J. Lyles Glenn, United States District Judge, convened at Columbia, S. C., on November 30, 1936, and the following proceedings, not otherwise appearing of record, were held.

Motions were submitted for intervention on behalf of the Interstate Commerce Commission and Marlboro Oil Company, as parties plaintiff, and on behalf of the National Association of Public Service Commissioners, Atlantic Coast Line Railway Company, Receivers of Seaboard Air Line Railway, and Charleston & Western Carolina Railway Company, as parties defendant, based on petitions, all of which have been duly filed. The Court took these under consideration, but announced that in the meantime it would allow each of the solicitors presenting the motions to appear amicus curiae. Since all of these motions and petitions were in proper form and no question concerning them is raised on the appeal, it is stipulated that they are not to be printed.

[fol. 129] Motion to Dismiss

Oral argument was then held at length on the defendants' Motion to Dismiss. At the conclusion thereof the Court made the following ruling:

Judge Parker: We indicated we would be giving consideration to all the questions that have arisen so far, and I will announce our conclusions. In the first place, we think that the petitioners who have asked to intervene should be allowed to intervene, except the Boards represented by Mr. Benton. As to them, we will allow Mr. Benton to appear amicus curiæ to present his contentions. Shippers and railroad companies who have asked to intervene will be allowed to intervene.

As to the scope of the hearing, we are of the opinion that in order that the case may be presented in its entirety on an appeal to the Supreme Court, that this Court of three judges should reconsider all the questions heretofore determined by the District Judge and give our decision on the bill as filed, so that when appeal is taken by either side to the Supreme Court of the United States, the Supreme Court may have the entire case before them and not have the case in piece-meal. We will reconsider all the questions arising on the bill.

As to the question of the effect of the Motor Carrier Act, we are of the opinion that the effect of that Act is not that

Congress has occupied the field with respect to size and weight. We don't think that that Act effects the question before the Court at all. We interpret the Act that Congress has expressly refused to enter the field in size and weight, as a matter of regulation for the time being. As to the power of Congress to enter that field, we express no opinion.

Now, with respect to the question of taking testimony, we are of the opinion that testimony should be taken bear- [fol. 130] ing upon the reasonableness of the Act as it affects interstate commerce. We are indicating no opinion as to whether the Act is reasonable or unreasonable. We think that this Court should have the benefit of testimony as to the allegations of the bill that the Act is an unreasonable burden upon interstate commerce, particularly in view of what the Supreme Court said in the Morris versus Duby case: "Regulation as to the method of use, therefore, necessarily remains with the State and cannot be interfered with unless the regulation is so arbitrary and unreasonable as to defeat the useful purposes for which Congress has made its contribution to bettering the highway systems of the Union and to facilitating the carrying of the mails over them."

In other words, we will pass upon the question as to whether the Act constitutes an unreasonable burden upon interstate commerce, and we are of the opinion that testimony should be addressed to that question and that question alone, and we see no reason why any great volume of testimony need be taken, or we see no reason why the taking of testimony should consume very much time.

One other question remains, and that is whether we are to hear the case on the application for interlocutory injunction or hear it finally now, and we see no reason for hearing the application for interlocutory injunction and then having another hearing on whether we are going to grant final injunction of it. The Supreme Court has said time and time again that the discretion of the Court in granting or refusing an interlocutory injunction in cases of this character will not be reviewed in the absence of abuse by the Court. Manifestly, it is of importance to everybody concerned in this case that the question be finally decided by the Supreme Court. The only way to get a final decision by the Supreme Court is by final judgment by this Court [fol. 131] and the findings and appeal to the Supreme Court, and then the Supreme Court can pass on all the questions

involved and finally settle the matter. This has been in litigation now for about three years. It is time it was brought to an end, and we see no reason why you shouldn't put your testimony in and let us finally determine the case.

It was then stipulated and agreed in open court by all counsel that the hearing should be both interlocutory and final, and that the Court should render a final decree in the case.

Mr. Ross: If Your Honor please, may I ask a question for the purpose of clearing up our own status in the proceeding? The Commission intervened when it seemed to them the proceedings were limited to the question of supersession, and the possible question of the constitutionality of the Federal Act. Of course, I understand under the Courts' ruling the whole matter was opened up. The Commission has not felt that it was interested to the point of participating in the hearing that was confined entirely to the question of burden on interstate commerce or unreasonableness of this Act.

Now, I think I should say to the Court we brought certain witnesses and testimony here, thinking that their testimony would be proper in connection with a consideration of those matters; more or less a joint proposition on the question of construction of the Act to some extent, on the question of constitutionality to some extent, but as I understand the Courts' decision now, the complaint has in effect been dismissed as to the allegation of supersession.

Judge Parker: No, I don't think I meant to convey that impression. What I meant to convey was this, I am telling you what the Court thinks about that question of law. When we write the opinion, unless we change our mind, we are going to interpret the Act and say the Act does not apply to size and weight. The Interstate Commerce Commission [fol. 132] is a party to the suit, and the Interstate Commerce Commission might desire to contest that holding in the Supreme Court.

Mr. Ross: And it would still be open to us to present testimony that might be competent, that might still go to the Act. We would be free to present that?

Judge Parker: I suggest you do this. We don't see now how that testimony could have any bearing on the case, but suppose when you think proper you present it and we will pass on it at that time.

Mr. Ross: That is satisfactory, Your Honor.

Mr. Lyles: I think it is understood that so far as the intervention of the railroads is concerned, that we are permitted to adopt the answer which has been filed by the State and go ahead on that issue.

Judge Parker: I don't know whether that is understood, but I think that should be understood now. We will make an order to that effect.

Mr. Ross: No objection.

Judge Parker: The intervening railroads are allowed to adopt the answer of the defendants, and the intervening shippers are allowed to adopt the allegations of the bill.

Mr. Funkhouser: That is satisfactory to us. It is the answer filed by the State, and they are adopting that answer as their answer.

Judge Parker: Yes.

Mr. Funkhouser: That is perfectly satisfactory.

Judge Parker: And the intervening shippers are adopting your bill.

Mr. Funkhouser: That is right.

[fol. 133] Statement of Evidence

THOMAS J. BURKE, a witness for the plaintiffs, having been first duly sworn, testified.

Direct examination.

By Mr. Funkhouser:

My name is Thomas J. Burke. I live at Charleston, S. C. I am Commissioner of the Charleston County Traffic Bureau and look after the shippers and receivers of freight in the City of Charleston, and also the Port of Charleston, in all transportation matters, particularly as to how rates affect the Port of Charleston as compared with other ports—competitive points.

Q. Are you familiar with the law of South Carolina limiting the gross weight of trucks to 20,000 pounds, and the width of trucks to 90 inches?

A. Yes.

Q. If that law is enforced, what effect would this have on the shipping industry in connection with Charleston?

Mr. Griffith: If Your Honor please, we object to that.

Judge Parker: On what grounds?

—— ——: ——.

Judge Parker: Overruled.

Mr. Griffith: Exception.

Judge Parker: I think we will save time if we remember the Federal rule that the Court is passing on testimony. On irrelevant testimony we are assumed to disregard and all relevant we are assumed to consider.

Mr. Griffith: I was doubtful whether that rule applied. Do I understand it is not necessary to object to any testimony that is incompetent or irrelevant?

[fol. 134] Judge Parker: It is not necessary.

The Witness: At the Port of Charleston we have shipments arriving from various ports throughout the country. We have coastwise — between New York, Philadelphia, and Baltimore to Charleston. We also have coastwise shipping from the Gulf ports of Houston, Galveston, New Orleans, Lake Charles, Louisiana; then we have intercoastal service from the Pacific Coast ports of the United States arriving in Charleston, and then foreign commerce coming into the Port and going through the Port to foreign ports of a large part of it, and the Port of Charleston would be seriously affected by this weight law. I can call one particular instance on an inbound shipment. This is a shipment of cotton tire, cotton fabric moving from Gastonia, N. C. This movement has been going to Charleston for a number of years, consigned to the Pacific coast. The shippers state if they cannot make the shipments through Charleston——

Judge Parker: I don't think you ought to go into hearsay.

A. This shipment would be discontinued if the weight law went into effect, and the shipment would move to the port of Wilmington, N. C. on the inbound products from the Pacific Coast moving out by it to points in North Carolina, there is a large movement, but the shipments would be discontinued and the movement would be made to the North Carolina points through the port of Wilmington. This is because the steamship companies operate not only to Charleston, but to Savannah, Wilmington and Norfolk, Virginia.

The inbound freight comes into Charleston on the A. & P. trucks, larger trucks than are permitted under this gross weight law. The outbound traffic is moving by the A. & P. [fol. 135] trucks down from Gastonia to Charleston. I have

seen those trucks at the dock and looked at them. They are larger than a truck that would carry a gross weight of 20,000 pounds.

Enforcement of the weight law would cause discrimination against the Port of Charleston, because it would tend to divert that traffic that moves by truck from Charleston to the ports of Savannah and Wilmington. The main commodities that move through the Port of Charleston are those moving from the Pacific coast; canned goods of all kinds, dried fruits, dried beans and peas. All commodities moving from the eastern ports of the United States, we have practically everything that moves into the interior of South Carolina and North Carolina; these goods that are used in the wholesale grocery trade, hardware lines and the manufacturers. For instance, to the cotton piece-goods manufacturers we have chemicals, acids and dyestuffs that move out of Eastern cities by boat line to Charleston and then by truck from Charleston to the Carolina mill points.

Q. What percentage of these commodities move to and from the Port of Charleston by trucks?

A. Taking the Pacific Coast movement on inbound movement, these movements coming into the Port of Charleston and moving from Charleston to the interior, during the ten months of 1935, 14% of that tonnage moved by truck. Comparing the first ten months of 1936, 24% of that commerce moved by truck. On the outbound shipments from the interior points in North Carolina or in South Carolina moving to the Pacific Coast, the outbound shipments for the ten months of 1935, 54% moved by trucks; for the ten months of 1936, 58% moved by trucks. Taking the coastwise steamship lines, the Clyde-Mallory, comparing the tonnage with the railroad tonnage, 30% of their tonnage moved by truck. We come to the Bull Steamship Company, [fol. 136] operating from Baltimore, Philadelphia, and also from the Gulf ports, their approximate tonnage moving by truck was about 40%.

Q. How many steamship lines come into Charleston?

A. On the intercoastal trade we have inbound the American-Hawaiian Steamship —; on the outbound, the Williams Steamship Corporation; on the coastwise trade, we have the Clyde-Mallory lines and Bull Steamship Company. Then the Bull Steamship Company operate a service between Porto Rico and Charleston. Then we have the for-

eign steamer lines of monthly sailings to all United Kingdom and Continental ports.

The Witness: All those steamship lines haul freight into Charleston for distribution through Charleston to the interior part of the country; and all of them carry cargo out of Charleston. A certain percentage of the cargo for and from all those steamship lines goes by truck into and out of Charleston; some moves by the railroads. The percentage I named at first was the intercoastal traffic; it applied to the Williams Steamship Corporation and the American-Hawaiian Steamship Company, the coastwise traffic applying to the Clyde-Mallory and the Bull Steamship Company. As to the foreign commerce, I have no figures on the extent of their cargo that moves by truck.

The enforcement of the weight law would cause these steamship companies to divert a large cargo from Charleston to other ports. When you do that, it immediately affects the labor that is employed on the docks and also affects the money that is spent by the steamship lines in the City of Charleston, and that immediately affects the citizens of Charleston.

The Port Utilities Commission was created by the State of South Carolina to take over the wharves and docks at Charleston and also a switching railroad that connects with [fol. 137] the three railroads coming into Charleston. This Port Utilities Commission was also required to operate these wharves and terminals and develop the commerce through the Port of Charleston. If there is any lessening of the amount of traffic that will move through Charleston, it will have a decided effect upon the operating revenues of the Port Utilities Commission.

Judge Parker: Mr. Funkhouser, aren't we getting pretty far afield? Your inquiry is this, whether there is any relationship between this Act and the safety of the highways and the protection of the roads, and if the Legislature of South Carolina hurts Charleston by protecting the roads that is a matter in their discretion. The only thing we are interested in is whether or not there is such a relationship between this Act and the safety of the public using of the highway and the protection of the roads that the Act cannot be said to be unreasonable.

Mr. Funkhouser: Basically that is my understanding of the case, but there is one point, it seems to me you have not

covered. In testing reasonableness you show the effect, and another thing, I am here on an application for injunction, preliminary and permanent, and I have to show my damage, permanent, immediate and irreparable.

Judge Parker: Well, I would say to you that so far as the Court is concerned—I think I speak for the other members of the Court, and certainly for myself—you need not put any great amount of testimony in to show you will be damaged by being kept off the roads.

Mr. Funkhouser: There is another point, in making a record I don't see how I could go along—this Motor Carrier Act expressly prohibits discrimination against ports, towns and people, and I want to show the discrimination against the Port of Charleston.

[fol. 138] Judge Parker: I don't think that is what we are thinking about, and unless you can show me, we are not going to consider that point. The point is, just as I have indicated, whether this Act is reasonable. The Courts cannot supervise the general trade policies of the Legislature of South Carolina.

The Witness: The losses to which I have referred would occur when you had any lessening of commerce through the Port of Charleston, because it is true that when you divert traffic to another port, it takes years to regain that traffic, and during the time we are attempting to regain it, we are losing money.

Enforcement of the weight law will increase the taxes of the citizens of Charleston. The City of Charleston is bonded for the Port Utilities Commission in the sum of two and a half million dollars, and this Port Utilities Commission operates the wharves and terminals and a belt line railroad. So far, they have been able to pay their operating expenses and a proportion of the interest on this bond out of their operations, but if you reduce or lessen the traffic there, then they are not able to make the operating expenses, and of necessity the citizens have to be taxed.

The width limit of 90 inches imposed by the South Carolina law would have the same effect on the commerce as the weight limit. The width of most of the trucks and tractors and some trailers that come into the Port of Charleston carrying this interstate commerce is 96 inches, and the same loss would result from the enforcement of this width limit as from the enforcement of the weight limit.

The freight rates in the southeastern part of the country are somewhat higher than those in the middle west. If the truck competition with railroads was eliminated, the truck [fol. 139] competitive rates now in effect would go out and you would go back to the normal level of rates, which is higher than these competitive rates. This would mean that commerce flowing into, out of and across South Carolina would be carried at higher rates to the public.

I can cite you one example of that. We get rice from Lake Charles, Louisiana, that is bought by a concern in Florence, South Carolina. It does not stop at the Port of Charleston; it comes by steamer line to Charleston and then goes out to Florence. At the present time the railroads have in effect what they term a truck competitive rate from Charleston to Florence. This rate is 11 cents per 100 pounds. If you remove trucks and don't permit movement that way, there is no need for that truck competitive rate and you go back to the normal rate. This 11 cent rate is a minimum on 30,000 pounds. The normal rate is 22 cents with a minimum weight of 40,000 pounds; there is an increase of $55.00 a car.

The situation as to the higher rates in the southeastern part of the country has been a gradual process. In 1928 the rates were all revised in the southern part of the United States under what is known as the southern class rate investigation—that was class rates—but since that time we have revised the commodity rates. At the time the class rates were revised the level in the South was 25% higher than the midwest section of the country. That level today has risen to about 40% higher.

The truck competition with the railroads has tended to keep the levels of the rates down. If it were removed, this would be a detriment to the shippers and to the citizens of this State and section. I can point out some examples here where it will be to the shippers of Charleston. There are some concerns that handle linoleum moving out of Marcis Hook, New Jersey, to Charleston. They buy the shipments in quantities so as to keep the stocks active all [fol. 140] the time. That is moved in by truck. If the weight law is put into force, these shipments will have to move by railroad. They will have to buy in larger quantities and they will not be in the same position to compete with the competitors located in other states. That would create a burden on interstate commerce.

We have fourteen fertilizer plants located at Charleston. We manufacture enough fertilizer to ship it all over the states of Carolina and Georgia, but on account of the rate structure we are limited in the distribution of fertilizer, and we have been able by the use of trucks to make shipments of fertilizer into North Carolina and Georgia, but if this weight law goes into effect, then we will have to fall back upon our railroad distribution, and therefore, our area of distribution is going to be limited.

Cross-examination.

By Mr. Griffith:

I gave some percentages as to the volume of freight moving by truck in 1935 and 1936, which I compiled from records of the intercoastal steamer lines, their agents at Charleston, Street Brothers. I haven't with me any percentages for prior years. The trucks have reached their point of efficiency within the past five *five* years. There was some movement prior to that time, but not as much as in the last five years. Our records indicate that there has been a steady increase in the movement by trucks during the last five years.

Judge Northcott: I want to ask the witness a question. What, in your opinion, would be the effect on Charleston and the citizens of Charleston, and the port and taxes and all these various things you testified about, if the trucks put the railroads out of business?

A. Judge, we would be as seriously concerned about that as we would about the trucks. Our idea is, there is sufficient [fol. 141] for all as long as they are kept within reasonable limits, and we are anxious to see the railroads, the steamships and the trucks compete with each other under reasonable regulation.

