for property installed... \$17,231 Costs for property retired... 4,116 Expenses of miscellaneous operations..... 23,158
Chesapeake & Ohio: Pere Marquette Ry. Co.	Replacing draw bridge over Black River, near Fort Huron, Mich., with single track bascule bridge. (Project completed in 1931.)	306,490	43,851	16,742	1,054	322,178	
Chicago, Burlington & Quincy R. R. Co.	Constructing bridge over Missouri River, at Kansas City, Mo., replacing old bridge adjacent thereto. (Project completed in 1915.) ¹	1,433,534	1,235,805	185,658	89,128	1,533,064	
	Altering bridge at La Salle, Ill., over Illinois River, by changing a fixed span to a lift span. (Project completed in 1915.) ¹	22,766			(*)	22,766	
	Altering bridge at La Salle, Ill., over Illinois River by replacing 150-foot truss span, 150-foot lift span, and pivot pier, with 258-foot 6-inch lift span and two 20-foot tower spans on two new piers, etc. (Project completed in 1934.)	211,722	35,278	7,910	(*)	210,632	
	Altering bridge at Ottawa, Ill., over Illinois waterway by converting 176-foot truss, channel span, into lift span with operating machinery, and adjoining 176-foot trusses into tower spans, etc. (Project completed in 1933.)	88,494	1,547	902	(*)	89,396	
	Total—System.....	1,756,516	1,272,630	194,470	89,128	1,864,858	
Chicago Great Western: Leavenworth Terminal Ry. & Bridge Co.	Altering bridge over Missouri River at Leavenworth, Kans., by installation of electric power for operating draw span. (Project completed in 1917.) ¹	4,117			(*)	4,117	
Chicago, Rock Island & Pacific: Chicago, Rock Island & Pacific Ry. Co.	Replacing bridge over Illinois waterway at Joliet, Ill., with new structure and raising grade at bridge approaches. (Project completed in 1931.)	1,169,833	103,863		(*)	1,169,833	
Kankakee & Seneca R. Co.	Replacing bridge over Illinois waterway at Seneca, Ill., with new "lift span" type bridge. (Project completed in 1934.)	116,842	30,308		(*)	116,842	
Choctaw, Oklahoma & Gulf R. R. Co.	Replacing bridge over White River at De Valls Bluff, Ark., with new structure having a lift span. (Project completed in 1928.)	574,411	105,200	96,052	39,191	631,272	
	Total—System.....	1,861,086	239,377	96,052	39,191	1,917,947	
Delaware & Hudson: Rensselaer & Saratoga R. R. Co.	Altering bridge over Hudson River at Troy, N. Y., by raising and widening, converting easterly fixed span into a movable lift span, etc. (Project completed in 1926.)	682,347	86,307	100,599	3,704	779,242	
Delaware, Lackawanna & Western: Morris & Essex R. R. Co.	Replacing drawbridge over Hackensack River at Marion, Jersey City, N. J., with a vertical lift bridge. (Project completed in 1928.)	3,745,184	496,623	31,580	9,647	3,767,117	

See footnotes on page 297.

TABLE III-5.—Costs incurred by railroads since dates of basic valuation in altering or reconstructing bridges over navigable waters in compliance with orders of War Department¹—Continued

System Present company Original company	Description	Costs affecting the investment account		Costs charged to operating expenses	Value of salvage recovered	Net money outlay to the carrier in making the change	Remarks
		For property installed	For property retired				
		(1)	(2)	(3)	(4)	(5)	
Detroit, Toledo & Ironton R. R. Co.	Replacing bridge over River Rouge Short-Cut Canal, Ecorse township, Wayne County, Mich., with single leaf trunnion bridge having girder approach, supported by two abutments, and one pier bascule and girder. (Project completed in 1923.)	\$385,808	\$23,584	\$38,484	(*)	\$424,292	
Elgin, Joliet & Eastern Ry. Co.	Altering bridge over Illinois waterway near Divine, Ill., by converting a truss span into a vertical lift span, adjoining truss spans into tower spans, etc. (Project completed in 1934.)	113,711	2,654	2,780	(*)	116,491	
	Replacing bridge over Des Plaines River (Illinois waterway) at Lockport, Ill., with structure having vertical skew truss lift span, tower spans, etc. (Project completed in 1934.)	435,864	41,215	13,578	\$3,975	445,467	
	Total—System.....	549,575	43,769	16,358	3,975	561,958	
Illinois Central R. R. Co....	Altering bridge over Illinois River at La Salle, Ill., by installing 340-foot through truss span, 134-foot 8-inch deck truss span, 37-foot 8-inch deck plate girder span, etc., in place of 106-foot deck truss draw span, two 160-foot deck truss spans, etc. (Project completed in 1933.)	191,330	105,030	55,952	1,737	245,545	
Inland Waterways Corporation: Warrior River Terminal Co. Ensley Southern Ry. Co.	Altering bridge over Locust Fork of Black Warrior River, near Short Creek, Ala.						No record of work being done.
Louisiana & Arkansas: Louisiana & Arkansas Ry. Co. Louisiana Ry. & Navigation Co.	Altering bridge over Bayou Manchac, near Hope Villa, La., by cutting out channel bents and placing 30-foot I beams across the cleared channel. (Project completed in 1915.) ¹			377	(*)	377	
Missouri Pacific: Texas & Pacific Ry. Co....	Altering bridge over Bayou Plaquemine, Plaquemine, La., by reconstructing fender protection. (Project completed in 1914.) ¹	1,863			(*)	1,863	
New York & Long Branch R. R. Co.	Altering bridge over Shark River (South Channel), N. J.						This work has not been done. An extension of time was secured, and the work was required to be completed by Aug. 30, 1936.
New York Central: Boston & Albany R. R. Co.	Altering bridge over Chelsea Creek, Boston Harbor, Mass., by constructing extension to southerly fender pier and removing 2 dolphins. (Project completed in 1922.)	8,855	1,286	239	328	8,766	
New York, Chicago & St. Louis R. R. Co.	Altering bridge over Calumet River, near Yates Avenue, Chicago, Ill., by retirement and replacement of center pier protection. (Project completed in 1935.)	13,412	3,617	1,148	17	14,543	
New York, New Haven & Hartford R. R. Co.	Removing jack-knife draw bridge over Fort Point Channel, Boston Harbor, Mass., pulling all obstructing piles, and repairing and filling in the gap in the timber guide pier in order to make it continuous. ¹		8,366	4,801	(*)	4,801	
Norfolk Southern R. R. Co.	Replacing draw bridge over Newport River (Gallants Channel) near Beaufort, N. C., with Scherzer rolling lift bridge. (Project completed in 1917.)	40,167	4,825	703	(*)	40,860	
	Extension of timber approach north end of bridge over Virginia Cut of inland waterway, Norfolk, Va., to Beaufort Inlet, N. C., formerly known as Albemarle & Chesapeake Canal; and extension of fender system. (Project completed in 1924.)	3,680		1,211	(*)	4,891	
	Replacing draw bridge over inland waterway, Virginia Cut, near Fentress, Va., with Scherzer rolling lift bridge. (Project completed in 1928.)	104,067	10,666	4,650	(*)	108,717	
	Total—System.....	147,904	15,491	6,564		154,458	
Pennsylvania: Pennsylvania R. R. Co.	Removal of pivot and fender piers and timber fenders between fender piers in Delaware River, south of Tranton, N. J. (Project completed in 1932.)		101,838		(*)		The superstructure of the proposed bridge across the Delaware River was never erected.
Delaware R. R. Co.....	Reconstructing bridge over inland waterway (Chesapeake & Delaware Canal). (Project completed in 1927.)	250,221	50,091	36,583	(*)	286,804	The costs shown are those borne by the carrier only, and do not include costs borne by the U. S. Government which are noted below: Cost of property installed..... \$478,432 Operating expense..... 73,376

See footnotes on page 297.

NONPRODUCTIVE EXPENDITURES

TABLE III-5.—Costs incurred by railroads since dates of basic valuation in altering or reconstructing bridges over navigable waters in compliance with orders of War Department—Continued

System Present company Original company	Description	Costs affecting the investment account		Costs charged to operating expenses	Value of salvage recovered	Net money outlay to the carrier in making the change	Remarks																
		For property installed	For property retired																				
		(1)	(2)																				
Pennsylvania—Continued. New York Bay R. R. Co.	Construction of bridge over Newark Bay at Greenville, N. J., consisting of one lift span, two truss spans, and 29 concrete and steel approach spans, piers, etc., replacing old bridge having 1 truss draw span, piers and approach trestles. (Project completed in 1930.)	\$5,064,674	\$529,550	\$366,758	(*)	\$5,481,427	This bridge is jointly owned by the New York Bay R. R. Co. and Lehigh Valley R. R. Co. of New Jersey (lessor of Lehigh Valley R. R. Co.). The costs shown include those borne by the New York Bay R. R. Co. and Lehigh Valley R. R. Co., as noted below:																
							<table border="1"> <thead> <tr> <th></th> <th>Costs for property installed</th> <th>Costs for property retired</th> <th>Costs charged to operating expense</th> </tr> </thead> <tbody> <tr> <td>N. Y. B. R. R.</td> <td>\$2,767,691</td> <td>\$408,774</td> <td>\$231,717</td> </tr> <tr> <td>L. V. R. R.</td> <td>2,296,983</td> <td>125,776</td> <td>135,036</td> </tr> <tr> <td>Total</td> <td>5,064,674</td> <td>534,550</td> <td>366,758</td> </tr> </tbody> </table>		Costs for property installed	Costs for property retired	Costs charged to operating expense	N. Y. B. R. R.	\$2,767,691	\$408,774	\$231,717	L. V. R. R.	2,296,983	125,776	135,036	Total	5,064,674	534,550	366,758
	Costs for property installed	Costs for property retired	Costs charged to operating expense																				
N. Y. B. R. R.	\$2,767,691	\$408,774	\$231,717																				
L. V. R. R.	2,296,983	125,776	135,036																				
Total	5,064,674	534,550	366,758																				
Philadelphia, Baltimore & Washington R. R. Co.	Altering bridge over Eastern Branch, Anacostia River, Washington, D. C., by replacing fixed span with lift span and installing mechanism for operating. (Project completed in 1918.) ¹	27,408	1,609	213	19	27,602																	
Pittsburgh, Fort Wayne & Chicago Ry. Co.	Raising bridge over Allegheny River at Eleventh Street, Pittsburgh, Pa. (Project completed in 1923.)	2,394,900	117,140	845,736	(*)	2,940,636	Costs shown include the following expenditures incurred by the Pennsylvania R. R. Co. in raising track and Duquesne Elevated to grade due to raising of Allegheny River bridge: Investment account: Costs for property installed... \$19,208 Operating expense..... 30,538 The costs shown include those borne by the carrier only, and do not include \$1,116,450 borne by New Jersey Highway Department in connection with installation of the new structures.																
United New Jersey R. R. & Canal Co.	Replacing freight line draw bridge and passenger line draw bridge over Hackensack River, west of Marion, N. J., with 2 new electrically operated vertical lift bridges. (This work was done in compliance with order of War Department served May 13, 1925.)	7,221,757	625,599	334,217	(*)	7,555,074																	
	Total—System.....	15,958,960	1,425,827	1,283,502	19	17,242,448																	
Pennsylvania-Reading Seashore Lines Pennsylvania-Reading Seashore Lines.	Altering fender at pivot pier of draw bridge over Beach Thorofare, Atlantic City, N. J., in order to make a better alignment with the fender of West Jersey and Seashore R. R. pivot pier. (Project completed in 1925.)	3,947		1,022	(*)	4,969																	
West Jersey & Seashore R. R. Co.	Connecting fender system between bridge over Beach Thorofare, Atlantic City, N. J., and Pennsylvania-Reading Seashore Lines draw bridge. (Project completed in 1925.)	5,164			(*)	5,164																	
	Altering bridge over Raccoon Creek, at Swedesboro, N. J., by replacing present bridge with 69-foot 8-inch half through girders on concrete abutments. (Project completed in 1914.) ¹	47,275	5,106	1,374	137	48,512																	
	Raising bridge over Big Timber Creek, at Westville, N. J., 7 feet 2 inches. (Project completed in 1918.)	82,469	2,078	24,496	(*)	105,965																	
	Total—System.....	133,855	7,184	25,892	137	165,610																	
Reading: Central R. R. Co. of New Jersey.	Raising bridge over Jake's Creek at Toms River, N. J. (Project completed in 1933.)	604			(*)	604																	
Seaboard Air Line: Seaboard Air Line Ry. Co.	Altering bridge over Nassau River near Yulee, Fla., by substituting a 45-foot through plate girder span with solid floor system for the old steel span, and installing a new fender system. (Project completed in 1913.) ¹	6,281	821	652	(*)	6,933																	
Georgia, Florida & Alabama R. R. Co.: Georgia, Florida & Alabama Ry. Co. Wilmington Ry. Bridge Co.	Altering bridge over Ochlocknee River, near McIntyre, Fla. Installation of new lift bridge at Hilton, N. C. over northeast branch of Cape Fear River. ¹						No record of work being done. See under Atlantic Coast Line System.																
	Total—System.....	6,281	821	652		6,933																	

See footnotes on page 297.

TABLE III-5.—Costs incurred by railroads since dates of basic valuation in altering or reconstructing bridges over navigable waters in compliance with orders of War Department—Continued

System Present company Original company	Description	Costs affecting the investment account		Costs charged to operating expenses	Value of salvage recovered	Net money outlay to the carrier in making the change	Remarks																				
		For property installed	For property retired																								
		(1)	(2)	(3)	(4)	(5)																					
Southern: Southern Ry. Co.-----	Altering bridge over Tombigbee River at Jackson, Ala.			\$1,878	(*)	\$1,878	Preliminary charges of \$1,878 were cleared to operating expenses. No further work has been done.																				
	Altering bridge over Tombigbee River, near McDowell, Ala., by installing turning mechanism and motor house for operation of swinging draw bridge. (Project completed in 1922.)	\$3,978			(*)	3,978																					
	Altering bridge over Congaree River, near Kingville, S. C., by installing two new spans, piers, etc. (Project completed in 1920.)	183,837	\$44,798	12,408	(*)	106,245																					
	Altering bridge over Mulberry Fork, Black Warrior River, near Cordova, Ala., by installing new lift span, and two new piers, and removing old span.	34,401		907	(*)	35,308																					
Alabama Great Southern R. R. Co.	Replacing bridge over Warrior River, near Eutaw, Ala., with steel single track vertical lift bridge. (Project completed in 1919.)	434,767	79,945	44,885	(*)	479,652	Bridge piers only have been erected, this work being completed in 1918. War Department suspended its order requiring the alteration until further notice, and work was discontinued.																				
	Total--System-----	656,963	124,743	60,078		717,061																					
Southern Pacific: Southern Pacific Co.-----	Altering bridge over Oakland Harbor at Harrison Street, Oakland, Calif.						This work has never been performed. Bridge has subsequently been dismantled.																				
Texas & New Orleans R. R. Co.	Altering bridge over Green's Bayou near Houston, Tex., by replacing two 24-foot girder spans with one 48-foot deck plate girder. ¹	2,489		1,198	(*)	3,687																					
Galveston, Harrisburg & San Antonio Ry. Co.	Altering bridge over Brays Bayou, at Harrisburg, Tex., by replacing 30-foot deck plate girder span with a 50-foot lift bridge. ¹	5,327	1,405		(*)	5,327	This structure is jointly owned by the following: Texas & New Orleans R. R. Co. Galveston, Houston & Henderson R. R. Co. Gulf, Colorado & Santa Fe Ry. Co. Galveston-Houston Electric Ry. Co. Galveston County, Tex. The costs shown include those borne by the Galveston, Harrisburg & San Antonio Ry. Co., Galveston, Houston & Henderson R. R. Co., and Gulf, Colorado & Santa Fe Ry. Co., only, as noted below:																				
	Reconstruction of causeway over West Galveston Bay, between Galveston Island and Virginia Point, Tex., which was destroyed in storm of Aug. 6, 1915. (Project completed in 1922.)	870,903	377,496	79,870	(*)	950,773																					
							<table border="1"> <thead> <tr> <th></th> <th>Costs for property installed</th> <th>Costs for property retired</th> <th>Costs charged to operating expense</th> </tr> </thead> <tbody> <tr> <td>G. H. & S. A....</td> <td>\$239,846</td> <td>\$125,832</td> <td>\$26,448</td> </tr> <tr> <td>G. H. & H.....</td> <td>289,846</td> <td>125,832</td> <td>26,448</td> </tr> <tr> <td>G., C. & S. F..</td> <td>291,211</td> <td>125,832</td> <td>26,974</td> </tr> <tr> <td>Total-----</td> <td>870,903</td> <td>377,496</td> <td>79,870</td> </tr> </tbody> </table>		Costs for property installed	Costs for property retired	Costs charged to operating expense	G. H. & S. A....	\$239,846	\$125,832	\$26,448	G. H. & H.....	289,846	125,832	26,448	G., C. & S. F..	291,211	125,832	26,974	Total-----	870,903	377,496	79,870
	Costs for property installed	Costs for property retired	Costs charged to operating expense																								
G. H. & S. A....	\$239,846	\$125,832	\$26,448																								
G. H. & H.....	289,846	125,832	26,448																								
G., C. & S. F..	291,211	125,832	26,974																								
Total-----	870,903	377,496	79,870																								
							The following costs borne by the Galveston-Houston Electric Ry. Co. and Galveston County have not been included:																				
							<table border="1"> <thead> <tr> <th></th> <th>Costs for property installed</th> <th>Costs for property retired</th> <th>Incidental operating expense</th> </tr> </thead> <tbody> <tr> <td>G. H. E.-----</td> <td>\$365,580</td> <td>\$126,188</td> <td>\$21,555</td> </tr> <tr> <td>Galveston Co..</td> <td>1,312,706</td> <td>123,107</td> <td>61,214</td> </tr> <tr> <td>Total-----</td> <td>1,678,286</td> <td>249,295</td> <td>82,769</td> </tr> </tbody> </table>		Costs for property installed	Costs for property retired	Incidental operating expense	G. H. E.-----	\$365,580	\$126,188	\$21,555	Galveston Co..	1,312,706	123,107	61,214	Total-----	1,678,286	249,295	82,769				
	Costs for property installed	Costs for property retired	Incidental operating expense																								
G. H. E.-----	\$365,580	\$126,188	\$21,555																								
Galveston Co..	1,312,706	123,107	61,214																								
Total-----	1,678,286	249,295	82,769																								
	Total--System-----	878,719	378,901	81,068		959,787																					
St. Louis-San Francisco: St. Louis-San Francisco Ry. Co.: Kansas City, Memphis & Birmingham R. R. Co.	Altering bridge over Mulberry Fork, Black Warrior River, near Cordova, Ala.	30,297			(*)	30,297	The project was not completed, 2 bridge piers only having been constructed.																				
Wabash Railway Co.-----	Altering bridge over Rouge River, at Detroit, Mich., by replacing 184-foot swing through truss span with 162-foot bascule span, 73-foot 6-inch tower span, two 54-foot 10-inch spans, etc. (Project completed in 1923.)	534,239	88,993	78,454	3,841	606,852																					
	Grand total-----	27,940,701	4,374,496	2,164,760	151,500	26,653,961																					

*No record.

¹ This statement also includes costs for those projects indicated which were completed prior to respective dates of basic valuation and are included in basic valuation reports. The approximate over-all period is from 1919 to about 1935.

² This project was completed subsequently to date of basic valuation but is included in basic valuation report.