I had occasion to look up the coal figures in a coal case which we handled before the Interstate Commerce Commission, and the coal going into Charleston annually in 1933 was 125,000 tons. No coal comes into Charleston by truck, because we are too far distant from the coal mines, over 450 miles from the nearest coal mine. Steamers take on coal at Charleston, we have bunkering facilities and a coal pier, and quite frequently ships come into Charleston for cargoes and also for bunkering. The total of 125,000 tons that I gave relates only to the consumption of coal in the

City of Charleston and to coal used by tug boats in the Port. That does not relate to the tonnage that moves through the Port.

Redirect examination.

By Mr. Funkhouser:

60% of all movements of cotton into Charleston is by truck; 40% by railroad. If the truck competition were removed and all cotton moving through Charleston went by rail, the cotton would seek other ports. The reason we have been able to control a substantial percentage of a cotton movement is because we can use the trucks, but if we can't, the cotton rates are going up to the normal basis and they are going to seek other ports where they can move it through.

(The witness recalled.) As to the actual tonnage of coal moving through the Port of Charleston (in response to question by Judge Glenn): There were for exterior movement from Charleston 36,778 tons in 1934, and 75,780 tons in 1935. This moved by rail to the Port and moved by ship beyond the Port in exterior trade.

[fol. 142] JOHN W. GERATY, a witness for the plaintiffs, having been duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live at Yonge's Island, Charleston County, South Carolina. My principal business is growing vegetables, farming and specializing in vegetable growing. In addition to that business, I am also an officer and an organizer of the South Carolina Produce Association, which is a cooperative farm organization composed primarily of the farmers or vegetable growers. This concern was organized in 1915. We have completed 21 years of business and for over 18 years of that time the South Carolina Produce Association was the largest shipper of vegetables in the Carolinas, and when I speak of the business, my own business is handled through this cooperative organization, as well as the other growers who are members, and over 90% of the total produced, the vegetable produced is shipped in interstate commerce. The Produce Association ships in interstate com-

merce. We operate principally in the coastal section, which is the market garden section of the State, Charleston County, Beaufort County,—we have had members in Georgetown County,—Horry County, Colleton County, and a few members in Hampton, but I would say 85% of our volume of business is in Charleston, Beaufort and Colleton Counties.

I am familiar with the South Carolina weight and width law on trucks. I have attended almost every hearing that was held while that law was being passed by the South Carolina Legislature. The enforcement of the law as to weight and width would absolutely debar the vegetable growing interest of the use of those facilities for moving our products, and it would mean the discontinuance or confiscation of our industry. We would have to go into other business or go bankrupt. We ship by refrigerator trucks. [fol. 143] If the law is enforced, I could not use a modern refrigerator truck for hauling products in South Carolina. Just at this point I would like to stress that the cost of transportation by truckers, and most of them have to move by refrigerator trucks, and the different growers and organizations do not own this equipment. We cannot afford to buy it, no more than we could afford to buy and operate a railroad. We have to depend upon securing this equipment for moving our class of products from large corporations who own this standard equipment. This equipment travels with the season. Some of the equipment we use is owned by corporations in Michigan, Wisconsin and New Jersey concerns and different states in the Union. They go to Florida, following the seasons up through Georgia and the Middle West and go where they have the stuff to move. Now all that equipment is standard. If the law is enforced there could not be one single piece of that standard equipment used in South Carolina, because it is all 96 inches wide and on account of the weight, we will simply be debarred from using the trucks. We could not secure trucks to use.

We cannot ship by railroad because the service that is rendered on a large percentage of our business by the trucks cannot be rendered by the railroad. It is a different class of service and a different kind of service. Our competitors in Georgia, Alabama—I mean the market gardens who grow the same commodities—ship at the same time and they could get the benefit of this truck service which is entirely different from railroad service and would give them

such a monetary advantage that it would amount to around anywhere from $50.00 to $85.00 an acre as against the growers of vegetables in South Carolina. Our records show that we don't average this profit per acre. It means that we would simply have to go out of business and it would go to our competitors who could use this equipment.

Judge Glenn: I meant, why could you not use the railroads?

A. Well, I will take—say, the shipments moving from the Charleston territory to the New York market. I will take that area because that distribution handles about 35 or 40% of our products. This is the difference. Our rate—[fol. 144] we will say—our rate by truck and the freight rate by rail is the same, but the service that is rendered is an additional cost when stuff is shipped by rail and it amounts to this; that we ship by truck and when we ship by truck, the truck loads at our packing shed in the field, goes to New York and unloads at the store of our consignee or the persons to whom we have sold or shipped the stuff. In the matter of schedules the truck makes a schedule of around 30 to 35 hours from our place to New York. The schedule by rail is a third morning delivery, nearly twice as long. If the stuff is shipped by rail, after it gets to New York it has to be lightered across and unloaded on the terminal. We have a terminal charge for unloading which figures at 1.2 per package. This is in addition to the freight rates. The freight rates are the same. After that stuff is unloaded on the terminal in New York, we have a cartage charge. It has to be carted from the terminal to the buyer or consignee. That cartage charge is eight cents a package. Then on account of the difference in length of time in transit, there is a difference of three cents a package in the cost of refrigeration, which makes a total additional charge when shipped by rail of 12 cents per package. The standard car load has 600 bushel packages, and you take in commodities like cabbage and spinach, that is just about the average yield per acre. The additional charge of 12 cents per package would figure at $72.00 per car or acre. Therefore, the growers of these commodities in South Carolina who cannot use these refrigerator trucks would be put at that disadvantage against his competitors in Florida, North Carolina, Georgia, and Alabama. That is, as far as equipment, schedule and extra charge.

About the lightest unit of the standard refrigerator equipment being used now will run from 12,000 to 14,000 pounds. That is the unit without the payload. As to the refrigerator, that unit will carry 450 to 500 bushel packages. Then to refrigerate that load you will have to use 5000 [fol. 145] pounds of ice. There are 13,000 to 18,000 pounds and under the present law, if enforced, that would reduce the payload you could carry, 2000 pounds at one point.

Judge Parker: What is the weight of those units?

A. The vegetables vary very much, but the average weight runs about 40 pounds a bushel. Say 500 packages would be 108, about 20,000 pounds. That would be that the unit and the load would give you about 35,000 or 36,000 pounds. But that is the smallest standard size refrigerator unit we use at all. There is much larger, but we have been using the equipment hauling from 400 to 520——

Judge Parker: Is that a single truck or trailer?

A. It is a single unit—but I don't think the Court has that clear. We have what we call a semi-trailer and what is called a four-wheeled trailer. The standard equipment is semi-trailer equipment. You have your motor and power in a short coupled power unit. Just your refrigerator truck sets on to that.

Judge Glenn: You have a six-wheeled unit?

A. Some six and some eight. Then you have three and four axles. A lot of the trailers have two axles under the trailer and two under the power units which gives you four and a lot of those axles have double wheels. You have eight wheels under the trailer, you see, you have six wheels under the rear end of the power unit which would be fourteen tires and two tires in front end, which distributes the load over the highway, and that is done to protect the highway. That evidence was taken in this hearing and was not refuted before the Legislature. It was stated there that these standard units loaded with that capacity that what damage was done to the highways is due to the number of bearings that an ordinary Chevrolet or Ford with five passengers would do just as much pounding or damage to the highways as this load distributed on standard [fol. 146] equipment with six wheels. That evidence was given at the hearing and they did not attempt to refute that.

We have two classes of buyers. The railroad service is just as necessary to us as the truck service. Now, to a

large buyer and a large operator, to the one using and buying a solid car load of one commodity, we must use the railroad service because his car can be shifted around without breaking the bulk, but 50% of the stuff is used by dealers who do not buy in solid car lots and to that man the truck service is indispensable and that class of buyers use over 50% of the products, and they demand that service.

If we were denied that service we could not compete with produce growers in other states. On account of the new freight rates on the general freight revision on perishables that became effective September 5, 1934—I think that is correct—that did away with discrimination on perishable vegetables from the western territory to the east. That is going to necessitate a very large percentage of the acreage of lighter vegetables, such as spinach, lettuce, carrots, and other stuff grown in Texas and shipped to the eastern markets, that acreage will have to be transferred to the eastern seaboard markets on account of the advantages. There is one large New York operator who was operating 8000 acres in Texas of these commodities. We were doing considerable business with him. He wanted in 1934 to transfer, as soon as the law became effective on September 5, 1934, to arrange to transfer that acreage and wanted to transfer that acreage to Charleston, South Carolina, area and have it grown by our organization, 8000 acres. On account of the truck law that was then pending, he said he could not afford to make that change until the matter was settled, because unless he could handle that stuff with those trucks he could not load as a result of the law, and that man has now located part of that acreage [fol. 147] in Florida towns near Tampa and part at Moultrie, Georgia, and there are 15 to 20 other large operators in New York who have to make some kind of transfers representing over 100,000 acres of these commodities.

If the law is not enforced in South Carolina, I think these growers will come into this State, because we have natural advantages. We have a better labor condition, better soil condition, and better climatic condition. If we are not interfered with by something arbitrary, we will have natural advantages.

Judge Northcott: Do you think the Court should consider whether North Carolina, Georgia, or other states getting this business is proper to enter into this case?

Mr. Funkhouser: I think that shows discrimination against interstate commerce.

* * * * * * *

[fol. 148] The Witness: Since the advent of good roads and automobiles, communities have grown up in this State which produce vegetables where there has never been any railroad. On these hard surface highways that have no rail facilities there has been a large development of acreage devoted to the growing of vegetables for shipment to market. If these trucks were banished from the highways, they would not ship these vegetables.

The manner of conducting the produce business has changed remarkably since the advent of trucks, and particularly as to the broadening of consumption and cheapness, making the price of the commodity sufficiently low that a large percentage of the population can buy and use vegetables now that could not use them prior to that. As a result of that, less than carload shipments are sent to small towns by truck. In a town of as much as 2500 or 3000 population that town can not use a carload of mixed vegetables and under the present railroad loading regulations we cannot economically ship a car load of mixed vegetables to those small towns th*ey* cannot buy in carload lots.

Q. If he is compelled to ship by railroad, could they be shipped by rail?

A. At this particular point they could not, because there is not a consumptive demand to use them.

Q. That is, unless put in a larger car which would be prohibitive in cost?

A. Yes.

M. M. STUART, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live at Shelby, N. C. I am in the motor transportation business with Barnwell Brothers, Incorporated, a plaintiff in this case. I am a stockholder and manager of our

[fol. 149] western division, which includes North Carolina and South Carolina. I am familiar with the South Carolina weight and width law, which has to a great extent prevented my company from operating in this State. We have ceased a good many of our South Carolina operations for this reason. In most cases, if we ship into this State, we ship through another company. If that law goes into effect, an operator attempting to come in and through this State would have to secure equipment for use only within this State; equipment to operate here could not be operated profitably in other states that have tire weight limits. It would be necessary to unload from large trucks to small trucks at state lines. For a profitable operation from Atlanta, Georgia, to New York, a truck would have to unload at the South Carolina state line, also unload and reload into a larger truck at the Georgia line; that would be two unloadings, and possibly two trucks to carry the same amount of tonnage through South Carolina that one truck would handle through the other states. That would increase the cost of transportation materially, because it costs practically as much to operate a small truck as a large one, the costs are of varying character, gas consumption, labor costs and the investment in the equipment. That would increase the cost of transportation to the ultimate consumer. A truck to comply with the South Carolina law would cost about 75% as much as a truck that would carry twice the amount of merchandise. The comparative total would be three to two.

My company operates under authority of the Motor Carrier Act, and has filed a schedule of rates with the Interstate Commerce Commission, in which we have taken into consideration the increased cost of operation in South Carolina. We have tried to comply with the law in South Carolina and for that reason, we have set up restrictions in our rates causing the rates on commodities which originate in South Carolina moving to the East to be considerably [fol. 150] higher than from some point in North Carolina, which ordinarily would take the same rate basis. As an example, the product of a cotton mill at Shelby, North Carolina, would be moved to New York at the commodity rate of 74 cents. On the same shipment from Blacksburg, South Carolina, about 15 miles from Shelby, to New York, the rate would be $1.14 per hundred pounds, a difference

of 50 cents. We are forced to discriminate against the business originating in South Carolina. A good bunch of the big textile shipments from Spartanburg moves by truck, but not nearly as much as the same type of commodities from North Carolina points. Gastonia, N. C., and Spartanburg, S. C., are comparable as to the amount of textiles produced. They have the same rate basis to the east. We make a difference now. On almost every kind of article, our rates from any South Carolina point under ordinary circumstances showing the same rate from similar points in North Carolina is considerably higher. Most of the commodities from Gastonia are cotton yarns to Philadelphia with a rate around 68 cents. That same commodity from Spartanburg by our line would be rated at third class or approximately $1.14 or right at that figure.

The excess cost means that the South Carolina textile shippers are not able to use truck transportation. They have to a great extent lost their markets. I know of lots of instances where they have already lost their markets.

If the South Carolina Act is enforced, it will not exclude the operation of tractors and semi-trailers, but it will reduce the size and the amount of tonnage they carry down to the point where it will not be economically profitable to operate that type. We could not operate them on a profitable basis, because we would not be able to carry enough payload to justify the increased cost of operating and the first cost of this type of outfit.

[fol. 151] As between a truck and semi-trailer under the South Carolina law, the amount of pay-load that we would be able to carry would depend on the weight of the empty vehicle. The truck in every instance ordinarily would weigh less than the truck trailer outfit. Taking two similar vehicles, the semi-trailer that will carry the same quantity that the truck will carry—that type of semi-trailer and tractor would weigh ordinarily, the smallest unit, about 12,000 pounds empty, and the payload would not weigh but eight to nine thousand pounds. It is the experience of the states who have small limitations, that the roads are full of small overloaded trucks which are much more unsafe than the type loaded properly and conducted along safe lines. Under ordinary circumstances, leaving out this law, a motor carrier would carry more of a pay-load on a semi-trailer than on a truck; but if the South Carolina law is

enforced, he will be compelled to carry the most pay-load on the truck and not use the semi-trailer. There is a better distribution of the load on a semi-trailer outfit. If the law is enforced, it would enforce heavier loads on vehicles which are not prepared to carry as good loads as tractor-semi-trailers, and it would create an unsafe traffic on the highway. That is the experience we have had in every state that has low weight restrictions.

If the law is enforced, the service rendered by trucks to the buyers in New York would be greatly hampered. The decrease in time of delivery of shipment is of the greatest importance. In the ways of conducting business, particularly of people carrying a very small stock of goods on hand, and in order to get in their supplies fast enough they have been forced to use truck transportation. Prior to the advent of the trucks coming into the picture, they could not get the service that they have today. They were forced to carry some thousands more in stock and inventory.

[fol. 152] Since the advent of good roads and motor transportation, the method of doing business has changed entirely. The retail buyer has reduced his investment considerably. We have customers who have been able to reduce the amount of money invested in inventories and stocks on hand by as much as $500,000.00. Truck transportation has been able to give them service on their supplies which has reduced time in transit more than one-half. They can get the goods quicker when they want it and don't have to wait on delivery, and don't have to buy and hold for future use. That change has come in the last four or five years, since the development of motor transportation.

Most people are employed in South Carolina in the textile industry, outside of agriculture. If the State law is enforced, the mills in South Carolina cannot compete on the same basis with other mills in the country if they will not be allowed to run or get their proportion of business that they ordinarily would, thereby creating unemployment.

I think about 75% of the textile products in North Carolina are transported from the mills to their markets by truck. I think the figures in South Carolina are just about the reverse, only about 25% of the textile products move by trucks. This difference has been caused by the fact that motor transportation has been denied to the people of South Carolina to a great extent.

Approximately two hundred trucks are operated by my company, which was organized in 1930 and has been in business since that time, handling mostly textile products from the Southern mills for New York markets. We operated two trucks in 1930. We have had two hundred trucks since January 1, 1936; our business has grown from two trucks to two hundred trucks in those years. That situation is generally true with the large trucking companies. There [fol. 153] is a revolution in transportation, and practically all of it has taken place in the last five or six years. It has changed the method of doing business in the country to a great extent. I think that is a natural development; it is as natural as the growth of the railroads when they replaced the former method of transportation—when the canals could not give service the railroads gave it. Now the trucks give service the railroads cannot give.

Cross-examination.

By Mr. Griffith:

The large development in the use of trucks for transportation is general among the operators the country over. A great many of such operators have increased much more than my company. I think that our company is an average as to the increase in business, that we are just about the average.

Our line of trucks, the trucks that are principally in the business of handling shipments over long distances from New York into the South here, weigh in the neighborhood of 16,000 to 17,000 pounds empty, truck and trailer. Our loads average on those trucks around 16,000 to 18,000 pounds, on the average; sometimes they are loaded as high as 20,000 or 21,000 pounds, but we are still within the law in the various states when they are loaded to that extent. Our axle weights when loaded are less than 18,000 pounds per axle—I cannot tell you exactly. You can figure it—there are three axles per unit. This front axle does not bear as much weight as the middle axle, and the middle does not exceed 18,000 pounds. I would say that our axle weight is somewhere around 18,000 pounds per axle, and we stay under that.

Redirect examination.