NONPRODUCTIVE EXPENDITURES

TABLE III-6.—Number of persons killed or injured at grade crossings, 1890-1936

[From Accident Bulletins, Bureau of Statistics, Interstate Commerce Commission. From 1890 through 1916 figures are for fiscal years and thereafter for calendar years]

Year	Killed	Injured	Year	Killed	Injured
1890	402	675	1906	929	1,892
1891	564	863	1907	934	1,817
1892	568	942	1908	837	1,762
1893	596	1,064	1909	735	1,833
1894	571	817	1910	839	1,939
1895	508	961	1911	992	2,434
1896	615	1,068	1912	1,032	2,506
1897	575	1,033	1913	1,125	3,080
1898	657	1,123	1914	1,147	2,635
1899	674	1,087	1915	1,066	2,981
1900	730	1,297	1916	1,652	3,859
1901	831	1,354	1917	1,969	4,764
1902	827	1,335	1918	1,852	4,683
1903	898	1,481	1919	1,784	4,616
1904	808	1,463			
1905	838	1,574	Total 1890-1919	27,576	80,228

TABLE III-6.—Number of persons killed or injured at grade crossings, 1890-1936—Continued

[From Accident Bulletins, Bureau of Statistics, Interstate Commerce Commission. From 1890 through 1916 figures are for fiscal years and thereafter for calendar years]

Year	Killed	Injured	Year	Killed	Injured
1920	1,791	5,077	1934	1,584	4,307
1921	1,705	4,868	1935	1,080	4,038
1922	1,810	5,383	1936	1,786	4,930
1923	2,268	6,314			
1924	2,149	6,525	Total 1920-36	33,731	98,544
1925	2,206	6,555			
1926	2,491	6,991	Grand total	61,806	163,773
1927	2,371	6,612			
1928	2,568	6,666			
1929	2,485	6,804			
1930	2,020	5,517			
1931	1,811	4,657			
1932	1,525	3,989			
1933	1,511	3,690			

TABLE III-7.—Train and train-service accidents and persons killed and injured at highway grade crossings involving motor vehicles, by type of vehicle, 1922-36

[From Accident Bulletins, Bureau of Statistics, Interstate Commerce Commission]

Year	Passenger automobiles			Motorbuses			Motortrucks			Motorcycles and bicycles			Train accidents without casualties but with damage to railway property in excess of \$150 ¹			Accidents involving passenger autos, buses, and trucks	Total accidents
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Passenger autos	Motor-buses	Motor-trucks		
1922	2,457	1,094	3,471	35	40	159	732	225	863	53	20	39	10	—	33	2,776	3,329
1923	3,172	1,472	4,446	30	25	84	805	262	866	40	19	29	8	1	21	4,032	4,073
1924	3,237	1,420	4,675	24	26	87	778	232	888	37	15	29	7	—	5	4,161	4,188
1925	3,707	1,545	4,916	26	12	96	818	227	904	32	13	22	9	1	15	4,576	4,606
1926	4,078	1,768	5,350	31	15	106	861	281	902	26	18	13	8	—	19	4,997	5,028
1927	3,901	1,690	4,984	30	30	98	887	254	936	31	18	17	10	—	19	4,837	4,868
1928	4,030	1,820	5,071	23	9	108	950	336	1,039	33	10	26	21	2	20	5,046	5,076
1929	4,207	1,741	5,321	28	7	71	906	337	955	42	22	26	32	—	24	5,191	5,233
1930	3,462	1,426	4,379	12	38	43	740	231	784	32	17	21	21	—	22	4,262	4,294
1931	2,905	1,331	3,583	8	10	32	664	239	721	19	5	15	24	1	25	3,625	3,644
1932	2,520	1,100	3,208	8	4	18	532	206	557	28	12	19	21	—	21	3,108	3,131
1933	2,287	1,091	2,891	6	10	32	518	204	573	18	12	9	22	—	21	2,863	2,871
1934	2,659	1,062	3,416	8	2	15	599	256	656	12	8	8	22	—	29	3,317	3,329
1935	2,747	1,133	3,576	12	21	80	690	268	778	19	9	12	28	—	32	3,504	3,523
1936	2,929	1,193	3,758	13	9	58	764	317	851	26	18	15	32	1	41	3,780	3,806
Total	48,398	20,904	63,044	293	268	1,080	11,238	3,875	12,353	448	212	300	289	7	345	60,570	61,018

¹ Motorcycles and bicycles were not involved in any accidents where the damage to railway property was in excess of \$150.

TABLE III-8.—Distribution of accidents at grade crossings, including ratio of motor vehicle passenger casualties to motor vehicles registered, 1917-36

[From Accident Bulletins, Bureau of Statistics, Interstate Commerce Commission]

Year	Motor-vehicle casualties						Passengers in other vehicles, and miscellaneous accidents		Pedestrians		Grand total	
	Passengers		Motor vehicles registered	Casualties per 10,000 vehicles registered			Killed	Injured	Killed	Injured	Killed	Injured
	Killed	Injured		Killed	Injured	Total casualties						
1917	1,083	3,000	4,983	2.17	6.02	8.10	352	1,316	534	448	1,900	4,764
1918	1,131	3,109	6,147	1.84	5.06	6.90	299	1,245	452	326	1,852	4,653
1919	1,232	3,558	7,565	1.63	4.30	6.23	177	735	375	323	1,794	4,616
1920	1,273	3,977	9,222	1.38	4.71	5.69	153	778	365	322	1,791	5,077
1921	1,262	4,026	10,466	1.21	3.85	5.05	137	585	306	266	1,708	4,866
1922	1,359	4,493	12,238	1.11	3.67	4.78	177	618	274	272	1,810	5,383
1923	1,759	5,416	15,092	1.17	3.59	4.75	143	590	366	308	2,268	6,314
1924	1,688	5,650	17,592	.96	3.21	4.17	138	617	322	268	2,140	6,525
1925	1,784	5,916	19,954	.89	2.96	3.86	122	366	299	273	2,206	6,555
1926	2,062	6,358	22,001	.94	2.89	3.83	129	372	300	261	2,491	6,991
1927	1,974	6,068	23,127	.85	2.62	3.48	98	310	304	235	2,371	6,612
1928	2,165	6,218	24,493	.88	2.54	3.42	100	239	303	209	2,568	6,666
1929	2,085	6,347	26,501	.79	2.40	3.18	83	223	317	234	2,485	6,804
1930	1,695	5,205	20,524	.64	1.98	2.60	64	146	261	165	2,020	6,517
1931	1,580	4,336	25,814	.61	1.68	2.29	59	164	192	157	1,811	4,657
1932	1,310	3,778	24,137	.54	1.57	2.11	39	105	176	106	1,525	3,989
1933	1,305	3,496	23,827	.55	1.47	2.01	35	81	171	130	1,511	3,690
1934	1,320	4,009	24,933	.53	1.64	2.17	34	97	200	104	1,584	4,307
1935	1,442	4,434	26,221	.55	1.69	2.24	35	116	203	105	1,080	4,038
1936	1,519	4,662	28,221	.54	1.65	2.19	45	129	222	139	1,786	4,930
Total	31,028	94,146	—	—	—	—	2,365	8,836	5,943	4,626	39,336	107,607

TABLE III-9.—Number of grade crossings protected and unprotected, class I railroads, 1928-36, by districts

[From detail underlying data in Statistics of Railways in the United States, Bureau of Statistics, Interstate Commerce Commission]

Year	District	Total number of crossings	Crossings protected		Crossings unprotected	
			Number	Percent	Number	Percent
1928	Eastern	55,668	15,685	28.0	49,983	75.0
	Southern	46,135	3,157	7.0	42,978	93.0
	Western	128,286	10,373	8.0	117,913	92.0
	Total	240,089	29,215	12.0	210,874	88.0
1929	Eastern	55,568	16,208	29.2	39,360	70.8
	Southern	45,129	5,245	11.6	39,884	88.4
	Western	130,052	10,737	8.2	119,315	91.8
	Total	242,800	30,190	12.4	212,610	87.6
1930	Eastern	64,263	15,919	24.8	48,344	75.2
	Southern	46,024	3,366	7.3	42,658	92.7
	Western	130,384	11,002	8.4	119,382	91.6
	Total	240,671	30,287	12.6	210,384	87.4
1931	Eastern	63,004	16,600	26.3	46,404	73.7
	Southern	41,734	3,410	8.2	38,324	92.0
	Western	130,279	11,042	8.5	119,237	91.5
	Total	235,017	31,052	13.2	203,965	86.8
1932	Eastern	66,076	16,446	24.9	49,630	74.9
	Southern	41,516	3,401	8.2	38,115	92.0
	Western	129,443	10,962	8.4	118,481	92.0
	Total	237,035	30,809	13.0	206,226	87.0

TABLE III-9.—Number of grade crossings protected and unprotected, class I railroads, 1928-36, by districts—Continued

[From detail underlying data in Statistics of Railways in the United States, Bureau of Statistics, Interstate Commerce Commission]

Year	District	Total number of crossings	Crossings protected		Crossings unprotected	
			Number	Percent	Number	Percent
1933	Eastern	65,458	16,368	25.0	49,090	75.0
	Southern	41,316	3,367	8.1	37,949	91.9
	Western	129,053	10,893	8.4	118,160	91.6
	Total	235,827	30,628	13.0	205,199	87.0
1934	Eastern	65,160	16,015	24.6	49,145	75.4
	Southern	41,297	3,348	8.1	37,949	92.0
	Western	128,363	10,563	8.2	117,800	91.8
	Total	234,820	30,226	12.9	204,594	87.1
1935	Eastern	64,921	15,888	24.5	49,033	75.5
	Southern	40,933	3,415	8.3	37,518	91.7
	Western	128,377	10,997	8.5	117,380	91.5
	Total	234,231	30,200	12.9	204,031	87.1
1936	Eastern	64,737	15,942	24.6	48,795	75.4
	Southern	40,836	3,497	8.6	37,339	91.4
	Western	127,829	11,027	8.6	116,802	91.4
	Total	233,402	30,466	13.1	202,936	87.0

TABLE III-10.—Grade crossings at the end of each year with the kind of protection afforded, 1928-36

[From Statistics of Railways in the United States, 1928-36, Bureau of Statistics, Interstate Commerce Commission]

Kind of protection	1928	1929	1930	1931	1932	1933	1934	1935	1936
Gates, with or without other protection, operated 24 hours per day	3,282	3,168	2,947	2,919	2,821	2,737	2,704	2,670	2,687
Gates, with or without other protection, operated less than 24 hours per day	2,475	2,288	2,060	1,983	1,916	1,810	1,716	1,644	1,567
Watchman, alone or without protection other than gates on duty 24 hours	1,303	1,258	1,200	1,216	1,188	1,269	1,203	1,220	1,200
Watchmen, or with protection other than gates on duty less than 24 hours	5,994	5,779	5,454	5,214	4,963	4,772	4,452	4,308	4,206
Both audible and visible signals, without other protection	8,004	8,815	9,139	9,867	10,025	10,109	10,253	10,330	10,549
Audible signals only	4,572	4,244	3,959	3,792	3,646	3,543	3,476	3,450	3,354
Visible signals only	8,635	4,638	5,468	6,071	6,250	6,338	6,442	5,578	6,958
Total specially protected	29,215	30,190	30,287	31,052	30,809	30,578	30,226	30,200	30,466
Special fixed signs or barriers, with or without standard fixed signs	34,508	36,275	35,543	32,223	31,100	32,126	32,050	31,719	31,111
Standard fixed signs only	171,425	171,679	170,191	170,223	170,460	168,603	166,720	165,621	164,384
Otherwise unprotected	4,941	4,465	4,652	4,519	4,666	4,470	5,824	6,691	6,941
Total not specially protected	210,874	212,619	210,386	208,965	206,226	205,199	204,594	204,031	202,496
Grand total	240,089	242,809	240,673	239,017	237,035	235,777	234,820	234,231	232,902

TABLE III-11.—United States Public Works railroad-highway grade separations as of June 30, 1935, by States

[From Bureau of Public Roads, Department of Agriculture]

State	Total cost	Number of structures	State	Total cost	Number of structures
Alabama	\$290,042	10	Kentucky	\$192,581	6
Arizona	543,636	12	Louisiana	337,371	6
Arkansas	508,941	9	Maine	137,764	1
California	2,351,410	15	Maryland	96,705	1
Colorado	676,390	20	Massachusetts	183,094	3
Florida	264,192	5	Michigan	775,929	9
Georgia	532,379	19	Minnesota	1,263,922	38
Idaho	725,537	8	Mississippi	436,799	19
Illinois	5,281,006	88	Missouri	964,734	30
Indiana	1,269,217	17	Montana	324,404	10
Iowa	738,647	28	Nebraska	531,407	9
Kansas	1,028,063	10	Nevada	\$136,370	5

TABLE III-11.—United States Public Works railroad-highway grade separations as of June 30, 1935, by States—Continued

[From Bureau of Public Roads, Department of Agriculture]

State	Total cost	Number of structures	State	Total cost	Number of structures
New Hampshire	\$101,381	2	Tennessee	\$197,603	8
New Jersey	683,718	10	Texas	2,315,103	55
New Mexico	640,139	10	Utah	242,874	6
New York	1,690,829	22	Vermont	8,264	1
North Carolina	323,918	17	Virginia	875,362	21
North Dakota	176,456	7	Washington	735,288	16
Ohio	372,280	2	West Virginia	371,744	6
Oklahoma	278,923	10	Wisconsin	818,433	15
Oregon	324,653	8	Wyoming	169,185	3
Pennsylvania	791,214	10	Total	30,879,466	682
South Carolina	177,899	12			
South Dakota	159,718	5			

NONPRODUCTIVE EXPENDITURES

TABLE III-12.—Current status of United States Works Program grade-crossing projects (as provided by the Emergency Relief Appropriation Act of 1935) as of Sept. 30, 1937

[From: Bureau of Public Roads, Department of Agriculture]

State	Apportionment	Completed					Under construction					Approved for construction					Balance of funds available for new projects
		Estimated total cost	Works Program funds	Number			Estimated total cost	Works Program funds	Number			Estimated total cost	Works Program funds	Number			
				Grade crossings eliminated by separation or relocation	Grade-crossing structures reconstructed	Grade crossings protected by signals or otherwise			Grade crossings eliminated by separation or relocation	Grade-crossing structures reconstructed	Grade crossings protected by signals or otherwise			Grade crossings eliminated by separation or relocation	Grade-crossing structures reconstructed	Grade crossings protected by signals or otherwise	
Alabama	\$4,034,617	\$3,037,998	\$3,020,448	42	1	12	\$882,072	\$882,072	7			\$185,100	\$108,800	4			\$23,297
Arizona	1,259,099	1,113,688	1,079,056	13			185,468	163,059	2			6,403	6,403				7,581
Arkansas	3,574,060	2,764,944	2,748,164	48	8	3	634,348	633,613	7			160,817	160,347	1		26	82,036
California	7,486,362	5,603,168	5,384,827	38	8		1,082,369	1,079,589	9			10,000	10,000	6			11,946
Colorado	2,631,667	1,462,997	1,400,633	19	1		881,188	881,188	9	1		377,010	339,301	3		31	10,444
Connecticut	1,712,684	297,379	297,379	3	1	1	1,341,801	1,320,440	3								94,865
Delaware	418,239	180,000	180,000	1			277,993	277,993	2								10,246
Florida	2,827,883	2,181,925	2,178,863	26	6	2	342,524	341,918	5			132,520	132,520			78	174,583
Georgia	4,895,949	252,377	250,635	7	4	1	1,369,471	1,369,471	28	7	4	808,650	808,650	10	2	47	2,466,993
Idaho	1,674,479	1,261,332	1,263,853	19	2	9	399,821	398,731	4			4,921	4,921			4	18,974
Illinois	10,307,184	7,753,806	7,708,056	60	7		2,368,150	2,368,150	13	1		226,000	226,000	2			6,978
Indiana	5,111,096	3,682,911	3,424,333	32	12		1,626,288	1,625,286	10		163						61,477
Iowa	5,600,679	4,128,087	4,041,559	90	9	7	1,480,254	1,477,631	17			80,407	68,690		1		12,799
Kansas	5,246,253	4,000,835	3,939,399	54		5	1,273,119	1,253,704	4	1		108,004	18,000	2			88,155
Kentucky	3,672,387	1,195,369	1,187,927	16	4		2,148,221	1,858,489	8	7		573,365	573,365	4	1		82,608
Louisiana	3,213,467	1,260,353	1,260,353	13	1		1,099,237	1,096,219	11	1		842,856	776,660	7	1		81,330
Maine	1,426,861	1,069,189	1,066,911	19		2	375,052	327,380	1	2		4,380	4,380		2		28,100
Maryland	2,061,751	501,739	501,739	3	3	16	759,670	759,670	5	1	3	590,362	517,893	4	1	11	282,449
Massachusetts	4,210,633	2,035,116	2,035,031	17	4		1,709,751	1,709,751	9			249,991	249,991	1			216,000
Michigan	6,785,197	5,983,269	5,767,480	43	6		889,077	898,008	1	2		48,500	48,500		1		55,609
Minnesota	5,395,441	4,190,471	4,095,559	77	13	39	1,298,905	1,288,752	9	1	11						11,131
Mississippi	3,241,476	1,896,681	1,896,417	42	4	2	819,408	819,408	13	3	6	77,000	77,000	2		18	448,650
Missouri	6,142,153	2,337,883	2,278,386	24	1		3,976,910	3,842,469	25		1	1,550	1,550		1		19,660
Montana	2,722,327	2,621,142	2,534,020	37	7		245,876	185,931	1	1							2,376
Nebraska	3,556,441	2,659,232	2,622,097	73	3	18	713,269	713,266	8		1	219,670	194,632	6		5	26,446
Nevada	887,260	885,084	857,417	8	3		13,308	13,308				3,630	3,630				6
New Hampshire	822,484	643,076	643,031	6	4		292,094	267,946	4		2	11,608	11,608				6
New Jersey	3,983,826	1,368,744	1,357,699	12	3	1	2,527,814	2,527,814	12	6		44,730	44,730		1		58,583
New Mexico	1,725,286	1,647,440	1,637,999	18	1		82,384	82,384	1								4,908
New York	13,677,189	9,429,245	9,154,721	30	34		4,151,280	4,151,290	15	16		94,000	94,000				177,189
North Carolina	4,823,958	3,087,524	3,082,898	42	18		1,223,939	1,208,439	16		108	431,270	431,270	4			101,850
North Dakota	3,207,473	2,227,259	2,223,850	45	4		983,486	983,486	11	1							131
Ohio	8,439,897	1,790,539	1,681,388	12	3	2	6,090,644	5,627,411	34	6	1	963,579	932,874	1	3	10	198,225
Oklahoma	5,004,711	3,448,816	3,441,297	54	7	4	1,476,291	1,343,194	11	4	3	202,170	202,170		1	84	18,050
Oregon	2,334,204	2,239,057	2,154,389	16	6	2	164,842	161,937	2								17,878
Pennsylvania	11,483,613	5,051,439	4,649,856	66	14	9	6,874,416	6,396,082	30	9		180,473	180,473	5			267,202
Rhode Island	699,991	653,760	652,694	4	2		44,814	44,314		1							2,683
South Carolina	3,069,956	1,361,019	1,342,028	28	8	4	1,205,870	1,198,439	17	7	24	211,477	211,477	1	1	20	308,011
South Dakota	3,249,086	2,040,762	2,040,076	40	5	50	991,229	991,229	25	1	3	269,350	210,393	17			7,300
Tennessee	3,903,979	1,164,324	1,154,641	23	3	23	2,238,340	2,238,340	22			250,230	250,230	1	1	13	290,768
Texas	10,855,962	9,409,434	9,402,106	123	14	64	788,900	786,797	4	1	6	372,165	360,311		1	80	306,769
Utah	1,230,703	930,600	929,195	12	1	1	290,423	290,423	5								11,145
Vermont	729,857	660,407	633,839	7	6	17	204,133	187,274	3	1	3						8,744
Virginia	3,774,287	2,347,895	2,238,024	39	16	13	1,375,798	1,369,173	11	4		159,260	157,246	2	2	11	9,842
Washington	3,095,041	2,459,830	2,429,602	21	11	9	640,152	639,726	2	1		4,562	4,562				21,151
West Virginia	2,677,937	266,614	266,614	3		4	2,308,846	2,306,878	20	4	1	27,947	27,947	3			76,498
Wisconsin	5,022,683	4,054,169	4,018,147	37	5		973,618	973,618		2		68,667	29,367			19	1,550
Wyoming	1,360,841	1,164,879	1,164,770	12			189,365	189,365	2								6,706
District of Columbia	410,804	417,779	410,804	3													
Hawaii	453,703	293,667	292,776	3													2,556
Total	196,000,000	123,155,101	120,761,189	1,468	269	320	63,609,387	61,707,904	465	90	357	7,067,414	7,440,797	94	18	406	6,090,110