By Mr. Funkhouser:

As to the axle about which Mr. Griffith asked me, with the exception of the front wheels, there are two tires on each end of the two axles. The trailer has ten tires. Four tires [fol. 154] on the axle distribute the load better than two; it increases the amount of surface there is on the road. We use low pressure, pneumatic tires, balloon. I don't think they damage the road as much as high pressure tires. Our largest units are 96 inches, outside width measurement. That is the new equipment we have bought in the last two years, which is standard. Our pay-loads average from 16,000 to 20,000 pounds per load on our largest units, more often about 17,000 or 18,000.

96 inch wide trucks have been standard in North Carolina for only the past two years; practically every northern or eastern state has had 96 inch width or more all along, since any regulations have been in effect, since we started going into New York territory six years ago—those regulations were in effect then. The extra width increases the cubic capacity. It allows us to load much more thereon and especially is that valuable when there is bulk. They have to be longer and narrower, because you can get three or four lines of cases in there but with only 90 inches maybe you would lose two feet. Our experience has not shown that the extra width makes the trucks more dangerous to operate on the road. Our experience has shown that the lighter trucks are much more unsafe than the heavy ones. We have about 25,000 miles of actual road mileage per day and we keep several men to keep our cost accounting and observation, etc., and we have had much better experience on larger units than on small ones. Our ratio of accidents has been less. The same principle applies in a truck that is correctly balanced as it does in an automobile. For instance, a 6,000 pound Cadillac car can be handled on the road and stopped quicker at 60 miles an hour than a Ford can weighing 3,000 pounds. In other words, a small light car traveling at an excessive rate of speed cannot be handled on the road or stopped as quickly or as safely as a much heavier car. This is so at a higher rate of speed. I don't know why, but it is true, and the same thing applies with the truck. If a truck

[fol. 155] is correctly balanced, in other words, the ratio of the weight of a truck is correctly proportioned to the weight of the load, if it is correctly distributed over that entire medium it is much safer than one that is top heavy or a small one that is greatly overloaded. The extra space that the tires occupy on the road, the extra braking powers that the big trucks have, much more than compensate for the momentum of the truck because of the extra load. Our trucks have brakes that will stop the truck at 50 miles an hour, even though it tears the tires off the truck.

The trailers in most instances are about 25 feet long. They are ordinarily about 38 feet all over. I think the South Carolina law with respect to length is about 45 feet—it used to be. (Mr. Funkhouser advises that it is 35 feet.)

We operate from New York through Pennsylvania, Philadelphia, Delaware, Maryland, District of Columbia, Virginia, North Carolina, and principally some, in this State. We have rates in effect all over the territory east of the Mississippi River, joint rates in effect with various carriers over the entire eastern section, so that any shipment can be transported at a certain through rate—there are various carriers. If the South Carolina law were enforced, I don't think shipments could be made through South Carolina on those through rates; they could, provided it is done on the present rates. I think it would be necessary to increase the rates in South Carolina.

My company hasn't had any interchange of equipment with others, as where a truck is loaded in Boston or New York and is transferred to another company at a certain point, but it is very practical to do that if the regulations would allow it. The Interstate Commerce Commission has considered the possibility of that, I think, and suggested [fol. 156] that it be done. I think they have the power to do so. If that could be done it would enable us to give a much quicker service to our customers because loads could be loaded at the point that they originated and sent direct to the point of destination without any terminal transfer, or reloading. This would require only changing drivers, supervision, and responsibility.

[fol. 157] R. W. KNOWLES, a witness for the plaintiff, having been first duly sworn, testified:

Direct examination,

By Mr. Funkhouser:

I live in Cleveland, Ohio, and am employed by White Motor Company as a Transportation Engineer. I have been sixteen years with the present company. A transportation engineer has as his duties the examination of hauling operations of a number of operations and presenting the economic picture found thereby as well as buying equipment to meet that competition. I design combinations of vehicles to meet a particular situation, for example, tractors and semi-trailers with particular design of bodies to meet the particular condition.

The standard tractor-trailer used in the Interstate Commerce today is ordinarily designed to carry about 18,000 pounds per axle and sometimes a little less; usually 16,000 to 18,000 if a state law permits, which most of them do. I select 18,000 pounds per axle as a basis in designing the cars because most of the states permit this, and the various authorities, such as the American Association of Highway Officials, have subscribed to that weight per axle. The American Association of Highway Officials have recorded themselves as being in favor of no gross weight limit, but weight per axle limit.

As an engineer, I do not believe that gross weight in any way protects the highway. For example, if I might explain my idea: If there were two trucks, one proceeding behind the other, and each had one axle with 18,000 pounds limitation on it, whether those two trucks were independently propelled, pushed by hand, or one pulled the other, by means [fol. 158] of chains, cable, or bar, the effect on the highway would be practically the same. If the front axle were removed from the picture, throwing the support on the back of the other truck, having its body suitably disposed to permit that, then the weight on the axles would distribute —their effect on the highway would be the same standing or operating on the highway. The weight of the vehicle affects the highway in relation with the contact of the tires on the road; it is transmitted to the highway through the axles and tires.

In designing an automobile, we do not consider the gross weight as to the highways, we are concerned with the axle weights.

In designing tractors and semi-trailers for bridges, the common accepted procedure is to see that the axles are so spaced to the weight on the axles that they will comply with the formula, that the length between the front and rear axles, plus a space usually 40 center dependent on the type of bridge, shall not exceed a certain figure. There is a standard formula used by highway engineers and other engineers to determine that.

(The witness is handed a pamphlet entitled, "Who Shall Use the Highways and How," and is asked who makes up that Association.)

I believe that has been stated by other parties. My understanding is that it is the highway officials of the several States who, I am advised, work in connection with the Bureau of Roads. It contains specifications as to what weights the roads ought to be designed to carry. I understand that the Bureau of Roads concurs in that.

Q. Will you look at that and state to the Court what axle width is provided in there?

[fol. 159] Judge Parker: Wait a minute. Your adversary has not objected, but I told him he need not object.

Mr. Davis: That is not competent evidence.

Mr. Funkhouser: I want to make the point that the Association interested in highways and also the Bureau of Roads have agreed on that as a standard at the present time.

Q. Do you know about who has approved those recommendations in there, what they mean and whether or not that is a standard at the present time?

A. I know that I have read and studied this to some extent, and the regulations herein are substantially the same as they have been by this body for sometime and that the general recommendations are concurred in by the AMA right recently.

Q. What is that AMA?

A. That is the Automobile Manufacturers Association. Might I quote one sentence from this on page 9, "Highway stresses are ruled by wheel loads and not by gross loads."

Judge Glenn: That is your view, too?

A. Yes.

By Mr. Funkhouser:

Q. Will you read what it provides as to axle weights and recommendations?

A. (Reads:) "Axle load: The wheels of all vehicles, including trailers, except those who operated at 10 miles per hour or less, shall be equipped with pneumatic tires. No wheel equipped with high pressure, pneumatic, soled rubber or cushion tires shall carry a load in excess of 8000 pounds, or any axle load in excess of 16,000 pounds. Research indicates that the low-pressure pneumatic tires can carry 9000 pounds per wheel without increasing pavement slab stresses. An axle load shall be defined as to total load on [fol. 160] all wheel- whose centers may be included between two parallel transverse vertical planes 40 inches apart. These limitations are recommended for all main rural and inter-city roads, but should not be construed as inhibiting heavier axle loads in metropolitan areas if any State desires."

In my opinion, safety on the highway will not be enhanced by 20,000 pounds limitation. For this reason, among others, a vehicle having gross weight of about 20,000 pounds can carry approximately six ton pay load and a properly constituted semi-trailer whose axle weights are kept within the pounds as set forth by the AMA Highway officials, namely, 18,000, can carry a pay load of about 24,000 pounds. That is twice; consequently to move the same total tonnage of merchandise in interstate traffic or any traffic would require about twice the number of vehicles and using twice the number of vehicles would mean twice the opportunity for hazard. You would have twice as many vehicles operating at any rate, and if they are equally well constituted as to brakes, tires and manufacture, were of equal structure, there would be twice the hazard of meeting with some other vehicles. From that standpoint, I cannot see that safety would be enhanced.

Judge Parker: Does not the smaller unit prevent greater damage than the larger unit?

A. No, sir. It is true that certain tractor-semi-trailer combinations have been set up which are not safe. It is also true that many straight trucks are not safe, but if the weights per axle are kept within proper balance as defined by the body of Highway Officials and the others subscribing to it, namely 16,000 pounds, if they are properly equipped with brakes so that they can stop within a given number of [fol. 161] feet, then there is no more hazard on the road with one vehicle, than by a truck conveying equipment——

Judge Parker: Is there not more difficulty in the driver seeing around one of the long ones coming when he passes them on the road?

A. His passing them on the road is a matter of relative speed of the two vehicles and the freedom of the road to pass and the judgment of the over-taking driver as to whether he has proper space and the conditions in which to pass.

Judge Parker: The question I have in mind is this. Is not the larger unit of that sort a greater menace to the other travelers on the highway for the reason that passing on portions of curves, it is almost impossible to get a proper view of the highway?

A. This same Association advocates a limit of 45 feet in length and some trucks can be set at 45 or if not 45, then certain loads such as lumber, logs, might exceed the figure even at 30,000 pounds, you have the same length hazards.

By Mr. Funkhouser:

The Witness: The longer vehicle is more dangerous than the shorter one in passing. It is possible that one 50 feet long is more dangerous to pass than one 25 feet long but, of course, it does not hold of necessity.

Q. You have more distance to travel on the opposite side of the road the longer it is.

A. You should have a greater open space in which to let that passing, but that is in the judgment of the operator who wishes to overtake it. There is no difference in hazard between a tractor-semi-trailer of 45 feet length and two [fol. 162] trucks of 20,000 pounds, whatever their length, one behind the other, carrying the same pay-load tonnage because in either event you will have to pass the same length as the other.

In my opinion, vehicles of proper types, carrying approximately 40,000 pounds can operate as safely on the highways as trucks with gross loads of 20,000 pounds, because today we have power applied brakes on any combination axles, so that each axle and wheel of the vehicle can be stopped in the same distance with the same adhesive power, as if it were. Consequently the ability to stop is equally as safe. There have been vehicles constructed in the past when those brakes were not as safe, but not any more.

There has been a very considerable revision of the manufacture of automobiles in the last few years. Rather generally, by virtue of the availability of axles, heat treatments, etc., vehicles are now made lighter than formerly, — have the same strength. The advent of pneumatic and particularly low pressure tires has permitted you to do certain things with superstructure that has not been done prior. There has been a pronounced evolution, if not revolution in metals used in cars. There are metals available today for use in automobile construction that were not available three years ago, which makes it possible to do certain things for safety and strength.

The enforcement of a 20,000 pound vehicle law would affect highway costs in this way: As compared to a tractor-semi-trailer combination having its axles limited in weight according to the regulations of the same highway officials to 18,000 pounds, the tractor-trailer unit would or could carry safely about double the pay load. The cost per ton [fol. 163] of the two units would be about $1.00 in the case of a single truck unit limited to 20,000 pounds, because of the influence of the items of depreciation, insurance, license fees, drivers' wages, etc. As to the relative cost of highway maintenance:

Take one truck of a gross load of 20,000 pounds against one tractor-semi-trailer combination of 40,000 pounds— there may possibly be some relation there that I am not prepared to argue on, but it has been stated by people in that line of business for years that there is no difference in moving the requisite number of units for the tonnage over the highways at less, or the same number of units, provided the axle weight is kept within the proper bounds.

Semi-trailer combinations do not have to be highway hazards as compared with trucks. If they are properly constituted with their weight distribution per axle as advocated by the Association highway officials, etc., and their bodies subscribed to their findings, if they have brakes and adequate tires and — adequately constructed. The air brake has been in use on the semi-trailer-and truck combinations, possibly in a small way, for seven or eight years, and in a very pronounced way for the last five years particularly. I would be inclined to say that proper regulations concerning brakes would put the combinations on a par with the trucks, provided again, the weight per axle is cut down.

Cross-examination.

By Mr. Griffith:

I am not prepared to answer whether all highway engineers agree with my opinion. I don't know that I know all engineers. Those engineers having to do with the question in a public way and recognized by the industry generally, have agreed. None of them have expressed themselves in disagreement. [fol. 164] I have the statement of the Association of State Highway Officials and of the various officials in writing. Mr. McDonald of the Bureau of Public Roads is to the same effect. My own experience indicates that. I don't know of any contrary opinion; but I don't know the opinion of all engineers,—there may be thousands of engineers. I don't know what their opinions are.

HARRY TUCKER, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

My name is Harry Tucker. I am professor of Highway Engineering in North Carolina State College, and Director of the Engineering Experiment Station at Raleigh. I have been professor of highway engineering at North Carolina State College since 1921. Since that time, I have had intimate association with a number of the committees and organizations engaged in highway engineering work in the country. In addition, I have had some practice myself in highway engineering, that is, in the designing and construction of roads and streets. I am a graduate of Washington & Lee University. I hold degrees B. A., B. S., and C. E. I have charge of courses in Highway Engineering and Highway Economics. I teach all of the elements connected with highway engineering, including the location and design of highways, the operation of highways, that is, the operation of vehicles over them, the maintenance of highways, and those subjects properly belonging to a course in Highway Engineering. I teach them all.

I am familiar with the design of highways of different types. Concrete, or its equivalent, is considered standard

for main highway routes. The gross weight of a motor vehicle does not enter into the design of a concrete [fol. 165] highway or its equivalent. The design of a concrete pavement is based on the area of contact between the wheel and the pavement itself. That is, the gross load of a vehicle is transferred to the pavement through the wheels. Now, the wheel load is the thing that causes the damage to the highway; conversely the highway is designed to withstand a certain wheel load, without damage. The gross weight of vehicles has nothing to do with conserving the highway. It is the wheel load. The pavement is designed for certain wheel loads and, of course, certain axle loads. The wheel load is developed for the axle load, and if those loads are not exceeded, then the gross weight of the vehicle has nothing to do with conserving the highway or the cost of maintaining it.

I am familiar with some of the main State highway routes in South Carolina. I could give you a list of the ones I am familiar with. I have examined some of the South Carolina State highways. I went over certain roads in the State, and didn't pick them out,—didn't know much about the highway system in the State, and consequently did not pick out any particular road with malice aforethought, with any particular plan, but the roads I went over are the finest I have been over in recent years. They were well constructed, the shoulders well built, quite different from the way they are built and maintained in our State; the drainage good, and I didn't see any evidence of undue deterioration of the pavements from traffic. It is almost impossible to say what causes a failure of a pavement, especially a concrete pavement, there are so many factors entering into it. I will say that in a general way, without examining [fol. 166] every point in the system that is affected, that in a general way I saw no evidence of undue deterioration, —that might cause maintenance,—because of the heavy trucks, or trucks at all that come on these pavements. If heavy trucks were going to damage the highways and those trucks used those highways for six years, I think the damage would begin to show up.

Q. Using the concrete roads as typical,—what sections were used in the South Carolina highways you examined?

A. Well, of course, it is understood I didn't,—I was unable to dig a hole in the pavement, or drill a hole and get the thickness of the pavement. I got this information from

the highway department. I understand two sections were used on the road I examined, a 7½-6-7½, which means 7½ inches thick at the edge, six inches thick in the center, and 7½ inches thick at the other edge; and another was 8-6½-8, —8 inches thick at the edge, 6½ inches in the center and 8 inches at the other edge. I am informed by the Highway Department those are the two sections used on the concrete roads I examined.

Judge Parker: What concrete roads did you examine?

A. I will be glad to tell you. I went from Charlotte, in this examination to Spartanburg, Greenville, Anderson, Greenwood to Aiken, Batesburg, Charleston, Kingstree, Florence, Cheraw, and on route 52 to the North Carolina line. There is no particular town there that identifies it. I think without question these concrete roads that I examined will carry a wheel load of from 8,000 to 8,500 pounds, or an axle load of 16,000 to 18,000 pounds safely. As to how we determine that, we have methods developed originally by Mr. Clifford Older, by the Bureau of Public Roads, by Mr. Westergard, of the University of Illinois, by which knowing the thickness of a pavement and the strength of the concrete out of which it is constructed, we can determine [fol. 167] the wheel load, and therefore, the axle load, which that pavement will carry. There is no cumulative stress caused by the three axles of a semi-trailer-tractor combination. These three axles, if carrying the same load, each causes a stress in the pavement independently of the other axle. In other words, the three axles do not increase the stress.

Judge Glenn. In other words, take a given square inch on the pavement, the minute, the moment, the second the wheel passes off, the stress is all over?

A. That is correct. There is a limitation, as you perhaps know, the axles must be separated by 40 inches. If they get closer than 40 inches, my statement doesn't apply. They must be separated by at least 40 inches.

The axles of most of these trucks, trailers, tractors and semi-trailers engaged in interstate commerce, are absolutely separated to that extent, 40".

I have analyzed the road sections used in South Carolina and found that the road sections with minimum thickness at the center of six inches is good for the axle load of

16,000 to 18,000 pounds, so that with a tractor-semi-trailer combination, with three axles, the road will carry approximately 40,000 pounds gross; on the rear axle of the tractor and rear axle of the semi-trailer would be 16,000 pounds each, and on the front axle would be 8,000, that would make a gross of 40,000 pounds. If we add another axle to the vehicle about which we are talking, providing you could get it on there 40 inches apart, it would increase the gross load to 56,000 pounds without doing any additional damage to the pavement. These roads I examined would absolutely carry that load.