TABLE III-12.—Number of railroad grade crossings eliminated from Federal-aid system with Federal aid from 1917 to Dec. 31, 1932, by States

[From Bureau of Public Roads, Department of Agriculture]

	Number of crossings eliminated with Federal aid by—				Total	
	Grade separation		Relocation of highway			
	Primary roads	Secondary roads	Primary roads	Secondary roads	Primary roads	Secondary roads
Alabama.....	24	26	83	75	107	101
Arizona.....	4	9	8	25	12	34
Arkansas.....	12	3	65	32	77	35
California.....	26	4	17	5	43	9
Colorado.....	17	2	35	15	52	17
Connecticut.....	12	2	2	6	14	8
Delaware.....	2	0	0	3	2	3
Florida.....	3	6	36	27	39	33
Georgia.....	18	17	104	175	122	193
Idaho.....	19	5	36	17	49	22
Illinois.....	26	27	59	75	85	103
Indiana.....	19	10	81	33	100	43
Iowa.....	37	31	105	51	142	82
Kansas.....	22	12	117	72	139	84
Kentucky.....	15	12	58	29	68	41
Louisiana.....	5	3	28	15	33	18
Maine.....	1	0	16	17	17	17
Maryland.....	3	3	1	6	4	14
Massachusetts.....	7	11	9	10	16	21
Michigan.....	21	12	24	55	45	67
Minnesota.....	61	26	160	119	221	147
Mississippi.....	15	13	54	45	69	59
Missouri.....	46	16	48	21	94	37
Montana.....	22	7	61	51	83	58
Nebraska.....	12	8	59	80	81	88

TABLE III-13.—Number of railroad grade crossings eliminated from Federal-aid system with Federal aid from 1917 to Dec. 31, 1932, by States—Continued

	Number of crossings eliminated with Federal aid by—				Total	
	Grade separation		Relocation of highway			
	Primary roads	Secondary roads	Primary roads	Secondary roads	Primary roads	Secondary roads
Nevada.....	9	2	23	29	32	31
New Hampshire.....	4	1	10	9	14	10
New Jersey.....	9	9	9	9	18	18
New Mexico.....	8	4	6	33	14	37
New York.....	19	16	18	29	37	45
North Carolina.....	14	15	63	55	77	71
North Dakota.....	17	1	107	73	124	74
Ohio.....	28	7	25	49	53	56
Oklahoma.....	22	36	39	95	61	131
Oregon.....	12	3	27	22	39	25
Pennsylvania.....	17	33	58	77	75	115
Rhode Island.....	3	4	0	1	3	5
South Carolina.....	18	6	113	87	126	93
South Dakota.....	19	3	43	44	62	47
Tennessee.....	7	12	65	30	72	42
Texas.....	61	72	217	317	278	390
Utah.....	3	8	23	15	31	23
Vermont.....	1	1	12	2	13	3
Virginia.....	7	13	46	48	53	61
Washington.....	3	3	56	24	64	27
West Virginia.....	7	7	27	18	34	25
Wisconsin.....	39	26	111	90	150	116
Wyoming.....	11	5	28	28	39	33
Hawaii.....	0	0	2	4	2	4
Total.....	756	564	2,399	2,251	3,155	2,815

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936. 1

(a) First cost. (b) Maintenance]

Alabama..... (a) No State law; in the past, the division of cost has usually been worked out on a 50-50 basis.
(b) Generally same as (a).

Arizona..... (a) No State law; division of cost result of negotiation; with few exceptions, by agreement railroad assumed 35 percent.
(b) Overpasses, State maintains entire structure; underpasses, with few exceptions railroad maintains entire structure.

Arkansas..... (a) Law provides that highway commission may participate to the extent of 50 percent of the cost of grade separation; when left to it, the commission has assessed railroads in some cases 50 percent of structure and approaches and in other cases 50 percent of structure only.
(b) Under agreement between railroads and commission, new structures are maintained by commission.

California..... (a) Division of the costs of grade separation structures is not covered by State law. Allocation of the costs of grade separation structures comes under the jurisdiction of the California Railroad Commission. While the Commission has no established procedure for dividing the costs between the interested parties, it does, from time to time, follow certain rules which are subject to change to fit the exigencies of the situation under consideration. Prior to 1933 the Commission had very well-defined methods for dividing the costs between the railroad or railroads on one side and the State and/or political subdivisions thereof on the other. Such division was as follows: (1) Where an existing grade crossing was eliminated, each party at interest was assessed 50 percent of the cost between beginning and end of new construction, based upon providing for existing traffic needs of both railroad and highway, including property damage. (2) If a grade separation were constructed on new alignment without effecting a closing of an existing grade crossing, 75 percent of the cost was assessed to the party at interest whose construction work made the grade separation necessary. (3) Where a grade separation was merely incidental to some major construction work, such as a bridge over a ravine or river and the existence of a railroad along the ravine or water course was incidental, then various methods of analysis were adopted to determine the extra cost occasioned by the presence of the railroad, which cost was apportioned according to the requirements of subdivisions (1) and (2).
However, in 1933 the railroads attacked the problem on the theory that such costs should be allocated between the parties at interest upon the basis of benefits derived by each, which at the same time would determine whether the grade separations were economically feasible.
Since all such construction in the recent past has been initiated by the public bodies, the Commission's policy now appears to be to determine the yearly saving by the railroads in the event a grade separation were built, such as crossing and crossing-protection costs and costs of accidents, etc., and to assess a capitalization of this amount to the railroad and permitting the public to assume the rest of the cost.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

California (contd.)..... (b) In most cases by agreement the following conditions prevail: (1) Overgrade structures maintained by public. (2) On undergrade crossings railroad maintains deck. All other portions, including pumping, lighting, paving, and abutments, maintained by public. The decisions of the Commission where the question was hotly contested by both sides are limited; however, it would appear from the small number available that (1) On undergrades the railroad is assessed with the maintenance of the "track supporting structure." (2) On overgrades the maintenance is assessed to public, but there is a tendency lately to assess a portion of the maintenance costs to the railroads.

Colorado..... (a) All authority for division of cost vested in Public Utilities Commission, which usually enters an order for division in accordance with advance agreement reached between highway department and carrier. The agreed division is not at all uniform, but generally it has heretofore been approximately one-half the cost of the structure falling between right-of-way lines of the carrier, which in most cases amounts to about one-fourth the cost of separation structure, including approaches.
(b) Maintenance provisions vary with type of structure, but usually agreements with highway department provide for relieving the carrier from maintenance of highway surface, drainage, lighting, and all approach maintenance.

Connecticut..... (a) In general in this State the statutory scheme has two phases, which for convenience may be called the old and the new. The old relates to highway crossings and structures in towns, cities, and boroughs prior to the inauguration of a State highway system. The new relates to State highways or roads over which the State highway commissioner has been given jurisdiction. The section numbers hereinafter given are the pertinent sections of the General Statutes of Connecticut, Revision of 1930.
Old-scheme statutes: Sec. 3668 (amended by sec. 1417c, cumulative supplement to the General Statutes). *Removal of grade crossings.*—Under this section a town, city, or borough, or the directors of a railroad, may petition the Public Utilities Commission for an alteration or removal of a grade crossing. If the directors of a railroad are the petitioners, the company must pay all the costs. If petition is brought by the town, city, or borough and the highway was in existence when the railroad was constructed, the Commission may order an amount not exceeding one-quarter of the total expense to be paid by the petitioner, the remainder of the expense to be paid by the railroad company. If the highway was constructed after the railroad, the Commission may order not more than one-half of the expense to be paid by the petitioner.
Sec. 3674. *Change in location of highways crossed by a railroad.*—This section relates to structures in a highway which passes over or under a railroad. A town, city, or borough may petition the Commission for a change in the structure. The expense of any change ordered must be apportioned among the railroad company, the town, city, or borough interested and any street railway company

See footnote on page 304.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Connecticut (contd.). (e) whose tracks are located in such highway in such manner as the Commission shall deem equitable, but in no case shall an amount in excess of one-half of the cost be assessed upon any town, city, or borough.

Sec. 3668. *New highway across railroad: expense.*—A new highway constructed across a railroad must pass over or under the railroad. One-half of the expense of such crossing must be borne by the company and one-half by the municipality.

Sec. 3670. *Commission may order removal of crossings.*—The Commission, on its own motion, may order the elimination of a grade crossing and the construction of not more than one bridge in any one year on any one railroad. In such a proceeding one-fourth of the expense must be paid by the State, the remainder to be assessed upon the railroad company.

New-scheme statutes: Sec. 1518 and 1519 (as amended by sec. 534c, cumulative supplement to the General Statutes). *Petition for elimination of dangerous crossings.*—These statutes were enacted upon the request of the State highway commissioner. They relate not only to grade crossings, but existing structures in any trunk line or State-aid highway or other main highway leading from one town to another. Any public service company or companies (this includes railroad), the municipality within which the crossing is located, or the highway commissioner, may petition the Commission for authority to eliminate any dangerous condition which may exist at such crossing. The statute provides that the Commission, in making its order, shall apportion the cost thereof among such public service company or companies, such municipality, and the State.

In recent years, as the State trunk line system and State-aid road system have expanded, most all of the proceedings before the Commission relating to the elimination of grade crossings and changes in existing structures have been brought under these statutes. No fixed division of the cost is prescribed by these statutes.

Depending upon the conditions and circumstances existing at the particular crossing involved, the Commission has assessed as much as 50 percent and as little as 15 percent against the railroad company. In the latter instance, a street railway was also involved and a portion of the expense apportioned to it.

(b) Sec. 3675. *Repair of structures over or under railroad tracks.*—Railroad companies shall keep in repair all structures over or under their tracks at any highway crossing, and the approaches to the crossing when the same are made with planked surface, and shall keep in repair the surface of the highway, including the planking or other surface material of the highway upon such structure.