[fol. 168] I have made a study of highway accidents,—have lectured, written and talked on that subject. I have specialized somewhat on the subject. I have data that will give the relative frequency of accidents according to the type of vehicles and have made studies in that regard.

Judge Glenn: What territory is this data gathered from?

A. I have it for any territory you want. I have it for the whole country, and I have it for North Carolina, and I tried to get it for South Carolina, but the Highway Department wouldn't let me have it. I have been up there twice trying to get it. I think it would be well to use North Carolina because it is contiguous to South Carolina. For passenger cars the number of accidents, including deaths and injuries, are 12.64 per 1000 vehicles. For commercial vehicles, the accidents, including deaths and injuries, are 8.03 per 1000 vehicles, so that is the relative ratio on the basis of number registered, in North Carolina. The same figures apply roughly to the whole country. As a matter of fact, that isn't fair comparison, because it should be on the basis of mileage, the number of hazards that occur is dependent on mileage. I have the figures for various vehicles for the whole country on the basis of mileage. If you want them, I will be glad to present them to you.

(Mr. Funkhouser requested the witness to do so.)

For passenger vehicles, the figures for the whole country is one accident, including death or injury, per 100,000 vehicle miles. That does not take into account other types of accidents. We must remember that there are some 25 to 50 accidents involving property damage to every accident [fol. 169] involving death or injury. We haven't any data on that, but that is roughly the ratio, so that we can say

there is from 25 to 50 accidents of every description per 100,000 miles traveled for passenger vehicles in here. Then, vehicles for commercial vehicles; busses 2.66; trucks, building materials, 1.49, that is per 100,000 vehicle miles; inter-city trucking, 1.69; laundry 3.58; bakeries 3.69; department stores 4.38; newspapers 6.80; coal and ice 7.10. That table, those figures, are presented there to bear out a statement that is frequently made that for commercial vehicles the accident rate is much higher for vehicles engaged in local deliveries more than anything else. You probably got that out of the figures I read.

I do not have figures for those trucks engaged in interstate commerce. They are not broken down in that form, but are included in the general term of commercial vehicles. I have no data as to trucks as distinguished from other vehicles. Passenger cars and motorcycles have the highest accident frequency. Commercial motor vehicles have the lowest of all vehicles. Commercial vehicles would include these interstate trucks. I don't recall whether bakery vehicles have the highest frequency; newspapers 6.80, and coal and ice 7.10, that is, ice trucks have the highest frequency. The figures are not classified according to loads, but I would think that coal and ice trucks with their loads weigh under 20,000 pounds, as a rule. I think most of these coal and ice trucks operate in the city and in areas contiguous to cities. Of the commercial motor vehicles, those making deliveries, local vehicles, more or less, have the highest accident frequency, and commercial vehicles engaged in long distance hauling, including these busses and trucks, have the lowest accident frequency.

[fol. 170] I explain this conclusion in this way:

I made some study of the methods in use by these organizations engaged in commercial transportation. They have safety departments where the importance of careful driving is emphasized. They check their equipment—they get good equipment to begin with—they are very careful about employing their men; they employ only experienced men, and they are very thoroughly disciplined and I think that is responsible for some of the records made by the commercial organizations. For example, one of them operating 59 units, that according to information furnished me, has not had an accident of any kind since September, 1934. I think that is remarkable, and I don't see how it can take place.

I think that proper weight distribution on trucks and semi-trailers is important because safety on the highways these days, at the speeds motor vehicles are operating, and hazards and emergencies developing so quickly, the important thing is stopping when the emergency develops. These modern vehicles, the tractors and semi-trailers are equipped with duel wheels, power brakes, and very careful to see that loads are uniformly distributed, and that is not entirely unselfish; by distributing the load properly the wear on the tire is uniform, but all those things increase the safety of operation. The result is the vehicle can be stopped very quickly when the emergency developed. I can't see how proper distribution of the load is encouraged by a law which has just a gross weight limitation, because under that law the load need not be properly distributed.

Cross-examination.

By Mr. Griffith:

The formula that I referred to was a formula developed [fol. 171] by Mr. Clifford Older some years ago, I believe formerly Chief Engineer of the Illinois Highway Commission, that has been modified by certain tests on the part of the Bureau of Public Roads, and particularly investigations conducted by Dr. Westergard, at the University of Illinois. From the result of all the work that has been done along those lines, it is possible for us now to use formulas to determine the thickness of a pavement to carry a certain load, or conversely, to determine the load a pavement of certain thickness will carry. Mr. Clifford Older was a pretty prominent engineer, so far as I know. That was some years ago. He was one of the pioneers in the design of concrete pavements.

Redirect examination.

By Mr. Funkhouser:

As well as I recall, it was Mr. Older who was one of the first engineers to develop this theory of axle loads for highways. Comparing the highways of South Carolina with the highways of North Carolina, as to the ability to carry weights of these vehicles, I consider the highways of South Carolina, the concrete roads will carry the loads just as

satisfactorily, the same load, and without as much damage as they would in North Carolina. In fact, they have been carrying these loads and I think our North Carolina roads are in much worse condition than those over which I traveled in South Carolina.

I do not consider the condition of the roads in North Carolina to be due to those heavy trucks. There is quite a difference in the method of constructing concrete roads in North Carolina and South Carolina. I will be glad to explain it if you want me to go into it. There are so many things that cause the deterioration of a concrete pavement that it is impossible to say it is due to this cause or that [fol. 172] cause in any case. I would say in North Carolina we have subgrade conditions quite different from the subgrade conditions in South Carolina, for one thing. There is a wider topographical condition there in the mountain section. We have conditions quite different from other sections. From my observation, the subgrade conditions in South Carolina are most excellent. As to the weather conditions in South Carolina, as compared to North Carolina, of course, in North Carolina, in certain sections we have the frost going down quite deep into the ground and that makes quite a difference as to the qualities of a concrete road. There isn't much depth to the frost in South Carolina, if there is any in certain sections.

Evidence Introduced in Behalf of the Intervener, Interstate Commerce Commission

L. W. TELLER, a witness in behalf of the intervener, Interstate Commerce Commission, having been first duly sworn, testified:

Direct examination.

By Mr. Ross:

My name is L. W. Teller. My residence is in Chevy Chase, Maryland, a suburb of Washington. I am employed by the Bureau of Public Roads, as an engineer. For the past seventeen years I have been employed by the Bureau, in the Division of Tests, and for approximately ten years I have been in charge of their researches in pavement design. In the course of that work, we have conducted many

tests and research investigations endeavoring to develop information that would aid us in the better design of highways, and a better understanding of how highways function under the loads that they have to carry, and in the course of that work we have made stress determinations in [fol. 173] pavements in surface, as well as in pavements that were built for particular test purposes according to designs we have in mind.

For about ten years I have been in direct charge of the section of the Division of the Bureau which conducts those experiments and tests covering rigid types of pavement. I have two engineering degrees, Bachelor of Science of Civil Engineering and Civil Engineering, from George Washington University. I have perhaps twenty or twenty-five published papers on this general subject, many of them directly on this subject.

Q. Will you tell us a little more as to the purpose of those tests?

A. Our aim is to find out the loads of traffic and the other changes to which pavements are subjected; how we can use the material in the most economical way, and how we can construct these roads so that they will carry their burden with the least distress, and we have used the rigid pavement as an index because it is an elastic material,—concrete is an elastic material which is subject to engineering laws, and we can analyze the effects of loads on it, and we have used pavements of many designs and many thicknesses and applied loads to them in many ways in order to determine such things as the effect of the magnitude load, the effect of the area through which the load is applied to the pavement, and other factors that affect the final result, and we have measured the effect of those loads on the pavement by actually measuring the strain in the concrete; that is an index of the burden that we are putting on the pavement. We know how much we can stretch it when it breaks. We know how much we can stretch it and use it and not have it break. That is the general nature of our research. [fol. 174] Q. Have the results of those tests been utilized to any extent in the specifications and standards which the Bureau of Public Roads will approve for highway construction?

A. We are not the only ones that have been studying the effect of loads on pavements, although I believe we have

done more work than anyone else, but those results are published through our monthly research journal, Public Roads. They are also published in the proceedings of the highway research board, and those reports, with other reports, have an influence, although it is not always easy to say that from this year on the results of these tests caused certain changes in practice, but the evidence is that the information that has been developed by our tests and other tests has been applied in the pavement designs that are in use today.

Q. Did you hear Dr. Tucker's testimony as to the design and cross-section of the South Carolina paved roads?

A. I did.

Q. Does that conform with your information as to those cross-sections and designs in this state?

A. That is in accordance with my understanding of those designs.

Q. Do you have any information, or what information do you have as to the designing of the cross-sections of paved roads, generally, throughout the country with reference particularly to how much variation occurs? Speaking broadly, of course.

A. I will speak broadly, but it is in connection with my work. It is necessary that I keep fairly well informed as to what the practice is in the various states, and the design that was described by Professor Tucker is not radically different from the designs that are being used in the vast majority of the states in the country for concrete pavement [fol. 175] cross-sections. Really there is not a great range in thicknesses, as used in the states throughout the country.

In general, I would say that by far the greatest majority of states with sections, that in the interior the slab was from six to seven inches in thickness.

Q. The South Carolina design then would fall about in the average for the group, is that correct?

A. It would seem to me it is quite a typical design.

Q. Is it your opinion that it is the thickness of the center of this design or slab which is the governing factor in strength?

A. The edge of the thickness is important only if we can conceive that the wheels of these heavy vehicles are confined to the extreme edge of the pavement, and modern motor vehicle speeds,—we all know the majority of the loads are

not traveling along the extreme edge of the pavement, and in my opinion the effect of these loads on the interior area of the pavement is probably the critical condition we should consider.

Q. Will you state your opinion of what gross load the South Carolina paved roads we heard described, will stand?

A. Well, as has already been brought out, the gross load is not a factor in pavement design. The axle load is perhaps a better factor to use, but the critical factor on which a pavement must be designed is the wheel load, because we have no guarantee that even if we specify axle load that the axles will be equally loaded and the wheel load equally loaded. The load that is applied to the pavement through the wheel is the load for which the engineer must design the pavement.

Q. What wheel load then would it be your opinion the South Carolina paved road type described would stand [fol. 176] without undue stress or undue damage?

A. There are many factors that effect that relation of the wheel load to the structural behavior of the pavement, but in my opinion the application of a wheel load of the order of 8,000 pounds, through proper pneumatic tire equipment for that wheel load, would not stress the pavement within a half of its breaking strength.

Q. Do you have information as to what the wheel load restrictions are in effect in the majority of the states?

A. I am not an expert on that, either, but in this work that we do we try to keep pretty well informed as to that also. I have been in charge of the motor vehicle impact researches of the Bureau for a great many years, and that is an important part of that work, and my impression is that by far the large majority of the states will permit a wheel load of 8,000 pounds or more on proper tire equipment.

Examination by Mr. Funkhouser:

Mr. Thomas H. McDonald is Chief of the Bureau of Public Roads. To my knowledge, he has been connected with the Bureau since 1916. I can't give you a more exact date. He is the gentleman in charge of the Bureau that distributes the Federal aid to the various states. He functions through the Secretary of Agriculture, of course. It is a bureau of the Department of Agriculture. As such official,

I believe he has testified before Congress a number of times, and also before the Interstate Commerce Commission. He is my superior.

Cross-examination.

By Mr. Griffith:

It is necessary for an engineer when he comes to construct a road and design it, to know what burdens it is going [fol. 177] to have to bear; that would be the starting point of paving design; like building a house, you must know when you start the foundation how much weight you are going to put on it. I have no knowledge of the designing of the highways of this State.

I knew Mr. Charles H. Moorefield, by reputation only. I believe his reputation was most excellent. I do not know what portion of the roads of this state are concrete roads. I do know that some of the roads within the State Highway System are what they call bituminous surfacing, because I saw some of them Sunday. So far as I know the weight that can be permitted on pavement of the bituminous type cannot be determined analytically or by tests. I do not know as to what weight should be permitted on them. I do not know as to the dirt type of roads within the State Highway System or anything about their designing or what weights they could properly bear; and, of course, I do not know anything about the mileage of these roads. I am not acquainted with the design of the bridges throughout the State Highway System of South Carolina.

(Asked to give his opinion as to what load the roads in South Carolina should bear, speaking of all the roads in the State Highway System:)

I don't believe that there is anyone that could go over the roads of any State Highway System and say that this road is good for so much, and this road is good for so much and the other road is good for so much. The concrete pavement is the only pavement that we have a means for rational design. The design of the other types must be based on the observation pavements of that type, under the conditions in which they have to serve under the traffic they are bearing, in my opinion.

My testimony so far as concrete pavements is concerned [fol. 178] is opinion based on a very considerable amount

of testing data. That is, data derived from tests conducted, with such records as we are talking about, on such type of pavement as we are talking about. I confine my opinions entirely to the concrete road. My testimony as to what these concrete roads can bear is my opinion based on test data, and I don't believe any other reputable engineer would come to another conclusion from those tests today.

I don't think that I made the statement that the gross load limit has no connection with the protection of the road. My statement was intended to convey the idea that when we came to design a concrete pavement, we were interested in the wheel load that was applied to that pavement, and not in the gross load of the vehicle concerned, provided, as was brought out before, that the axles carrying these vehicles are 40 inches or more apart, and that was established by tests made under my direction.

Q. Let me make it clearer. Under 20,000 pounds gross weight limitation, would it be possible ordinarily to put a greater load than 8,000 pounds on any one wheel; wouldn't that in itself——

A. (Interrupting:) I doubt it very much.

Q. That would limit the wheel load to a maximum of 8,000 pounds, wouldn't it?

A. I believe it would.

Q. That would limit the wheel load to a maximum, but it would permit just about such a weight, wouldn't it, on the ordinary two-axle?

A. I would expect to find about 6,000 pounds on the rear wheel, but there may be vehicles so constructed that there [fol. 179] is a larger proportion on the rear end than the normal vehicle.

Q. Do you know what percentage of the weight is on the front axle and rear axle?

A. I know we have weighed a good many of them. Recent designs have been changed and have changed the relation somewhat, but in general, there is from sixty-five to eighty percent of the load on the rear end. Now, the most recent data with which I am familiar, and the trucks we have been using in our tests, was that there was about one-third on the front end and about two thirds on the rear end when we had a capacity load on, and the reason for that was we had two tires on the rear and one on the front, and the designer figured each of those tires should carry the same load.

Q. But in your former testimony, you did find some of the vehicles carrying 80% of the load on the rear axle?

A. There have been such vehicles designed, I believe.

Redirect examination.

By Mr. Ross:

Q. My questions as to design of roads was directed to rigid type roads, I believe?

A. That's right.

Q. In most of your answers to counsel, he was talking about concrete roads. Is there any distinction there?

A. The rigid type road in our terminology covers pavements that have slab strength. The concrete pavement is the usual example of that, although a concrete base that carried a bituminous top, such as is used in some city pavement, might also be considered a rigid pavement, although composed of the two materials, but the rigid pavement type is confined to those that have slab strength, in our terminology.

[fol. 180] Q. So that when you were speaking of concrete roads, were you including this type you just talked about?

A. Well, we are talking about interurban roads, and interurban roads are not to any extent at all, so far as I know, built of anything but straight concrete pavement, where the rigid type is concerned. We find a few short sections of concrete bases with brick tops in some states. We find a few short sections of concrete bases, with bituminous top in some states, but by and large the rigid pavement as concerning interurban traffic is the concrete pavement.

H. R. Wilson, a witness in behalf of the intervener, Interstate Commerce Commission, testified:

Direct examination.

By Mr. Ross:

My name is H. R. Wilson, my residence Mt. Ranier, Md., a suburb of Washington. I am Chief Accountant of the Bureau of Public Roads.

(Referring to collection of sheets handed him.)

This is a certificate of the apportionment of funds for the improvement of roads on the Federal Aid Highways of the various states. They show altogether the amounts of money

that have been apportioned, year by year, to all the states in the Union under the Federal Aid, or other highway assistance. I summarized the figures shown on that sheet and they approximate two billion, seven hundred million dollars. Payments have been made to all the states, the District of Columbia, and Territory of Hawaii from appropriations available to the Bureau of Public Roads, from the fiscal year 1918 to October 31, 1936, in the amount of $2,197,634,970.13. There is about one-half billion dollars apportioned which has not been paid out. That covers roads now under construction, for which payments have not been made.

[fol. 181] Q. Have you made any tabulation taken from that information as to the payments made to the State of South Carolina under those acts?

A. Yes, sir.

Mr. Lyles: May it please the Court, we don't desire to disturb the equanimity of the testimony, but it does seem to us there should be some limit to this perfectly irrelevant testimony.

Judge Parker: If it is irrelevant it won't hurt you, and if it is relevant, the Supreme Court will have the benefit of it.