Delaware..... (a) State laws provide that whenever the highway department determines that a State highway crossing of a railroad at grade should be abolished and an overhead or an under-grade crossing substituted, it may, by bill, apply to the chancellor to determine whether an overhead or under-grade bridge should be constructed, and by his decree apportion the cost and expense of construction between the railroad company or companies and the department. The department has control over all public highways in the State. The elimination of grade crossings on State highways undertaken in the past few years have been by agreement with the State highway department, the State and the railroad assuming 50 percent of the cost, respectively.

(b) The railroad in the past has usually assumed the maintenance of the substructure and the superstructures of the bridges. However, more favorable agreements have been made with the State for maintenance, in connection with two projects financed with Federal funds, one the reconstruction of an overhead bridge and the other the elimination of a grade crossing by the construction of an overhead bridge; in both cases the State has, by agreement, assumed the entire maintenance of the bridges and approaches.

Florida..... (e) No State law. The usual practice has been to apportion cost equally between railroad and public.

Georgia..... (a) The total cost of a grade-crossing elimination effected by the use of an overpass or underpass, shall be paid one-half by the State highway department, or county board, and one-half by the railroad or railroads involved; the approaches for 300 feet on each side of the center line of the track or tracks to be a part of the cost, except that the railroad shall not be charged with any cost of paving except on the flooring of an overpass. No railroad shall be required to expend in any one calendar year a sum in excess of \$40,000, provided that no railroad whose gross earnings from both inter- and intrastate business, as reported to the Public Service Commission of Georgia for the preceding calendar year, did not exceed \$2,000,000 shall be required to expend in any one calendar year a sum in excess of \$3,000.

(b) The drainage, surface, and pavement of the highway and bridge, as well as the approaches and guard rails, are to be maintained by the State highway department or county board; the railroad or railroads are to maintain the foundations, piers, abutments, and superstructure of all underpasses and overpasses within the limits of the right-of-way.

Idaho..... (a) No State law. Generally one-third borne by railroad and two-thirds by State, except that in the past the expense has generally been divided—40 percent to railroad and 60 percent to State.

(b) Railroad maintains structure; State or county maintains roadway.

Illinois..... (a) Left to the Illinois Commerce Commission. The most common apportionment is 50 percent to the railroad and 50 percent to the public, being the State, a municipality, or a county, as the case may be. There are, of course, special cases where the railroad is required to pay more and others where it pays less than this amount.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Illinois (contd.)..... (b) The maintenance of structures carrying railroad tracks is borne by the railroads; generally, the maintenance of viaduct over tracks is paid for by the State or by the municipality or county.

Indiana..... (a) On highways under the authority of State highway commission, the cost is divided by law, 80 percent to the State and 20 percent to the railroad, providing the project eliminates an existing grade crossing or grade separation; the State pays 100 percent of the cost when a grade crossing or grade separation is not eliminated. In all cases, the railroad and State each pay their own engineering costs, and the railroad also pays the entire cost of changes required in its tracks, pole lines, or signals, together with the expense of flagmen for protecting traffic.

(b) The railroad maintains its roadway and track, the structures supporting the same and the drainage thereof; the State maintains the highway, the structure supporting it and the drainage thereof.

Iowa..... (a) The division of cost is not specified by law. The State law provides in effect that if a community or political body and the railroad cannot agree with respect to the improvement or division of cost, either party may file application with the Board of Railroad Commissioners, stating the facts, and after a hearing, the Commission may issue an appropriate order. With respect to any expense incurred by reason of grade-crossing improvements, the statute specifically provides (sec. 8023, Code of Iowa, 1931) as follows: "Any portion of the expense of making such crossing changes and alterations borne by any municipal corporation or township, the State or any person, shall forever be held in trust by such railroad corporation or its successors, and no part of such funds shall constitute any part of the value of the property on which it is entitled to receive a return."

Prior to 1930 it was the practice of the railroads to bear the entire cost of a grade separation structure proper located on the railroad right-of-way, the State bearing the cost of the approaches. Since 1930, it has been the practice of the State highway department to bear two-thirds of the cost of the entire grade separation and the railroads the remaining one-third.

(b) Prior to 1930 the railroads generally assumed the maintenance of the portion constructed at railroad expense. Since 1930, it has been the practice for State highway projects that the State has borne the entire expense for the maintenance of structures spanning the railroad tracks and approaches thereto, and the railroad has borne the expense of the bridge structure across the highway, and for the State to bear the maintenance expense of the highway and highway facilities.

Kansas..... (a) State law provides that the expense shall be in a fair and equitable proportion to be determined by the State highway commission; the commission to pay not to exceed 50 percent of the cost. Prior to the use of the present Emergency Relief funds, it was the practice for the State to assess 50 percent of the cost to the railway companies.

(b) The law provides that the railway companies shall be required to maintain structures at their expense. The practice, however, is for the railway companies to maintain the subway structures where the railway is carried over the highway, and the highway commission to maintain the viaducts where the highway is carried over the railway.

Kentucky..... (a) Law permits State highway department to require the elimination of grade crossings on State highways, the railroad company to pay 50 percent of the cost of the work within the limits of its right-of-way. The State bears the cost of approaches beyond the limits of the right-of-way. Under another law, first- and second-class cities, which include only the cities of Louisville, Ashland, Covington, Lexington, Newport, and Paducah, have authority to require grade separations, the railroad to pay 65 percent of the total cost, the city to pay the remaining 35 percent.

(b) The law applicable to State highway crossings, ch. 194, acts of 1926, provides that all work constructed within the right-of-way of the railroad, other than the surfacing of the highway, is to be maintained at the expense of the railroad. The law applicable to grade separation within cities of the first and second class, ch. 22, acts of 1922, provides that the city shall maintain the roadway, and the bridge or structure supporting the street where the street passes overhead. Where the street passes underneath, the railroads maintain the bridge or other structure and abutments on their right-of-way.

Louisiana..... (a) State law applies to grade separations in municipalities only, in which cases cost of construction and maintenance is equally divided between the railroad and the municipality. Heretofore, outside of municipalities the division of cost of constructing and maintaining separation structures has been a matter of negotiation and written agreement between the railroad or railroads involved and the State highway commission to cover each individual case. In some cases the full structural cost has been divided equally, especially in highway underpasses. In cases of highway overpasses the division of construction cost has varied from railroads paying 50 percent of total, including approaches, to 50 percent of cost of concrete structure required to span their tracks.

(b) Usually the State has assumed maintenance of overhead structures, and railroads have assumed maintenance of structure supporting tracks.

Maine..... (a) The statutes (Rev. Stat., ch. 27, sec. 29, amended by ch. 70, acts of 1933) apportion the costs of grade-crossing eliminations, 40 percent to be paid by the State, 10 percent by the town, and 50 percent by the railroad, except in case of State highways, where the expenses are divided 50 percent to the State and 50 percent to the railroad. Agreements between parties interested varying the above percentages are effective if approved by the Public Utilities Commission, provided the amount to be paid by the town shall

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Maine (contd.).....	(a) not exceed 10 percent, unless the town shall otherwise vote. In some cases railroads have secured a better division of costs by agreement with the other parties.
	(b) Maintenance of grade-crossing elimination structures is apportioned by the Public Utilities Commission between railroad, municipality, and State in such manner as it considers equitable (Rev. Stat., ch. 27, sec. 39, amended by ch. 70, acts of 1933). The maintenance of grade-crossing elimination structures, structures altered by decree of Commission, and structures built to carry a highway over or under a railroad after the railroad is constructed, is apportioned between railroad and municipality or railroad and State by the Commission. Other railroad-highway bridges are maintained by the railroad.
Maryland.....	(a) In 1931 the State laws provided that one-half of the expense of grade-crossing elimination be borne by the State and one-half by the railroads and the maintenance was divided in the same way. In 1933 a revision in the laws was made, and with this revision the laws read as follows: "One-fourth of the expense of such alterations, changes, relocation and/or opening, including damage to adjacent property, shall be paid by such railroad and three-fourths by the State roads commission. When two or more railroads use such crossings, each shall bear its proper proportion of the railroad's share of the expense, such proportion to be determined by the State roads commission."
	(b) One-fourth of the expense of the maintenance and repair of all bridges, archways, or culverts, including the approaches to such bridges, archways, or culverts, which may be required to be constructed in the elimination of any grade crossing, shall be paid by the company or companies operating such railroad. The other three-fourths of such expenses shall be defrayed by the State roads commission. All of the details with respect to such maintenance and repair shall be determined by the State roads commission, whose power and duties relating thereto shall be subject to all of the provisions of the foregoing sections concerning notice, hearing, penalties, enforcement of orders, etc., so far as the same may be practicable.
Massachusetts.....	(c) (1) Existing grade crossing.—By General Laws, ch. 159, sec. 70, as amended by acts of 1930, ch. 417, the railroad was to pay 50 percent. But by the acts of 1934, ch. 357, the total cost of elimination, excluding moneys allotted under any Federal statutes, shall be apportioned by a board of 3 members (the attorney general, chairman and one member of department of public utilities, commissioner and an associate member of department of public works). No proceedings under this statute have been had, but it is believed that the railroad might be required to pay substantially less than 50 percent. (As to maintenance, see below.)
	(2) Alterations.—By General Laws, ch. 159, sec. 61, as amended by acts of 1933, ch. 326, the charges and expenses of making such alterations and the future charges for keeping such bridge or crossing and the approaches in repair are to be apportioned by a commission of 3 disinterested persons. Formerly, the proportion of the railroad might run from 30 percent to as high as 65 percent. No proceedings of recent years have been had where such a commission had to make any real decision, though a special commission has been named many times merely to approve a prior agreement of the parties. It is believed that today no special commission would assess a railroad in excess of 50 percent, and quite likely the railroad's proportion would be far less.
	(3) An alternative method today is frequently used, namely, an agreement by the parties approved by the department of public utilities providing for the work and specifying how the cost shall be apportioned. In no such agreement would a railroad be penalized.
	Prior to 1930, the railroads were by statute, assessed 65 percent of the cost in existing grade crossings proceedings and whatever the statutory special commission might decide in alteration proceedings, though so far as known never in excess of 65 percent. Beginning in 1930, the laws have been modified. Owing to the financial condition of railroads in late years, the changed laws have never been invoked, and what work has been done has been with relatively little or no contribution from railroads.
	(b) (1) Existing grade crossings.—By General Laws, ch. 159, sec. 77, as amended by acts of 1930, ch. 417, in an elimination case the maintenance is fixed: In the case of an overhead, highway bridge, the railroad maintains the superstructure and subflooring and the abutments or other supports, the municipality the approaches and the pavement or wearing surface over the subflooring; in the case of an underpass, the railroad maintains the bridge and its abutments or supports, and the municipality the way and approaches.
	(2) Alterations.—The cost of maintenance, as in the case of the original cost of the work, is assessed by a special commission of 3, but such commissions were accustomed to follow by analogy the statutory provisions applicable to elimination proceedings.
Michigan.....	(a) Act 92 of 1893 covering all phases of grade separation, provides that in default of agreement of parties thereto, the public utilities commission is to allocate costs in a "just and equitable manner."
	Act 335 of 1931 provides that the division of costs shall be 80 percent to the railroad interests and 20 percent to the public authorities concerned.
	Costs usually are assessed equally as between railroad or railroads involved and the public authority or authorities concerned.
	(b) The railroads maintain the structures carrying railroad traffic and the structural supports and appurtenances within the limits of railroad rights-of-way. The public way is maintained by the public authorities.