We have paid to the State of South Carolina from appropriations available to the Bureau of Public Roads $29,741,137.63. I cannot state the exact amount of money which has been apportioned to the State of South Carolina which has not yet been paid. It is approximately $10,000,000.00 more which has been authorized, or has been apportioned but not yet paid, and is waiting payment upon completion of the work. We have a statement of the mileage of highways and grade crossings projects in South Carolina improved with funds available from the Bureau of Public Roads as of October 31, 1936, which totals 2,797.8 miles. The statement shows the different type of roads. There are no duplications or overlapping in these figures. There is no duplication of pavement and no duplication of mileage either, because if the road was once improved under a certain type of construction and later had a higher type of construction on it, that mileage is accounted only once.

(NOTE—Plaintiffs' Exhibits 1-6 inclusive were introduced in evidence in connection with the testimony of this witness.)

[fol. 182] EMORY A. BOUDREAU, a witness in behalf of intervener, Interstate Commerce Commission, having been duly sworn, testified:

Direct examination.

By Mr. Ross:

My name is Emory A. Boudreau; my residence 5555 Thirty-Second St., N. W., Washington, D. C. I am employed with the Bureau of Motor Carriers, Interstate Commerce Commission, as Assistant Chief of the Section of Traffic, which position I have held since the Bureau was organized, a little over one year. My duties are those of General Assistant to the Chief of the Section of Traffic and administrative head of the tariffs. I assist in formulating rules and regulations covering the construction and filing and posting of carriers' tariffs and schedules; conduct hearings with carriers and shippers, and am a member of the Suspension Board of Carriers Classification Committee. I have had approximately seventeen years' experience in the transportation field, in the so-called trolley, freight or electric railroad; in the rail, water, steamship and motor carrier. Seven of the seventeen years were in construction of common carriers' rates and tariffs; five were with the motor carriers; the last two years of my employment in the field was with a cooperative motor trucks rate bureau in New England, representing some 800 motor carriers.

During my experience with the motor carrier industry, the common carrier regular route operators established their rates in cents per hundred pounds, and the common carrier irregular route operators established their rates by the trip. The advent of regulation has changed that practice, only with common carriers irregular route operators, who for simplicity of tariff publication, publish their rates [fol. 183] at so much per mile. That has not changed the basis for rate making, which is, in my opinion, the cost of operation per mile. It has not been my observation that the motor carriers with which I have been familiar apply a different cost for their different size vehicles; for lack of detailed costs and accounting system, an average cost per mile is applied on the vehicles regardless of their size. I would consider the size and gross weight of the motor vehicle would be determining factors in establishing rates, first because the pay-load is in relation to the gross weight

and, of course, covered by the net weight of the vehicle; and, second that the size of the vehicle controls the size of the body, and necessarily the cubicle displacement available for the loading of the merchandise. As to how the gross weight of a vehicle effects the rate, we will say the gross weight of the vehicle is 40,000 pounds restricted (and it is possible to purchase equipment today weighing net empty. 16,000 pounds)—we will say that will permit 24,000 pounds pay-load. On the other hand if the gross weight restricted 20,000 pounds, and the equipment of itself weighing approximately 10,000 pounds, it will permit usually loaded approximately 10,000 pounds pay-load.

As to how this would effect the rate in cents per hundred pounds, I would have to use figures of comparison. While I haven't any figures available on the 20,000 pounds carrying capacity unit, I do have figures indicating 16,000 carrying capacity units that indicate approximately a cost of 23.81 per mile, and on a 24,000 pound carrying capacity unit an operating cost of 28.95 per mile.

[fol. 184] There is a difference of about 5¢ per mile cost in operating a vehicle that will carry 16,000 pounds pay load, as against one that will carry 24,000 pounds. These figures are the average for some five hundred operators and represent thousands of miles of observation, and I might say reflect a ten per cent profit in that cost. However, that might be different in this section here due to different conditions; that might be subject to some modifications.

I can give an illustration of such variation: Say a vehicle permitting 24,000 pounds pay-load, and operating one hundred miles, say at a rate of thirty cents per mile. There we would require $30.00 for the trip, and translated into cents per hundred pounds we would require a rate of 12½ cents per hundred pounds, while if the same vehicle cost thirty-three cents, or a differential of three cents per mile, we would require a revenue of $33.00, or in cents per hundred pounds, 13.9 cents.

Q. Now you indicated the difference of one and one-half cents per one hundred pounds for 100 miles and three cents a mile differential. A while ago you were showing a five cents differential. Would that mean approximately a three cents per hundred pounds per mile?

A. No, I had the comparison on the vehicles of same carrying capacity, whereas the five cents differential is between a vehicle of 16,000 pounds carrying capacity, as against 24,000 pounds carrying capacity.

Q. If a vehicle is 20,000 pounds gross weight, it would restrict your load to say 10,000 pounds, and the cost as you have stated is approximately 24 cents a mile to operate [fol. 185] this vehicle, how would the rate in cents per hundred pounds compare with the vehicle of say 40,000 pounds gross weight that restricts the pay-load to, I believe you said, 24,000 pounds, and which you said cost approximately 29 cents per mile to operate?

A. I can best answer that question by giving an illustration. Now the shortest distance over paved road from Asheville, North Carolina to Athens, Georgia, is by Greenville, South Carolina, for a distance of approximately 163 miles. A common carrier restricted to 40,000 pounds gross weight could handle canned goods, we will say, from and to these points at the rate of 19.07 per hundred pounds. If he was restricted to a 20,000 pound gross weight, because of its travel through the northwest corner of the State of South Carolina, he would require a rate of 38.08 per one hundred pounds.

Q. Let's take a carrier operating not through the state but into the state from a point like Richmond to Cheraw, or as compared with one operating to Wadesboro, North Carolina, outside of the State of South Carolina.

A. The distance from Richmond, Virginia, to Wadesboro, North Carolina, is approximately 290 miles. Between Richmond, Virginia, and Cheraw, South Carolina the distance is approximately 292 miles. Now while the carrier operates between Richmond, Virginia, and Wadesboro and restricted to 40,000 pounds gross weight would require a rate of 35 cents per one hundred pounds, on the same commodity between Richmond and Cheraw, because of the 20,000 pounds gross weight restriction, he would require a rate of 67.07 or a difference of 32.02 per one hun- [fol. 186] dred pounds for approximately two miles further to a South Carolina point.

Q. Are these actual rates you are quoting?

A. These rates are rates based on cost of operation, plus a reasonable profit, whereas the rates I understand filed through this territory, here were filed and are related to rail rates.

Q. But you are speaking of rates based on actual cost of operation?

A. That's right.

Q. With this same principle you have indicated as to the difference in rates that is necessary because of possible weight restrictions. Would that hold good as well in interstate operations from the north to the south and passing through South Carolina and going beyond?

A. The principle, the increased rate would be the same on traffic passing through South Carolina, although the rate might be lowered by the carrier if he established transfer arrangements at state line points, say like Rockingham, North Carolina, or Augusta, Georgia. Now the distance from Raleigh, North Carolina, and Macon, Georgia, is approximately 418 miles and if a carrier was restricted in his operation to 20,000 pounds gross weight, and he operated such equipment from terminal to terminal, he would require a rate of 99½ cents per one hundred pounds, whereas if he can operate 40,000 pounds from terminal to terminal the rate would be 50½ cents per one hundred pounds, or a difference of forty-nine cents.

Q. You have indicated there might be some different situation if he unloaded at the border and changed to a different type truck?

[fol. 187] Judge Parker: Don't you think you have pursued that far enough? What you wanted to show was this law placed a burden upon the carrier.

Mr. Ross: Yes, sir.

Judge Parker: You have shown that fully. It would result in an increase in rate. I don't think it makes much difference whether it is five cents or ten cents.

Mr. Ross: If your Honor please, there is one little matter I would like to clear up. He indicated unloading it at the border might change the situation.

Judge Parker: All right.

The Witness: With reference to unloading at the border, if a carrier established transfer points at Rockingham, North Carolina, and Augusta, Georgia, where he could transfer his loads from a 40,000 pound gross weight vehicle to a 20,000 pound gross weight vehicle, in order to cross the state of South Carolina, he would still require an increase of 20.9 cents, or 21 cents per one hundred pounds over the rate required if he is permitted to operate the

larger vehicle from terminal to terminal. In other words, he would require 72 cents for such transfer arrangement, as against 50½ cents if permitted to operate his 40,000 pound vehicle through.

Q. Then it is your opinion that the size of the vehicle is a determining factor in making a rate?

A. Very much so. Of course in these transfer examples I have cited I have not taken into consideration the cost of transfer, the possible cost of equipment or terminals that might have to be purchased at the transfer points.

[fol. 188] Cross-examination.

By Mr. Griffith:

I have a pretty broad general idea of the operations of motor carriers in all sections of the country. There are motor truck operators operating in the State of Texas, in the State of Kentucky, in the State of Tennessee; but I can't name one off-hand that would have to drive or traverse one of these states.

(In answer to question by Judge Glenn:)

The law in Texas is the same as it has been for some time as to weight limits, 14,000 pounds, so far as I know.

Judge Glenn: Are there any truck companies operating to any considerable extent in Texas and keeping going?

A. Well, so far as I know, I have heard of one operator who brought some court proceedings because he could not keep going, or he claimed that he stopped his operations because of the gross weight limitations.

A. B. Mahon, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live in Greenville, S. C. I am connected with Dunheen Mills located in Greenville, and Watts Mills located in Laurens, S. C., as Secretary and Assistant Manager. The volume of our sales is not less than $10,000,000.00, and not

less than 80% of our products is shipped by truck. The Poole Transportation Company and The Transportation, Inc., are the companies which haul our products, to Northern and Eastern points principally, New York City and vicinity. I am familiar with the South Carolina law limiting weights of trucks to 20,000 pounds. If that law is enforced, it will have an effect on the business of my com- [fol. 189] panies. If other mills in other states making similar products are not subject to the same restrictions it will place us at a disadvantage in competition with them, because it would cost more to get our goods to the principal markets and delay them in transit. That means that it would cut down the flow of our products in interstate commerce. We would also lose our markets to some extent, and it would increase the cost of our products to the public. We ship, from the two mills, probably 50,000,000 pounds annually by truck to New York on short orders for quick delivery. There has been a remarkable change in the handling of textiles in the last few years, so far as time for delivery is concerned. I don't think the big cloth merchants in the centers keep stocks on hand as they formerly did. The companies serving us use large trucks only, carrying a pay-load of around 15,000 or 20,000 pounds; that does not include the weight of the truck. We are paying a rate of $1.15 per 100 pounds by truck on unfinished rayon, piece goods. The average weight of the cases that we ship in is 450 to 500 pounds each.

The development of motor transportation has effected the business of our mills. It has placed us in a better position to compete with other mills making similar products located in other states; most of such mills are located in North Carolina, Pennsylvania and the New England States. I think it would curtail our business if we were deprived of truck transportation. If trucks were compelled to load in two trucks instead of one, it would cause immediate delay in transit and probably increase the cost. I think it would have an effect on the number of our employees. We employ about 3700 now at these two mills, and if this law were [fol. 190] enforced, I think the number of employees would be reduced.

The time consumed in transportation is a very important element in our business, because the buyers in New York who buy our goods, demand quick deliveries and place their orders where they can get the quickest deliveries. We can-

not get delivery over the railroad within the time our customers require, because they are accustomed to truck deliveries and expect quick deliveries.

I think that truck transportation has tended to reduce railroad rates. The rail rate to New York on the same product for which the truck is charging $1.15 per hundred is now $1.00 plus 8¢ emergency charge. The truck rate is higher than the railroad rate. I continue to ship by truck because it is faster and my purchasers demand it, and we get our money quicker. I consider motor transportation absolutely esential to our business. If mills making similar products in other states have motor transportation and are not subject to the same restrictions, it is imperative that we also have motor transportation for our goods.

I can only say that I think the railroad rate on rayon fabrics was $1.63 before the truck rate went into effect.

Our largest competitor in this southeastern section is the Burlington Mills, located in North Carolina and Virginia,—perhaps other mills in North Carolina,—but the Burlington is the largest group. We could not compete with that group successfully if truck transportation were eliminated. I believe that the advent of truck transportation had the effect of reducing the railroad rate of which I have just spoken.

What I have just said as to shipments leaving our mills applies also to shipments coming into our mills. The same [fol. 191] answers I have given apply to the Judson and other mills operating in this state on similar products. I have been delegated to speak for the Judson Mills today. Mr. Walter Grier, who is the official of the Judson, was expecting to be here but had to go to New York and asked me, if called upon, to speak for the Judson Mills.

JOHN L. WILKERSON, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live in Charlotte, N. C., and am engaged in the transfer and storage business, have been so engaged all of my life,—about 40 years. I am a member of the City Council of the city of Charlotte. I am what is known as an irregular

carrier, one who holds himself out at all times ready to go any place on call. We specialize in moving all household goods. In other words, we will come to your house in Chester this morning and pick it up as you leave it from breakfast and deliver it in New York City the next afternoon if you wish while you are making the trip in your car or by train.

I am president of the Allied Van Lines, made up of various operators all over the United States, consisting of about 500 members, agents of the Allied; President of the Household Carriers Bureau, which we have got together all or the majority at least of operators who handle household goods such as I do throughout the whole country and they have one bureau and one tariff. I use five trucks for my long distance moving of my own individual company in Charlotte. We have in the Bureau, of course, which represents about 2,000 participants, and naturally we have some 6,000 or 8,000 trucks that are covered by these participants in the Bureau.

[fol. 192] These trucks are specially constructed. In hauling household goods, you realize that is bulky and takes lots of space. We base our rate on the cubic foot, for example. The ordinary rooms in a home usually have about 200 cubic feet, or about 1,000 cubic feet to a 5-room bungalow. A 7-room house, of course, would run about 1,400 cubic feet. Well, to have a van handle any class household goods, you want it to be built rigid, you want it absolutely tight to prevent any dust or moisture whatsoever to get into it because it is carried out as it is taken up out of the house with proper pads. In handling it you have to have width and you will have weight in your equipment as well. The most of us use sleeper cab, which is made by the manufacturer, and really puts more weight on the vehicle by having the sleeper cab equipment. Altogether it would weigh over 20,000 pounds. As to the weight of these vehicles, speaking of most equipment, a van that will hold 1,000 cubic feet or move five rooms of furniture, weighs about 13,000 to 14,000 pounds. A 7-room van which we have weighs 19,300 pounds empty. The furniture weighs around seven pounds to the cubic foot, which makes 1,000 cubic feet of furniture weighing around 7,000 pounds, unless you have some extra books for lawyers, doctors, piano or

refrigerator coming in once in awhile. Altogether it would weigh over 20,000 pounds.

If the South Carolina law were enforced, I could use two pieces of equipment in South Carolina but for the fact that it is too wide,—we use mostly 96" equipment all over the country because that gives us the width of a room.

The railroads don't attempt to compete with me. I move most of the railroad people when they move from town to [fol. 193] town because they agree that I can do it very much more satisfactorily than they can. And I might say that I have a letter from Mr. Tilford of Atlanta, and you all know him, and he has no objection to our operation of household furniture moving. All we want is enough room to put a pay-load in there. We specialize in moving families of employees of large industries over the country, when they are moved from the main to a branch office or out in the country. We attempt to move a family with one haul. In other words, a family gets in a car and when they leave the furniture is put in the van as it is, and when they arrive the furniture is in the house. The average American home is a 5-room house. We can take that in one of our trucks,—for example, I am today loading in Boston coming down to Aiken, S. C.

I had the pleasure of moving my good friend, Mr. Jerry Wassum, from Charlotte to Columbia. He was Vice President of the Southern Railroad, now deceased. I could bring that down to Columbia for him, if I recall, for around $65.00 in the van, pick it up in his home and deliver it in his home here. Well, to prepare that for shipment in a baggage car, of course, which he could get, it would cost him around $85.00 to $100.00 to get that work done besides the hauling out at this end, and then he would be without his furniture some four or five days because it would take at least three days to crate the furniture, to prepare it for shipment, and naturally it has to come down to Columbia, perhaps overnight; but in a like shipment, I had a shipment that came locally from up in Massachusetts recently. It took ten days to come down, and yet we delivered it in Charlotte from up there in three days without pushing. We haul at a lower [fol 194] rate, which saves the public money.

This custom of the big industries moving their employees by big vans, when they have to transfer them from point to point, has grown in recent years. It has followed in the

wake of good roads and the development of automobiles. There are quite a number of people specializing, as we do in this country. I imagine, perhaps, as many as 1,000 throughout the country. That is the Association of which I am president.

As to the 90" width in the South Carolina law in connection with my business, 85% of the participants in our Bureau use a 96" width truck. It would mean, I guess that we would have to have a terminal about Charlotte and transfer there and bring down here various loads on smaller vehicles. The transfer of household goods is quite a hazard to household goods as you pick it up as you leave the home. For instance, lamp shades and pieces of that kind. It is a hazard to transfer them from one truck to another. Of course, it could be done. My business has developed from the development of good roads.

Cross-examination.