See footnote on page 306.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Minnesota.....	(a) Ch. 336, Session Laws 1925, provides: "The railroad commission may require any railroad company to construct and maintain underground crossings and separate grades when, in its opinion, it is to the public interest." Ch. 134, Session Laws 1923, provides: "The railroad commission may require said railroad company to construct and maintain, and may divide the cost between the railroad company, the town, county, municipal corporation, or State highway department interested, on such terms and conditions as may seem just and equitable to them." In the past, the railroad commission has usually assessed 50 percent against the railroad company.
	(b) Maintenance of undercrossings is obligation of railroad. The State maintains highway, culverts, and drains to prevent water from flowing on railroad right-of-way. The State maintains the approaches of overhead crossings, the wearing surface of the floor of the bridge, and also the guard rail and railing. The railway maintains the rest of the structure.
Mississippi.....	(a) House bill 100 approved Apr. 14, 1930, is the present law governing division of cost of separations of grade crossings in existence at the time the bill was passed. Sec. 17 of this act provides that the State highway commission and the railroad company shall pay equal parts of the cost of any underpass or overpass across the right-of-way of the railroad company. This has been interpreted by some to mean that this expense is restricted to that portion of the project on the railroad company's right-of-way. There is some question as to whether or not this act applies to highways newly opened.
	There is no law governing division of cost for the reconstruction of existing grade separation structures and as a result this is usually disposed of on the basis of ownership; that is, the owner pays the cost.
	(b) The act does not specify who shall maintain the structures. This is usually disposed of by the railroad company agreeing to maintain the bridge carrying its tracks over the road and the highway department agreeing to maintain the bridge carrying the highway over the railroad.
Missouri.....	(a) Determination left to the commission: <i>Provided, however</i> , That in all cases of eliminations on the State highways, not more than one-half of the cost of construction of any grade separation, overhead or underpass, authorized or ordered by the commission shall be apportioned to the State highway commission. Railroads usually bear not less than 50 percent.
	(b) When separation is by viaduct over tracks, State highway department bears cost of maintenance; when by subway under tracks, railroad stands cost except paving in roadway.
Montana.....	(a) As to crossings outside of incorporated cities and villages, authority is vested in Board of Railroad Commissioners. Inside cities and villages, jurisdiction seems to lie with the city and village, with no power to apportion cost, which practically means that entire cost must be borne by the railroad company. In general, about 50 percent against railroads.
	(b) Generally, the maintenance has been borne by the railroads, except that in numerous cases the political subdivision has assumed maintenance of the wearing surface of the roadway.
Nebraska.....	(a) In Nebraska the subject is covered by 5 statutes. Sec. 14-351, Comp. Stat. of Nebraska 1929, deals with the subject in cities of the metropolitan class (Omaha). This section confers on the city council authority to order construction of viaducts or subways by a railroad whose tracks cross or are upon any public street of the city, and to require the railroad to keep such structure in repair. It contains no provision requiring the city to participate in the construction cost, except to pay the damages caused any property by reason of the construction of a viaduct and approaches, which damages may be assessed by the city council against the property benefited.
	Sec. 15-702 governs the matter in cities of the first class having a population of from 40,000 to 100,000 (Lincoln). The statute confers power on the mayor and council when authorized by vote of the people at any regular election, to require the construction of a viaduct, reconstruction, completion, and repair thereof. The statute contains no provision requiring or authorizing the city to participate in the cost.
	Sec. 16-641 controls the subject in cities of the first class having from 5,000 to 25,000 inhabitants. The section authorizes such cities to require viaduct and subway construction by a railroad, when authorized by a majority vote of the citizens, and the city may also require the railroads to maintain and keep such structures in repair. It requires the city to pay damages to property owners by reason of change of grade of a street, but authorizes the city council to assess damages against the property benefited.
	Sec. 75-517 and sec. 75-518 govern the subject outside incorporated cities and villages. Sec. 75-517 authorizes a railroad company and the county board of the county in which the crossing is situated to agree upon such changes, alterations, and constructions as are necessary to carry the highway under or over the railroad, and agree upon apportionment of the expense. Sec. 75-518 confers power on the State railway commission, if the county and the railroad cannot agree, to hear a complaint and make an order requiring a grade separation and apportion the costs.
Nevada.....	(a) State law does not provide for division of costs. Such division of cost is fixed by the Public Service Commission, unless otherwise mutually agreed upon.
	(1) New railroad construction across existing highway, 66 2/3 percent of entire cost assessed against railroad company.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Nevada (contd.)..... (a)	(2) New highway construction across existing railroad, or the elimination of an existing grade crossing, division of cost assessed against railroad company 33 1/3 percent. (3) In 1933 there was a deviation from this practice. During 1933 and 1934, one highway-railroad grade-crossing structure was built with Federal and State funds at no cost to railroad, except that railroad paid cost of necessary flagging.
	(b) (1) <i>Underpass</i> .—Railroad maintains entire structure; others maintain highway roadbed. (2) <i>Overpass</i> .—Highway funds maintain entire structure and approaches.
New Hampshire..... (a)	The existing grade separation law in New Hampshire was passed in 1846 and has not been amended since 1885. It contains no provision for the apportionment of costs. All grade separations in this State in the last 10 or 15 years have been accomplished by agreement between railroad and State highway commission. In cases where change of a highway or other way is made for the purpose of avoiding or improving a grade crossing, the statutes (Public Laws, ch. 249, sec. 8, amended by ch. 103, acts of 1927) provide that the expense shall be apportioned by the Public Service Commission between the railroad, State, and municipality. There is also a recent statutory provision (ch. 110, acts of 1935) by which the Commission may close any public or private crossing if public safety so requires. Damages resulting are apportioned by the Commission against the railroad, State, and municipality. Apparently in the past, division has been on approximately a 50-50 basis.
	(b) Until recently railroads have been required to maintain not only the bridge but the approaches over a highway overpass, and the railroad bridge and abutments of a highway underpass. In recent years, by agreement with the State highway commission relative to bridges on State highways, the State has assumed the duty of maintaining the approaches and wearing surface of the bridge. The railroad maintains the abutments and superstructure. This applies both to bridges constructed for the separation of grades and bridges altered or reconstructed.
New Jersey..... (a)	There are two sets of statutes relating to grade-crossing eliminations and the reconstruction of existing grade-separation structures: (a) The Fielder Act (act of Mar. 12, 1913, as amended) authorizes the board of public utility commissioners to order the elimination of a public highway (other than a State highway), and imposes the entire cost of the elimination, including cost of removing relayline, or relocating any municipal water or sewer pipes, or other municipal pipes, conduits or subways, one-half upon the railroad company or companies involved, and one-half upon the State. Where the order of the board requires changes or the removal of the property or construction of any street railway, telegraph, telephone, gas, electric lighting, power, water, oil pipe lines, or other company or corporation, they shall at their own expense move or change the grade or location of their property or constructions. (b) The act of April 15, 1929, as amended by the act of April 27, 1931, provides for the elimination of railroad crossings at grade on State highways and for the improvement, relocation or reconstruction of crossings of railroads and State highways not at grade, and for the location and construction of new crossings of railroads and State highways not at grade. Under this act, the State highway commission is required to formulate a program for the elimination of railroad crossings at grade on State highways, the improvement, relocation, alteration, and reconstruction of crossings of railroads and State highways not at grade and the location and construction of new crossings of railroads and State highways not at grade, where the construction of such new crossings of railroads and State highways not at grade result, or will result in the closing, abandonment, or combination of an existing grade crossing at or in the vicinity of the new State highway crossing. The aggregate cost of the work included in each annual program must not exceed \$2,000,000. The cost of the work included in a program, exclusive of the cost of the surface paving on roadways, and the curbing, sidewalks, paving, and guardrails on approaches which must be borne solely by the State, must be borne by the State and the railroad company or companies involved in equal shares.
	(b) No provision is made by statute with respect to the maintenance of crossings other than State highway crossings. With respect to State highway crossings, the railroad company must maintain, repair, and renew structures within its right-of-way carrying the railroad over the highway and the State must maintain, repair, and renew structures within the rights-of-way of railroad companies carrying highways over railroads, but the railroad company is not relieved from liability for damage caused to a highway structure by the operation of the railroad. Approaches, curbing, sidewalk paving, guardrails on approaches and surface paving on roadways within the right-of-way of a railroad company are maintained, repaired, and renewed by the State.
New Mexico..... (a)	State law provides 50-percent division; in case of disagreement matter handled by district court for determination.
	(b) Law provides highway maintenance of roadway and structures supporting same and railroad maintenance of track and supporting structures.
New York..... (a)	The law provides for the division of cost as follows: 50 percent to the railroad, 49 percent to the State, and 1 percent to the county. In a case of reconstruction of existing grade-crossing structures, the law provides for 50 percent to the railroad, the other 50 percent being divided between the State and the municipality. On State highways outside of municipalities, the State bears 50 percent; in municipalities, the State taking 25 percent and the municipalities 25 percent.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