By Mr. Griffith:

The load that I carry only affects me as to whether I make money or not. It just increases the cost,—it increases the cost. We send two men on the van, and if we had to split the load, that would be four men. In all of our operations, we have to reduce the cost in every possible way. I pay my overload drivers from $23.00 to $25.00 per week, with an 8-hour day work, plus their expense while out on the road. I am not familiar with the railroad rates as to wages paid labor. If my wages were considerably higher that would also affect my business.

[fol. 195] The Allied Lines operate over the entire United States. I am making money.

Redirect examination.

By Mr. Funkhouser:

These big trucks cannot go into Tennessee, Texas and Alabama, but we have agents in those various states that, of course, have to have equipment suitable for those states. I suppose they keep it within the law of the state. They have to, I suppose. I am not able to say definitely, but I know they keep it within the law of the state. The law is not being rigidly enforced in those states.

Cross-examination.

By Mr. Griffith:

I did not say that we could go into a state in violation of its laws. There are a number of Allied Vans going into various states that carry more loads than they are allowed and are not bothered at all. They are no wider, because I don't believe there is a state that has width under 96″. The Allied Vans do not make money any way they can. As to paying attention to State laws, it depends on just about like how the railroads operate in various states. That is how rigidly it is enforced.

W. R. Thompson, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live at Greenville, and am president of the Southern Handkerchief Manufacturing Company. I have been in the handkerchief manufacturing business about seven years. I was in the cotton mill business before that time, Treasurer of the Lancaster Cotton Mills, located in Lancaster, S. C. The handkerchief industry is comparatively a young industry in the South,—for about ten or twelve years. My [fol. 196] company was organized in 1929. It has developed keen competition. As to our main competitors, the handkerchief industry centers around New Jersey, with some rather important producers in Chicago. One of the main factors in this competi-on that I have been troubled with is the question of getting our products to the main markets at competitive prices. In the earlier years of the development of my business, my competitors had much advantage over my company in transportation. We had trouble in getting to the eastern markets. We had a freight rate to New York of $1.68, which put us at a very definite disadvantage compared to the eastern manufacturers. The rate to Chicago was $1.97; and the Texas points were particularly difficult to get into. We had difficulty in getting the proper freight rates from the railroads for our products, and it retarded our business; we made honest efforts to get our competitive

rates reduced by the railroads. The trucking companies have reduced their rates to New York from $1.68 to $1.00; Chicago, $1.25 from $1.97; St. Louis $1.25 from $1.95, I believe along that line. These reductions very definitely enabled us to meet our competitors in other states, and to some extent these trucking rates caused the railroads to reduce their rates. If the trucking companies were banished from the highways, or put in a position where they could not operate, it would have the effect of restoring railroad rates, it would hamper us. The railroads now have truck competitive rates to a number of points, but they have not yet met the truck competition to all points. It would increase the cost of our product to our customers. We feel that the reduced rates of the truck companies have very definitely [fol. 197] contributed to our expansion. If this truck transportation were taken away from us, I think we would stay in business, but I think we would probably be seriously hampered and have a greater difficulty in finding our markets.

We do not have an arrangement with a particular trucking company to carry our goods. We just ship whatever we have from day to day. Since the trucking companies came in interstate commerce, the tariff applying to all companies, we use a number of them and we still use the railroad and express companies as well.

The advantage accruing to our company, as the result of our opportunity to ship to Norfolk and South Carolina by truck, lies very largely in getting our goods to the Pacific ports and to the Texas points. We have great difficulty in gaining any immediate competition over Passaic, New Jersey, due to its close proximity to New York and the Pacific Coast. We have to pay a higher freight rate to Charleston. It was $1.10 as I recall, it is now 55¢. We have another advantage in shipping to those points by truck over railroads due to the fact that we can definitely get our goods to those ports in time for scheduled sailings for steamers. We could not be certain of that by railroad. The element of time is very definitely an important factor in our business. Our customers frequently call for quick deliveries; that is a new development in recent years as a result of trucks; in our judgment it is here to stay.

I could not say whether it would increase the cost of our product to our customers if the trucking company hauling our products were required to use smaller vehicles; I would

say that if they had to increase their rates to us, it would increase the cost of our products to our customers and put [fol. 198] us to a decided disadvantage. If our competitors in North Carolina or other states shipped by truck, and we were prevented from shipping by truck, that would cut us right off as to our markets.

D. C. Mason, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

Mr. Funkhouser: I would like to state to the Court what the purpose of this testimony will be. This is a gentleman sent here by the Town Council of his town, which is the town of Summerton, where they had a railroad and it has been abandoned and the tracks taken up and that the community is dependent upon truck transportation. I understand there is a community of 35,000 people.

The Witness: The county has 35,000 people in it and this directly affects 75% of them.

Mr. Funkhouser: I am putting on as a typical South Carolina community that will be without sufficient adequate service and I will connect this up with the others. I understand there are 980 other such communities as a result of the abandonment of the railroad.

Judge Glenn: This Court takes judicial notice that that railroad has been abandoned. It operated at a loss and went into receivership.

The Witness: The Northwestern Railroad of South Carolina formerly served my town, Summerton, Clarendon County. There are about 1200 people in the town, and 32,000 in the County. Our half of the County which was served by this railroad contained about 75% of that population. There were two railroads abandoned in the County, the Northwestern of South Carolina and the Alcolu Railroad out from Alcolu. The Northwestern ceased to operate August 13, [fol. 199] 1935. This community now depends entirely on trucks for transportation. Harvin Gray Lines is the trucking concern that gives that service, operating four trucks. Cotton is about the only thing produced in interstate commerce. Corn is moved to North Carolina. Cotton is one of

the larger products of the community. Prior to the truck, the cotton rate by rail to Charleston at one time figured about $2.40 a bale, that was several years ago; and has been gradually reduced so that when the railroad left there it was 70¢ a bale. The rate to Charleston now by truck is 50¢ a bale.

Judge Parker: I don't see that that affects Interstate Commerce hauling it to Charleston.

A. The same rate applies to any place in North Carolina proportionately.

Judge Parker: This regulation is perfectly valid so far as Intrastate commerce is concerned in South Carolina. Let's confine ourselves——

Judge Glenn: How many bales of cotton are sold annually on the Summerton market?

A. Around 5,000 at Summerton probably. 75% of that cotton was sent to North Carolina Mills this year, different mills around Charlotte and other places. The customary truck load this fall on shipments of cotton to the mills at Gastonia is 33 bales. That is 16,000 pounds gross. If the 20,000 pounds law were enforced it would cut the load to 22 bales and increase the cost 5¢ a bale to Charleston.

Judge Parker: What do you think about a 33-bale load? Do you think it is a hazard on the highway?

A. I don't see any difference in a 33-bale load of cotton than in any other moving van so far as size is concerned. There is a movement of corn out of that community to North [fol. 200] Carolina which is hauled by trucks in racks, and they move approximately 8 tons. The production of corn in our community has grown up since the trucking industry. That is something that never had been known—to sell corn to a mill in North Carolina.

The old railroad depot has been torn down and a filling station put there. Fertilizer is hauled in interstate commerce into our section from Savannah, Ga. It is important that fertilizer be hauled in by loads of over 10,000 pounds, so that the gross loads will be over 20,000 pounds. At the present rate we can get a 9-ton truck of fertilizer from Georgia to Summerton for $2.40 a ton. If you cut that down to five tons, it increases the cost per ton $2.00. The truck delivers that fertilizer right to the farmer's field. This is

a benefit rather than storing the fertilizer in a warehouse, as it saves the farmer the labor cost of coming for the fertilizer himself. If takes about five hours to bring fertilizer over the Southern Railway to our community. If a farmer orders it late one afternoon by truck, it is delivered the next morning and he goes to work. The railroads cannot offer that service at all now because we have no railroad.

PAUL SANDERS, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Beall:

I live at Ritter, am engaged in farming and have been so engaged all my life, produce principally what is known as "perishables"—vegetables, all of which is shipped in interstate commerce. As to the relationship between my business and truck transportation, I will make this statement. Prior to the advent of the movement of our products by truck, we had reached the point where we had concluded to quit, could not go on. We could not get the one thing [fol. 201] we have always cherished and tried to get—distribution. No way to get it and no way today except by movement of trucks. As long as we get distribution——

Judge Glenn: You mean delivery to live markets?

A. Yes. If we load a truck load of radishes and load about 400 packages very frequently the Washington market will not absorb more than 100 packages. They leave 100 packages there, go on to Baltimore, leave 100 there, then leave 100 at Philadelphia, and New York 100. We do that practically every day. We get that kind of distribution, and we reach small towns in that way that will not take a whole car load and reach towns that will handle a truck load where it could not handle a car load. Then we get this big advantage; we take a truck and go to the farmers, say, A., B., and C., our neighbors, six or eight miles from a railroad, and that same refrigerator truck goes in and serves those three or four or five farmers, loads one truck, thereby giving small farmers who heretofore could not get to the market—so that has been quite an advantage.

Now we are making joint shipments. We feel if you take the truck service away from us, and if we expect to remain in business we have either to go to North Carolina or some point north where we can continue in our vegetable production. We cannot meet competition without truck service.

If the South Carolina 20,000 pounds gross weight law is enforced, it would put us out entirely as to refrigerator trucks, because we cannot get a truck to go from our place to New York with a pay-load of less than 10,000 pounds. They cannot afford to take it. A truck could not get over 5,000 to 6,000 pounds pay load and comply with the South Carolina law. If we had no trucks, we could not ship by railroads, because we cannot get the distribution.

[fol. 202] Q. Tell the Court some of the factors that have existed in connection with the cost of getting stuff from the farm to the railroad and leaving it at the other end.

Judge Parker: Is this not cumulative of what Mr. Geraty said?

Mr. Coleman: Yes.

By Mr. Coleman:

Q. You heard the testimony of Mr. Geraty?
A. Yes.
Q. Do you adopt Mr. Geraty's testimony as to this?
A. Yes.

[fol. 203] J. K. MAYFIELD, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Coleman:

I am a truck farmer, living about fifty miles from Columbia at Denmark, S. C. I specialize in watermelons and canteloupes. As to how melon growing is affected by truck transportation and refrigerated trucks, to begin with, we practically went out of the truck growing business at Denmark because of the highness of the rates and slowness of the railroads. We can load 800 melons at our farm to Philadelphia. It would leave the farm at six in the afternoon and be there at midnight. The Federal Inspector would check these melons for crating and weight. Those

800 melons would weigh, say, an average of 25 or 30 pounds —a 20,000 pound pay-load. The smaller trucks simply cannot make the haul with this limited tonnage. I cannot tell you why, but we don't get quick service from the railroad. Quick service is important, because our products ripen quickly and suddenly, more particularly so with canteloupes. We have had extremely hot days, maybe Saturday we have loaded a truck load and then Sunday when it turns hot maybe 50% ripen just about in a few minutes. Then these would have to go out in a refrigerated truck to the market. Another thing, the market in the north wants fruit ripened on the vines now, because vine-ripened canteloupes we have been able to sell much better, particularly in Washington, Philadelphia and Baltimore. We can load them at our shed on the farm at six o'clock in the evening and they will be at the commission man's office at twelve o'clock. We load them Saturday afternoon at six o'clock and they will be at the commission man's for Monday morning's market. That is a new service possible through trucks, and we need the heavier weights to take care of the retail stuff that calls for refrigeration. You simply cannot ship watermelons on the small trucks. They are heavier and it is impossible for a man to get a pay load. The pay [fol. 204] load would be 20,000 pounds. These refrigerated trucks carry about 300 crates of canteloupes, then they have to have ice and the weight of the equipment on top of that, the pay load would be from eighteen to twenty thousand pounds. This is more so as to watermelons, because of their bulk.

C. B. Carley, a witness for the plaintiffs, having been first duly sworn, testified:

Direct examination.

By Mr. Funkhouser:

I live at Yonge's Island, South Carolina. I have been with the Fruehoff Trailer Company, the world's oldest and largest manufacturer of trailers in Detroit, Michigan, and we think the world's best. I am one of their agents in South Carolina.

Q. That company is probably the largest manufacturer of trailers in the United States?

A. By far. I would like to explain one thing, that for fourteen years this month I have been connected directly with the sale and use of heavy vehicles. For a short period of time I tried to operate some trucks that came within the limit of South Carolina's 20,000 pounds, and I found out to my sorrow that it could not be done. I was in Tennessee when the other half of the new Mason-Dixon Line was constructed. I was employed there and had to leave; was transferred to Baltimore. I have sold the heaviest and most expensive and know the light, cheap truck. I would be glad to have you ask me questions. I am not a specialist, but have had a good deal of experience.

The standard size of the body of trucks used in interstate commerce generally is 96 inches. I would say from 85 to 90% of all trucks used in interstate commerce are 96 inches in width. With reference to the standard as to weight, the standard pay load is approximately ten tons and loaded in every state in the Union in safe vehicles with proper brakes and tires, except five. The width of 96 [fol. 205] inches, or greater, is allowed in every State except South Carolina. Florida and North Carolina recently changed to conform.

Judge Parker: Which five do not load ten tons pay load?

A. South Carolina, Tennessee, Kentucky, Alabama and Texas. They are all related to the Mason-Dixon Line.

Q. How about Mississippi and Alabama?

A. I included Alabama. Mississippi is low in which ten tons could be handled, I believe. They have an axle limitation.

As to my opinion as to what is the smallest truck that will safely carry a standard pay load, there are various opinions about that. I want to tell you in South Carolina today that there are a great many trucks that are bought to try to conform with this law and yet are being overloaded and unsafe. I want to point out that the gross weight of 20,000 pounds does not relate to safety at all—quite the contrary. A light weight bridge is not safe; neither is a light railroad car. A box car must be heavy to keep it from folding up, bending and sagging under a load. The same thing applies to trucks—four or five hundred pounds' difference in the weight with a proper set of brakes, and improper brakes in a trailer—those things all

enter in. The rates of men hauling in interstate commerce are based on the ten ton pay load.

(In Response to Questions from Judge Glenn): If one of the companies doing a big business, and having capital, would give my company an order for ten trucks conforming to the South Carolina law, we could manufacture them and sell them at a reasonable profit, depending on the cost of manufacture, but they would be manufactured to meet special conditions and at a naturally higher cost to us.

Judge Glenn: Would not after six months' or a year's time—take care of South Carolina business, and would they [fol. 206] not be able to consolidate it to haul it in these small trucks even at a slightly increased cost?

A. My opinion goes right along with the other gentlemen as to the increase in cost—about fifty to sixty per cent.

Judge Glenn: Even if the trucks were bought in considerable number instead of the spasmodic buying of one or two trucks?

A. Yes.

Judge Glenn: I am talking about cost of trucks. Suppose Mr. Barnwell's company would give you an order for ten trucks that would conform to South Carolina's law, at one time. Couldn't you make him a much better figure than he was talking about this morning?

A. Yes, sir; but on the other hand, the regulations applied in these few states, South Carolina, Alabama and so on, restrict the use of trucks in those states to a certain degree and therefore our market in those states is restricted still greater.

Judge Glenn: But you sell a lot of trucks like those to private individuals who do intrastate business almost entirely?

A. In South Carolina?

Judge Glenn: Everywhere, all over the country?

A. No, sir; our average trailer sale is 20 feet long—that is our average truck and rather large trailer.

Our smallest trailer is capable of carrying 7½ tons pay load; from that up to one hundred tons pay load, the largest we have. The one capable of carrying one hundred tons pay load was built for handling electric equipment—they got special permits for hauling them.

If this law were enforced, as to the effect on shipments

of tobacco from South Carolina—the principal tobacco market in North and South Carolina is Winston-Salem, [fol. 207] and that area, and it is approximately the same distance from Mullins, South Carolina, to Winston-Salem as from Washington, North Carolina, to Winston-Salem, and the farmer in the North Carolina area would have the advantage of the much cheaper transportation cost to Winston-Salem than his competitor in South Carolina. There would be a discrimination against the South Carolina shipment.

The modern refrigerator truck built by our company cannot be used in South Carolina, generally speaking. I have a photograph here and a certified copy of one of the vehicles that has been talked about here, which I sold for use in South Carolina, and it has been used in South Carolina. It is a modern refrigerated truck. It weighs 13,600 pounds. When it is loaded it would weigh 33,600 pounds, with a ten ton pay load. That would be legal in every state on the Atlantic seaboard except South Carolina. I would like to point out that North Carolina, Virginia, District of Columbia, Maryland, Delaware and all these other states tell these South Carolina farmers they can haul that ten ton pay load of vegetables, over their highways—"Yes, Mr. South Carolina Farmer, you can do that; put enough brakes, tires and lights and so forth on your vehicle to have it strong and safe * * *." The markets in the North require that kind of a load of refrigerated products in order to compete. The practical effect of the enforcement of the South Carolina law would not be to exclude tractors-semi-trailers entirely. The tractor semi-trailer can carry a little larger pay load under South Carolina law, because there is one thing in the law we haven't understood before, and that is this 10,000 pound axle limitation, which would make an actual gross weight of a four-wheel truck of only about 15,000 pounds, because you would only get about one-third on your axle.

Mr. Coleman: That is all.

The Witness: Could I have about two more minutes to explain something that is difficult to bring out in a question? [fol. 208] Judge Parker: All right.

The Witness: You are interested in the reasonableness or unreasonableness of the South Carolina law, and whether it actually does promote safety upon the highways. There

are hundreds of vehicles in South Carolina that will be legal if this 20,000 pound law is enforced, that are very unsafe, that could not go into North Carolina, because South Carolina in its hurry to pass this law overlooked applying brakes on semi-trailers. That is a very important matter. Semi-trailers aren't even required to have brakes in South Carolina, but they are in North Carolina, but this law wasn't enacted to improve safety.

Maryland has weight limitations graduated according to the weight of the vehicle. I have had experience there in that state. Here is a Ford truck that is handled by Cokers Wholesale Company; that vehicle is used almost entirely in interstate commerce. They made a very thorough study and did allow that vehicle approximately 30,000 pounds gross in Maryland and only 20,000 pounds in South Carolina. That vehicle has been inspected in Pennsylvania and has a Pennsylvania inspection certificate in its windshield, showing that it is properly equipped, yet it is going to be taken off the roads by this law, and hundreds of vehicles that couldn't meet that inspection will be left on the road, so is that law reasonable when it does such a thing as that?

J. S. WILLIAMSON, a witness for the defendants, after having been first duly sworn, testified:

Direct examination.

By Mr. Griffith:

I am Chief Engineer of the South Carolina State Highway Commission, and have held that position since July [fol. 209] 15th of last year. Mr. Charles H. Moorefield, my predecessor, held the position for about fifteen years. He died in April of this year.

The Witness then identified ("Defendants' Exhibit 7") a map of the State Highway System of South Carolina, on which, in addition to the regular printed matter, there is shown in red ink the roads in the construction of which Federal Aid Funds have been used at one time or another.

The Witness: This does not indicate that the entire cost of such roads was borne by the Federal Government—not more than 50 per cent of the cost came from Federal funds.

There are some few short sections, since the New Deal has been in, as to which we secured Federal money for the entire construction, but the majority of the roads have been built partly with State and partly with Federal funds. That practice has obtained since 1917, I think.

(The map in question was offered and received in evidence and marked "Defendants' Exhibit 7".)

We have approximately 60,000 miles of road in the State of South Carolina, and about 6,100 miles in the State Highway System—that is the latest estimate—so that our Highway System is approximately 10% of the road mileage in the State. The other road mileage is under the supervision of County and City authorities.

Q. Now, do you have different types of roads in your highway system?

A. Yes, we have roads classified as standard paving, bituminous surfacing, earth type and unimproved. That is the general classification that we give the roads.

Q. Can you give me the mileage in each classification?

A. At the end of the last fiscal year, June 30, 1936, our mileage of standard pavement was 2417; bituminous sur- [fol. 210] face, 1724, earth type 1141, and unimproved 666 miles.

Q. Now, in your standard type of concrete paving, does that include variations of concrete paving?

A. That includes what we call plain concrete pavement, that is, the whole surface is concrete. It includes asphalt pavement with concrete base. It includes asphalt pavement on asphalt base.

I think that the gentleman from the Bureau of Roads was about right when he testified that the concrete road is the one road for which there is a formula to determine its strength. There is no definite formula by which to determine the strength of other types of roads; we use our experience in determining the thickness, etc.

Q. Will you tell us the approximate mileage out of the 2,400 which is concrete throughout, and the approximate amount of variations?

A. I don't believe I have that right now, Mr. Griffith. The concrete mileage is probably 75 or 80 per cent of the total.

Q. The concrete is about 75 or 80 per cent of the total?

A. Yes, sir.

Q. So, you would say then that you would have somewhere in the neighborhood of 1,800 to 2,000 miles of concrete paving?

A. Yes, sir.

Q. Now, as to the dependability of the different types, how do they vary?

A. We have some of the oldest pavement in the State which are asphalt pavement on concrete base that are giving satisfactory service.

Q. We have some old concrete pavement that is giving good service?

A. Yes; however, the concrete surface has more tendency to break up than the asphalt pavement. We have more [fol. 211] breaking, that is, a visible breaking. There may be breakings in the base under the asphalt pavement that are not noticeable.

Q. What is your opinion as to the load that these concrete roads may safely bear?

A. That is very indefinite.

Q. Why so?

A. That will depend on a number of different things. The sub-grade conditions is a very big factor entering into it. Some concrete pavement in one section may hold up 100,000 pounds. The same identical pavement, as far as construction goes, may break up under a two or three thousand pound load.

Q. Do those sub-grade conditions occur right along in the same territory of short distances?

A. It occurs very often in short distances of one another on the same road.

Leaving out the concrete roads, and asphalt combined with concrete, our next best type of road is the bituminous surfacing. In recent years we have constructed considerable mileage of that type. So far as weight or stress goes, the ability to withstand weight, that is more or less an earth type road with an all weather wear or surface on the top. It is constructed by building an earth type base of some local material, that is, with proper clay and sand content to make a good tight hard base that water will not soak through, and moisture will not soak through and won't get soft when wet or dust out when dry, then in placing an asphalt wearing surface about three-fourths inches thick. This wearing surface merely gives a roof to the pavement,

though the base is what carries the load. Of course, this is nothing more than an earth type road with a cover over it. That is exactly what it is. The base is usually eight inches thick, but there are variations from that; where we nor-
[fol. 212] mally see that there is a bad sub-grade condition we have increased that up to approximately 12 inches in short sections. Where it is very noticeable that we have a bad condition, that is, gumbo, wet clay, water seeping, we have increased that base thickness. These roads are primarily designed for automobile traffic. They are not well adapted to heavy loads or to steel tires or horse drawn vehicles. Horse drawn vehicles, steel tire vehicles, will injure the surface, cut through the surface. When you break the seal of that surface, you are apt to have failures. We have been constructing those since 1924, and on a large scale only recently. We have gone to that type of construction rather than to the concrete type on account of the financial situation. That type can be constructed at a much cheaper price than the concrete pavement, and due to the lack of funds and the demand from the public generally to get them out of the mud and dust, we have had to take what funds we had and spread it over a large mileage, and that is about the only way we figured we could do it in order to get all weather roads. These bituminous surface roads are about one-third of the mileage in our State Highway System; we have about 1,700 miles of them. We have about as much earth type and unimproved roads as we have surfacing, not quite one-third.

My experience and observation as to how these bituminous roads hold up under heavy traffic is that in the places where we have had unusually heavy traffic, we have had considerable failures. And we have had other failures. Various things can happen—your subgrade condition and that always comes into it, it is always a factor. You get a base, a subgrade, wet and spongy, and particularly in the clay which changes in volume, which causes trouble, and when you have got a subgrade of this type of road, if it gets wet, of course, any heavy load will mash the sur-
[fol. 213] facing down into it more readily than a light weight on it.

Q. Have you had opportunity to compare a road standing light traffic constructed with bituminous surfacing, and afterwards being subjected to heavy motor vehicle traffic?

A. Yes. In 1935 we completed a section of State Road No. 33 between Tillman and Hardeeville of this bituminous type on sand clay base, and in the fall of that year, shortly after it was constructed and opened to traffic, it was necessary to do some repair work on Route 17 between Ridgeland and Hardeeville, and in order to do that repair work we had to detour the traffic from Hardeeville up to Tillman over this new construction, surface treated road, and the traffic on that road immediately caused failures and ruts were developed in the surfacing. The wheels of the trucks would sink down in there and the shoulders were pushed up. As a result of that, we have had to do considerable repair work on that road, and I believe we spent in the last 12 months as unusual repair on that road in the amount of $12,378.00 in order to put the road back into shape. The traffic was only detoured over that section for two or three weeks and since we have got the repair work done we have had practically no trouble on that road since.

Q. You say you detoured heavy traffic over that particular section of bituminous road. The main road that was closed and caused this detour, what kind of traffic has it been subjected to?

A. It carries practically all the load of the traffic that comes into South Carolina out of Savannah, the automobile traffic, and motor truck traffic. All the traffic practically that comes into South Carolina from Savannah goes over that route.

[fol. 214] Q. And you say you had detoured them over this bituminous surfacing for two or three weeks?

A. Just a few weeks. Also we had a section of route 15 which is one of our main routes through the State. We have two sections of that type, the bituminous type, one in Clarendon County from Summerton to the Sumter County line, and the other in Marlboro County from Society Hill to Bennettsville. Those sections of roads were constructed in 1933, and have been open to traffic continuously since. Our regular schedule on roads of this type is to place a re-treatment on them—we have set up a sort of schedule of about every five to six years to take care of the wear and irregularities that might develop in it normally from traffic. Both of these sections of road that I named, it was necessary for us to retreat them both this year, which is only three years. They

were only three years old, so that on account of the heavier traffic on that route, it was necessary to retreat those sections about two or three years earlier than we would normally have done. Other roads that were constructed that same year have not yet been retreated. We have quite a number constructed earlier than that have not been retreated yet.

I cannot say that I definitely know, except in a general way, the roads which bear the most of this heavy truck traffic. All of them are subjected to some. There are trucks on practically every road in the State, it has been my observation. There are some trucks on every road, every station that I come to.

Q. I will ask you this question. Are there not other routes over the State over which there is some of this bituminous surfacing, or other weak type of road?

[fol. 215] A. Right off hand, I think we have some section like that on practically every road in the state. There is either a light bridge or piece of bituminous surfacing or pavement, or surface treatment of some kind on practically every road we have got throughout the State.

Q. Now, just in that connection, Professor Tucker * * *

Judge Parker: I wish to clarify that a little. I know something about South Carolina roads—the road that goes from Columbia and strikes the North Carolina line and goes through Augusta, the road that goes from Florence to Charleston, the road that goes from North Carolina to Greenville, are they weak in spots—are there weak spots on those roads?

A. Route No. 1 going through the State, we have a bituminous surface road from Cheraw to the North Carolina line. We also have a very weak bridge at Cheraw. We have just recently let a contract to build a new bridge at that section. The balance of Route #1 is of what we call standard pavement. We have some concrete paving. We also have some asphalt paving on concrete base. We have some of that type about ten miles north of Camden with asphalt paving and goes through Columbia and stops.

Judge Parker: Isn't that sheet asphalt with concrete foundation?

A. Yes, sir, we class that as standard paving. It isn't all sheet asphalt. Some of it is. This section from Columbia

to the County line, that is asphalt with concrete base and the same thing from Columbia to Batesburg, sheet asphalt, concrete base. The balance of that road is plain concrete paving.

Judge Parker: You spoke of a weak bridge—what do you mean by that?

[fol. 216] A. That is a bridge that is not safe for more than ten tons.

Judge Parker: I am speaking about this particular bridge you are speaking about, at Cheraw.

A. That bridge at Cheraw is unsafe for over five tons, and part of that bridge is an old covered bridge that was built three years ago. It is one of the old relics of the State. That is the only covered bridge in the State highway system now.

Q. What about your road from Wilmington, N. C., to Charleston by Florence?

A. That is, coming in by Dillon and Florence? You cross the Pee Dee River at Mars Bluff and you have a bridge there that is not good for more than two tons. We are rebuilding it now.

Judge Glenn: That is the one we rowed about a few years ago?

A. The Mars Bluff, yes, sir. We are rebuilding the bridge, but the overflow bridge on the Marion side is practically rotted down and we have a contract to rebuild that bridge. It is not safe to motor traffic. The bridge was not designed to carry more than ten tons. At that section they ought not to have built a bridge like that. I would not build it like that, certainly at that location. It is a very poor location. The road from Charlotte down by Gaffney and Spartanburg to Greenville, that is, route 29,—that is standard paving most of the way. We have concrete paving north of Gaffney; between Gaffney and Cowpens at Thickety Creek we have a bridge that is only fifteen feet wide. We have only rails. We are contemplating rebuilding that bridge probably next year, and the strength of that bridge—[fol. 217] that is one of the first bridges built by the State Highway Department and it was designed for a ten ton load.

Judge Parker: You are an engineer. Will it support ten tons?

A. I would not say it would safely support it. It may stretch beyond the limit of stretch and a few loads go over it and then a lighter load will drop through it sometimes, a horse and wagon may drop through it after a heavy load has gone over it. That is one bridge we are contemplating rebuilding. We have under construction now a relocation there out of Greenville between Greenville and Spartanburg. It is so rough you cannot hardly get through there. It is narrow and it is not safe for the traffic. This road is one where we have lots of accidents, fatal accidents. We are relocating that road and building a bridge. The road below Anderson at the Georgia line, there is an old steel bridge built as a toll bridge back in the horse and buggy days, it is still there in use and I just got a letter from the Georgia Highway Engineer this morning, or this week rather, asking that we consider that in our construction for another year. I told him we would be glad to do it as soon as we could get hold of the money to build it. The alignment of that bridge is particularly bad on the Georgia end. You hit a place at the end of the bridge, and the bridge is light steel construction, built by a private individual for the purpose of making money out of it on the toll and he built it as cheap as he could get by with. The bridge isn't safe for certainly over ten tons.

Judge Parker: Are there any arteries of interstate commerce in South Carolina where there are any such places?

A. Yes.

[fol. 218] Judge Parker: Are there any other arteries other than the three routes I have mentioned?

A. Yes, you might consider the road from Augusta up through Greenwood. The Greenville and Henderson and Asheville road. That road generally is a pretty good road. The bridge crosses the Savannah River to Augusta. We have plans under way now to construct that bridge. There again the State of South Carolina has already set up an allotment and Georgia is going to handle that work and we specified we had to get all our contracts through before the money became available. We have the money available now to construct that bridge which is a weak bridge in there.

Judge Parker: Are there any other weak bridges on those routes?

A. I do not recall any other weak bridges. There are some timber bridges in Greenwood County between Greenwood and Ware Shoals that are not safe for over ten tons.

Judge Parker: I had in mind this: that in view of this testimony—I don't know what may be disclosed—it appears here that the wheel load is the criterion with respect to load on pavement and with respect to weights. It seems to me the total weight of the truck is the important factor and the Legislature would have a right to consider that, as well as the strength of the pavement.

A. Yes, that is a very important factor because the bridge, particularly if a trestle, if you have a 200 foot span, that span has got to stand the total load that goes across it regardless of whether there are three axles, two axles or one. The whole load will then be on that span at one time, and we have quite a number of spans more than 200 feet in length [fol. 219] from one pier to the other.

Judge Glenn: Yes, that road that goes over by Rosinville to Sumter is used quite extensively?

A. Yes, I think that road probably carries more interstate traffic than any other continuous road through the State. We have other routes that have heavier traffic immediately adjacent to towns between Spartanburg and Greenville, the traffic generally is heavier there. The road immediately out of Charleston towards Orangeburg, traffic is quite heavy there, and from Aiken to Augusta the traffic there is heavy, but they are mostly short sections, but this route by Rosinville, Sumter and Bennettsville carries pretty heavy traffic all the way through, and we have a number of weak bridges on that as well as weak sections of surface treated roads that I have just described.

By Mr. Griffith:

Q. I was asking you to trace the road that Professor Tucker said he traveled. He said he left Charlotte and went to Spartanburg. Did he encounter any weak bridges and sections of road there?

A. Yes, a weak bridge at Thickety Creek. That is route 29. That is the bridge we contemplate rebuilding next year.

Q. From Spartanburg to Greenville?

A. Spartanburg to Greenville there are several narrow bridges, the ones we have had several accidents on. They are concrete bridges about eighteen feet wide. We have had one rail broken off of them and quite a number of accidents against them. There is a place between Greenville and Taylor, a place we have under construction and relocation to get the traffic off the road. That is very inadequate. That is under construction now and it is very heavy traffic, and as I understand, the road we are building is designed to carry two to twenty trucks traveling behind each other twenty feet apart.

[fol. 220] Q. You found it necessary to accommodate the traffic there?

A. Yes, and we have to contract for grading two grades over the Southern and the P. & N. railroads. We have not let the contract for paving, but that will be let.

Judge Glenn: You are building the bridges now?

A. Yes, sir, we are building that grade over the Southern. We are building the bridge.

Judge Glenn: What about all this talk about a new super highway from Greenville to Spartanburg?

A. That is part of it. We are also contemplating letting some building out of Spartanburg, and I except we will keep on until it meets in the middle. With the funds we now have, we will be able to do it, but we can not go into it all at once. We have to go at it gradually.

By Mr. Griffith:

Q. From Greenville down to Anderson?

A. From Greenville to Anderson there are two roads in there. I don't know which road he followed. If he went by what we call Dunner's bridge, Route 81, that is bituminous surface road practically all the way within a mile of Anderson. The other road by Piedmont, Pelzer, Williston, is concrete pavement. There is no particularly week place on that.

Q. From Anderson to Greenwood?

A. From Anderson to Greenwood, I presume he went by Belton and Honea Path, Donalds and Hodges. In Hodges we have a piece of surface treatment for about a mile, and there are three grade crossings there in Hodges, two over the Southern and one over the P. & N.

Q. Have you a project for a program for building or for probably letting a contract to rebuild it sometime soon?
[fol. 221] A. Our plans for rebuilding that will be for surface treating, that is bituminous surface through that section from Hodges into Greenwood. We have a contract under way now in the City of Greenwood where we have completely torn up the old pavement as it was and replacing that with new concrete paving.

Q. You mean the pavement in Greenwood gave way?

A. Yes, it was practically worn out and hammered out, and when we got there to move it out, we found it was very little trouble to shovel it out.