New York (contd.).. (b)	In all cases the division of maintenance requires the railroad to maintain the masonry supporting the structure over the railroad and the framework of the structure; the city or county maintains the pavement and the approaches.
North Carolina..... (a)	For underpasses the railway company is responsible for one-half the cost of the excavation of the railroad through the embankment and one-half of the complete cost of the structure, including both foundation and superstructure. For an overhead bridge the railroad is responsible for one-half of the entire cost of the bridge which will span the opening over the tracks of the railroad from abutment to abutment and including such abutments.
	(b) <i>Underpasses</i> .—The State bears no part of the cost of maintenance of underpasses. <i>Overhead bridges</i> .—The State can bear part of the cost of maintenance of overhead bridges but the statute is not definite in this respect. According to past interpretation by the State highway department, the State is to maintain concrete overhead bridges and the railway company is to maintain timber structures. The railroads have been successful in having the State assume the maintenance of the wearing surface and handrallings of timber bridges built in cooperation with the State.
North Dakota..... (a)	The board of railroad commissioners has the power to apportion any part, or all of the cost to the railroad or the political subdivision in which the separation is located. In general, the division has been 50 percent against railroads.
	(b) In general, the maintenance has been borne by the railroads, except that in numerous cases a political subdivision has assumed maintenance of the wearing surface of the roadway.
Ohio..... (a)	(1) Crossing of railroads and streets within cities or villages and on county or township roads, railroad 65 percent and public authorities 35 percent; (2) crossings of railroads and main market roads and intercounty highways or crossings of railroads and street railroads with State highways, railroad 50 percent and public authorities 50 percent unless otherwise agreed upon. Provision is made in (1) that railroads may by agreement assume a greater portion of the cost.
	(b) When the public way crosses over the railroad on an overhead bridge, the maintenance is borne by the public authorities. When the public way crosses under the railroad the maintenance of the railroad bridge and its supports is borne by the railroad, and the public way and its approaches are maintained by the public authorities.
Oklahoma..... (a)	Left to discretion of corporation commission. In the past, the cost has apparently been borne 50 percent by the railroads and 50 percent by public bodies.
	(b) Left to discretion of corporation commission.
Oregon..... (a)	Law requires hearing by public utilities commission and prescribes basis of apportionment of construction and maintenance cost, 50 percent to railroad, and 50 percent to State, county, municipality, or other public authority in interest.
	(b) See (a).
Pennsylvania..... (a)	The public service commission has full jurisdiction to allocate the costs and maintenance for grade-elimination and bridge-reconstruction projects. Its orders in grade-crossing cases have generally assessed the railroad between 40 percent and 50 percent of the total cost, exclusive of property damages, which are usually allocated to the municipalities in which the projects are located. With respect to reconstruction of bridges, costs ranging between 25 percent and 35 percent have generally been allocated to the railroad. The proportion that the railroad is assessed is frequently dependent upon the financial ability of the municipalities to contribute.
	(b) Maintenance of substructure and superstructure of overhead bridges (over the tracks and right-of-way of the railroad) is allocated to the railroad company. Maintenance of substructure and superstructure of undergrade bridges is allocated to the railroad company.
Rhode Island..... (a)	No State law providing for division of cost. The percent age assessed against the railroad company is governed by the benefits derived.
	(b) Bridges carrying the railroad over the highway to be maintained by the railroad. Bridges carrying the highway over the railroad not to be maintained by the railroad, the railroad to be relieved of the maintenance of the approaches as well.
South Carolina..... (a)	Overhead bridge shall be paid one-half by the highway authorities and one-half by the railroad. <i>Provided, However</i> , That the proportion to be paid by the railroad shall in no case exceed the actual cost of that part of the structure over the railroad's tracks between the piers or abutments and foundations adjacent to said tracks and including the costs of said piers and abutments or foundations: <i>And providing further</i> , That in case of a permanent structure of concrete, steel, or other like substance the railroad shall pay one-half of the cost of such structure, including the approaches for a distance of not exceeding 150 feet on either side of the railroad measured from the center of the space occupied by the tracks. When a grade crossing is eliminated by the building of an underpass the highway authorities shall pay one-half and the railroad the other half of the cost of the cut through the railroad fill and of the cost of the bridge carrying the railroad including the foundations and piers or abutments for such bridge, but the cost of the approaches to the underpass shall be paid by the highway authorities and the highway authorities shall likewise construct and maintain the necessary drainage. While the statute fixes the division of cost between the highway authorities and the railroad, there is a provision in the law permitting special agreements between the highway authorities and railroad companies respecting the allocation of the cost of constructing a grade separation structure.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

South Carolina (con.)	(b) The statute provides that in all cases of an overhead bridge the railroad shall maintain at its expense the foundations and piers or abutments supporting the superstructure. If the railroad provides a floor for an overhead bridge capable of carrying a road surface of rock, asphalt, or other like substance, the highway authorities shall assume the duty and cost of the maintenance of the superstructure of the bridge; and if such a floor is not provided, then the highway authorities shall assume the duty and cost of the maintenance of the superstructure and require the railroad company to pay such cost within 60 days after rendition of bill therefor. In cases of an underpass the railroad is charged with the duty and cost of maintaining the entire structure carrying the railroad tracks, including the foundations and supports thereof.
South Dakota	(a) Board of railroad commissioners is vested with power "to fix the terms upon which the separation should be made and the proportion in which the expense of the alteration, or the abolition of the crossing or the separation of the grade should be divided between the railway companies affected or between the railroad companies and the county, municipality, or public" (South Dakota, sec. 9646-A). The apportionment is generally 50 percent to the public and 50 percent to the railroad. (b) Railway must maintain all subway structures supporting its tracks; the public maintains the roadway and drainage systems. With respect to overhead viaducts, the railway must maintain all of the structures and approaches on its right-of-way. This, however, does not prevail with respect to the overhead highway structures recently constructed using Federal funds, as the State highway commission, which has charge of the distribution of the Federal funds, has arranged for the public to maintain the overhead structures or viaducts.
Tennessee	(a) Fifty percent railroad and 50 percent State highway department. (b) Railway shall maintain that part of structure on its right-of-way, with exception of roadway proper, to be maintained by State highway department.
Texas	(a) The division of cost is negotiated between the railroad and the State on each project. Usually in the past, where crossings were separated with State funds, the railroad agreed to pay 50 percent of the cost of the structure, exclusive of drainage, pavement, and right-of-way that is located on the right-of-way. By this agreement, generally the railroad paid about one-third of the total cost of the project, including the cost of right-of-way, drainage, paving, and incidentals. (b) It has been the practice for the railroad to maintain underpass structures and the State to maintain overpass structures. The State maintains the paving, retaining walls, if any, and drainage in connection with both overpass and underpass structures.
Utah	(a) No State law. Generally one-third borne by railroad and two-thirds by State. (b) Railroad maintains structure; State or county maintains roadway.
Vermont	(a) Railroad 65 percent, State 25 percent, town or city 10 percent. (In view of their financial condition, Vermont has recently exempted the railroads from the terms of a law which requires that they spend annually \$75 per mile of road in grade-crossing elimination work.) (b) Railroad maintains both structure and roadway within limits of right-of-way.
Virginia	(a) The cost of the structure and approaches is borne 50 percent by the railway company and 50 percent by the State.

TABLE III-14.—Statement of State laws and practices covering division of cost of grade separations in 1936.—Continued

Virginia (contd.)	(a) The State bears the entire cost of right-of-way for the grade separation. The railway company participates in all costs between points where the approach grades leave the ground line of the State road, but not including cost of right-of-way. (b) The railway company is required to maintain the portion of the structure and approaches lying within its right-of-way lines with the exception of the surface of the roadway.
Washington	(a) Determined by department of public works, according to benefits to respective parties as found by the department at a hearing. (b) Law provides that framework and abutments of structures over right-of-way be kept in repair by railroad company and the roadway and approaches by county, city, or State.
West Virginia	(a) State law provides 50 percent shall be paid by State and 50 percent by railroad. (b) Railroad maintains everything on right-of-way except surface of roadway.
Wisconsin	(a) Public service commission is vested with power to fix the proportion of the cost to be paid by the railway companies and municipalities (Wis. 195.29 (2)) which is, as a rule, 60 percent to the public and 40 percent to the railroad. (b) Railway maintains all subway structures supporting its tracks. The public maintains the roadway and drainage systems. The railway maintains the wearing surface of the roadway of overhead viaducts carrying highways over the railroads. This, however, does not prevail with respect to the overhead structures recently constructed using Federal funds as the State Highway Commission of Wisconsin, which has charge of the distribution of the Federal funds, has arranged for the public to maintain the overhead structures or viaducts.
Wyoming	(a) The only statute is sec. 94-140, Wyoming Rev. Stat. 1931, which provides that the public service commission shall have the power to direct the manner in which all utilities shall cross public highways and other utilities, and by which public highways shall cross the utilities, and to prescribe methods of approach and crossing that shall secure safety to the public; that at every such crossing, in case the persons interested do not themselves agree, it shall be the duty of the commission to apportion between the parties the cost and expense of installing and maintaining such crossings. In case some portion is assigned to be paid by a public highway such portion shall be paid by a city or town if the crossing is within its boundaries, and by the county if the crossing is not within the limits of a city or town. The public service commission has made no regulations under the above statute, and grade-crossing separations have in the past been made by agreement between the State highway authorities and the railroads on the basis of sharing the cost 50 percent each. (b) Overhead separations are customarily maintained by the State and underpass separations by the railroads, but there is no law or regulation to this effect.
District of Columbia	(a) Grade separations made and financed by act of Congress. Apportionment is on a 50-50 basis.

¹ Based in large part on a summary prepared by Committee on Grade Crossing Elimination, Association of American Railroads, of returns to questionnaire dated Nov. 20, 1935. No official summary has been made for as recent a period. The present summary sets out many facts based on first-hand knowledge of local conditions and not otherwise available. A partial check with other data indicates that the summary presents a conservative statement of the portion of the costs borne by the railroads.

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