Q. In practically all of these routes, regardless of where they are, don't they pass through towns and cities?

A. Yes, we have tried in a few places to build by them, and sometimes we have. One of the most noticeable is your city of Newberry. We built a road past that town and it does not necessitate all of the traffic going into the town.

Judge Glenn: And Ridgeway.

A. Yes, built two in Ridgeway, and now building a third one.

By Mr. Griffith:

Q. In passing through those towns, you don't construct the roads through the towns?

A. Generally not, particularly if they are towns of over 2,500.

Q. So in towns of over 2,500 you have no authority under the law to build them?

A. Except under certain restrictions that such law permits. The law permits us to build roads in towns over 2,500, provided the houses average more than 200 feet apart on both sides. So going through a thick settled town, about all we do is to go around. Sometimes we get a few blocks. Of course, under the National Recovery Act [fol. 222] where we got Federal funds, they provided funds for municipalities, and where Federal funds are furnished we have gone into the town and built some povement, like Greenwood.

Judge Glenn: That place in Greenwood?

A. Yes, I say this, under the National Recovery Act where the Federal Government furnished all the money, Federal

money, the Act provided that 25% of the money allocated had to be spent in the town. We have spent some in them. We spent some in Columbia, Greenwood, Spartanburg and Anderson.

By Mr. Griffith:

Q. In using the streets of the cities and towns, how are they constructed, have they been designed for heavy traffic?

A. Mr. Griffith, my experience with the city work is that the pavements are not as well constructed, if I might say so, as the ones that we construct today. The city pavements, the most of them, were constructed years ago. They did not probably know as much about paving as I think we know now, although I think we know very little, but their design—they built thinner pavement, for instance, a good part of the city work a few years ago, standard construction, was four inches concrete base with a 2½ inch asphalt on that surface; whereas now when we construct a road of that type we put a six inch concrete base, which is a 50% thicker concrete base, with a three inch asphalt surface, which gives a nine inch pavement against what they had, 6½ inches, and not even that, probably due to the inspection or otherwise. A good many cities' pavements are not even that thick. Some of this pavement we have torn up where they have had four inches, or an inch or an inch and a half, or two inches.

[fol. 223] Q. They were not designed for anything much more than passenger traffic?

A. I cannot say what they were designed for, but that is what I would think they were designed for. I have had experience in city work. I have done some of it back in 1920, and we had very few heavy loads at that time, and what we wanted was to get the streets paved so the people could ride in their automobiles and get them out of the mud and dust. That was the main thought at that time.

Q. In order to save a little time, I will not ask you to complete the route traveled by Professor Tucker. The conditions which you have named up until now on that route about weak bridges and over bituminous surfacing, that applies generally throughout the State, does it now?

A. Yes, about the average. On some routes we have many more weak places than on others.

Q. Now, you also have stretches of unpaved dirt public roads scattered through your highway system?

A. Yes, sir.

Q. For instance, at your prominent city of Newberry to Chester—aren't they connected by a dirt road?

A. Yes, we have a part of that road—it is quite a long road out of Chester—from Chester to Rock Hill still a dirt road. We entered into a reimbursement agreement, but it has not been done. There are quite a number of weak bridges on that road that we are going to reconstruct.

Q. That is the Calhoun highway?

A. Yes, that is one of the principal highways. That is not the Calhoun highway, no, sir, but that is a section of route 9, which is one of our longest routes in the State. It [fol. 224] goes to Spartanburg and continues through the northern part of the State to Little River on the Coast. That is one of the longest routes we have in the State.

Q. You have other sections in the state scattered through your highway system?

A. Yes, sir.

Q. Would you say that that type of road is designed to carry heavy traffic?

A. Top soil road?

Q. Yes.

A. Oh, no, sir, particularly in wet weather. You put a heavy load, even a three or four ton load on an earth type road in wet weather, it is liable to tear it to pieces.

Q. What about having axles 40 inches apart on that dirt type road?

A. It depends on how much you put on the axle. You can put as much on the axle as on the single truck, the weight on the axle is what does the damage to your road, the wheels. You can have numerous axles, and if all of them are heavily loaded, you will have damage, of course.

Q. As to your dirt type road * * *

Judge Parker: The actual distribution of weight—in other words, if you had four axles on a truck, each axle carries one-fourth of the weight if it is evenly divided, that is true if you have ten tons and four axles.

A. Yes, sir.

Judge Glenn: Let me ask you about this. If the axles are spaced 40 inches apart, if the strain from one wheel will be absorbed, but the other wheel strikes some spot

on the ordinary concrete road, is that true of the other road, the dirt road?

[fol. 225] A. Not so much because you have not beam strength on the dirt road. You may hit a soft spot, there is no beam strength that you can see in an earth type road. That is an entirely different character. A concrete road gives a little beam strength that the load is distributed over. A wet area section, I think that is fatal to the dirt road.

Judge Parker: Mr. Williamson, in your policy—you spoke of the Thickety Creek bridge for example, in your policy of strengthening these weak bridges for construction, have you given any priority to those bridges on the main routes which carry heavy traffic, or have you followed the policy of strengthening the weak bridges in the state roads?

A. Just so say we pick one against the other, I cannot say we do. We may have a one-way bridge in a side road that we have constructed and did not reconstruct the bridge.

Judge Glenn: I mean in choosing the weak bridges to repair, have you sought to repair those on the roads carrying the most interstate and intrastate traffic, or have you discriminated against those bridges?

A. We do not wish to discriminate, but it is our policy to go back on the roads we have reconstructed and to give priority to the weak bridges.

By Mr. Griffith:

Q. I ask you this question. I think it is a question of law, but under the State Highway Act were you required by the State Highway Department to do work in every judicial circuit?

A. Yes, sir.

Judge Glenn: That is true, but you haven't made the point I am getting at. The bridge between Spartanburg and Greenville, the Thickety Creek bridge, for example, is on one of the roads that these gentlemen are most interested in. Have you as a policy, discriminated against the early [fol. 226] strengthening of such a bridge, or have you rather favored the strengthening of such a bridge—the bridges that are most important in the highway system?

A. I don't know that we have discriminated against them.

Judge Glenn: Have you sought to meet the needs of the heavy traffic, regardless of where it is, or have you discriminated against it?

A. We have probably done some of both. We have sought to meet the needs of the people, getting the people out of the mud and dirt. That is our main object, and we have tried to get back to those other bridges as fast as we can. We have widened a good many little narrow bridges on the main road between Charleston and Orangeburg, and we widened quite a number of bridges that were necessary.

Judge Glenn: I put the question in a leading form. You haven't tried to discriminate against trucks moving in interstate commerce in your policy of repairing weak bridges?

A. No, sir.

By Mr. Griffith:

Q. As a matter of fact, you are handicapped by lack of funds, isn't that your situation?

A. Yes, sir.

Q. You haven't got the money?

A. If we had the money to go ahead and strengthen all of them and to widen them, we would be only too glad to do so.

Q. You like to build good roads and bridges?

A. Yes, that is my profession and my practice.

Judge Glenn: Would you rather build one that is going to be used a little than one that is not going to be used at all?

A. Absolutely I would.

[fol. 227] By Mr. Griffith:

Q. Now, I was asking you about streets of cities and towns, as to that construction, have you observed that they have been damaged or cut up by heavy traffic?

A. Yes, I know this, that I have gone into several towns with this National Recovery fund, and have torn up some of the old streets in the city and put down new pavements and I have very often had requests from various towns to come down there and help us out, that the heavy traffic is tearing up the streets. We go back and we have torn up

and replaced pavements in several places and resurfaced a good many others.

Q. Now, if you were to continue a program of building concrete roads, would you be able to complete your highway system nearly as early?

A. No, not without we had funds a lot faster.

Q. In the present situation?

A. No.

Q. Is that the reason you departed from the concrete roads?

A. Largely. And we have spread out on what we say are secondary roads that don't carry heavy traffic, but lack of funds and wanting to spread the money over as large a margin as we could is the reason we are building more of that type than the concrete.

Q. Are all the revenues received by the State Department, motor vehicles, are they applied to road construction?

A. Yes, and road maintenance and retirement of bonds.

By Mr. Bell: What year are you speaking of—what period are you covering?

[fol. 228] A. Any period since we have been getting all of the revenues.

Q. You never have deferred any highway funds to other than highway purposes?

A. Yes.

Q. Are you sure of that?

A. Yes.

Q. You make reports to the Bureau of Public Roads on that matter?

A. As far as I know, we never have spent anything other than one cent on gasoline tax going to the County. The Highway Department gets the motor vehicle fees and five cents tax.

Q. The counties have about 90% of the roads to maintain and build?

A. Yes.

Q. Now how much has the State built in the highway system?

A. We have a system now that we estimate at about $111,000,000.

Q. How much has the Federal Government contributed?

A. Of that, about $25,000,000. Now the Federal Govern-

ment has contributed some prior to that. We got Federal aid prior to 1925, and we ran about $4,000,000 extra.

Judge Glenn: I thought those figures put in evidence yesterday showed $39,000,000.00.

A. I think $29,000,000.00 is about right.

Mr. Funkhouser: $10,000,000.00 allocated but not yet spent.

A. But this $25,000,000.00 is of the $111,000,000.00. If you run up to 1929, we have to run up $111,000,000.00, and we do not have that figured.

[fol. 229] By Mr. Griffith:

Q. How much bridge mileage do you have in the State Highway System?

A. About fifty.

Q. About fifty miles of bridgework?

A. Of all types.

Q. What percentage of that mileage would you say has been designed to carry a load not in excess of ten tons?

A. Probably around 75%, I would think. I have not checked that up accurately.

Q. How does the cost of bridge construction compare with the road construction—is it a substantial item, the bridge cost?

A. It is a very substantial item. The cost of bridges runs anywhere from $50.00 a lineal foot up to $200.00. The average price is between $80.00 and $100.00 for a 20-foot width bridge.

Q. How about road cost?

A. The pavement costs have been running between $30,000.00 and $35,000.00 a mile. That is a little less than the bridges.

Judge Parker: I am troubled about this. I understand until three years ago you could load 40,000 pound loads on the bridges. Do you have any failures, or did you have failures of bridges at that time?

A. Well, on the timber bridges particularly, we were constantly having to replace boards. Some of them, we had to put extra stringers in them, and in the maintenance of our bridges we tried to keep them up, but we have not

had any failures on the concrete steel bridges we have built.

Q. How long have you been connected with the State Highway System?

A. About fourteen years.

[fol. 230] Q. Did the Highway System make any recommendation to lower the weight of trucks?

A. Mr. Moorefield I believe made recommendations to the Legislature along that line.

Q. When was that?

A. In 1931, I believe.

Q. He recommended that the weight be lowered?

A. Yes.

Judge Glenn: Was there any control to that at all?

A. I don't remember the law then.

Judge Glenn: That was the first law they had?

A. I believe so.

Judge Glenn: They were putting an initial limit on it?

A. Yes.

[fol. 231] By Mr. Griffith:

Q. Do you find in your files a written statement which Mr. Moorefield prepared for the investigating committee?

A. Yes.

Q. Will you produce that please? I wish to call attention—I don't have the particular reference—I wish to call the attention of the Court to the special Act of the Legislature authorizing the investigation of motor vehicle transportation in 1931. We now desire to introduce in evidence a typed statement which Mr. Moorefield presented before that investigating committee.

Mr. Fun-houser: If there were certain statements picked out of the testimony before the Legislative Committee, it seems to me that we should have the whole benefit of the testimony instead of certain statements because there may be statements otherwise that we might wish to use.

Mr. Griffith: We have a report of that committee, the statements taken by that committee, and we offer that in evidence, but we want Mr. Moorefield's typewritten statement because it is contained in there in full.

Judge Parker: Why is that not competent and proper, Mr. Funkhouser?

Mr. Funkhouser: I thought probably there might be modified statements in the whole testimony. They might pick out what was favorable and the Court would not have the benefit of the background of the questions asked.

Mr. Griffith: You want the whole record to go in?

Mr. Funkhouser: I don't mind if they put the whole of the record in.

Judge Parker: If he has the whole, I think it is all competent because we are investigating the reasonableness of the Act of the Legislature.

Mr. Griffith: This is all we have and all that was taken, as far as we know.

[fol. 232] Judge Glenn: We have not got to the point yet of having stenographers take down everything the Legislative Committees say.

Mr. Griffith: We offer the whole record.

Judge Parker: Right at this point, are there any points that you want to make—if so read them.

Mr. Griffith: I would like to read the entire statement. It all bears on highway costs and the problems facing the state.

Judge Parker: Read such parts as are pertinent.

Mr. Blease: I suggest that we get through with Mr. Williamson before you read this.

Here defendant introduced statement presented by Mr. Moorefield, Chief Highway Engineer, before the South Carolina Legislative Investigating Committee being defendant's Exhibit Number 8.

By Mr. Griffith:

Q. Now, Mr. Williamson, as to the load that these concrete roads will carry. Have you had any experience and observation as to their weakening in any places?

A. Yes. We have had failures in concrete pavements. We have had corner breaks in the system at times. That is usually a pretty good failure, I mean the corner breaks—two head joints together with expansion strip between them and the outer edge of one of those corners breaks. We have quite a number of those about all over the State. We have had systems practically adjacent to bridges and over fills

and causeways and some places we have had no failures at all. We have had very good results.

Q. You have had like experience as to bridges too?

A. Yes.

Q. Now will you give us the width of the road?

A. Most of our pavements are eighteen feet in width. We have some twenty feet and some sixteen feet There is one little stretch in Sumter County that is only nine feet wide. That is a concrete pavement. Now in bituminous surface our roads are twenty feet and wider. The standard [fol. 233] is twenty feet and we sometimes widen where adjacent and close to towns or through different communities. The standard is twenty feet.

Q. How about dirt roads?

A. We surface them about twenty feet.

Q. With respect to the county roads, about which we have been speaking—there are various types of roads and bridges throughout the county?

A. Yes, some improved and some unimproved.

Q. Some weak and some strong?

A. Yes, and that is particularly true with bridges.

Q. In your highway system have you taken over some roads which were actually paved by the county?

A. Yes.

Q. That is old paving, is it not?

A. Yes.

Q. Let me ask you this as an engineer: Does not an engineer have to know the weight the road is going to have to bear in order to design that road?

A. That is desirable to know, of course.

Q. Is that not the only purpose of his designing?

A. Yes, it is.

Q. Would you say that an enormous amount of truck traffic, the evolution as the plaintiffs call it,—did you contemplate it as an engineer back in the old days in building those early roads?

A. We did not know about that then.

Q. Are those old roads scattered all throughout the highway system—that is they are not all combined in one road?

A. That is true. There is not much mileage of that. Most of the state highway has been constructed by the State Highway System. Sumter, Anderson, Greenville, Richland and Charleston are practically the only counties that had

any roads paved prior to the state highway department.

Q. I am asking you about the old streets. Are they narrow or wide?

A. Some are wide and some are very narrow.

[fol. 234] Q. Take as an illustration the town of Newberry. When a long truck comes through that town and turns one of the corners, how much of the street does he take?

A. At the corner of the Exchange Bank Building that is a pretty narrow intersection and it takes a good bit of the street there for an automobile and truck to pass.

Q. A long truck would have difficulty in turning that corner, as a matter of fact?

A I think so.

Q. And those conditions apply in other towns?

A. Yes, we have quite a number of towns with narrow streets.

Q. Charleston is particularly an example of narrow streets, but I believe Columbia is generally about as wide as any city in the State.

A. That is true.

* * * * * * *

Q. In the construction of your paved roads, do they have a center joint?

A. The ones we are constructing now do have. The earlier days they did not have. We began center-joint construction about 1929 or 1930. The roads constructed prior to that did not have center joints.

Q. Could you give a rough estimate of how much of the 2400 miles does have the center joints?

A. About 40% has center joint, and concrete pavement.

Q. What are the thicknesses?

A. We have two thicknesses; one is eight inches at the edge and six and a half at the center. The other is seven and a half at the edge and six inches at the center Those are our two. We have used the thicker centers generally on relocations, fills, causeways, and so forth, and the thinner section where we follow an old road or cut centers.

Q. What do you know about the strength of concrete?

[fol. 235] A. Very little—that is in a way. We make tests of pouring concrete when we pour it, for its compressive strength and things of that nature, but as to what load a concrete pavement will hold up, that is pretty indefinite.

Judge Parker: There is no doubt about these new roads you build on main highways supporting the loads of the heavier trucks?

A. How heavy?

Judge Parker: 18,000 pounds per axle.

A. I would think so; if we have good conditions they should support that without trouble.

By Mr. Griffith:

Q. You, of course, don't know the construction of the roads which you took over from various counties?

A. No.

Q. You all did not have anything to do with that?

A. No, we have been maintaining them, except I do know this that in Anderson County I know about the construction of those particular roads there.

Cross-examination.

By Mr. Funkhouser:

Q. In which state would you say are the better sub-soil conditions, North Carolina or South Carolina?

A. I would judge generally that they are about the same. We have several different classes. We have sand subgrade along the coast, and some gumbo sections in our state, sand hills, mountainous sections and clay. North Carolina is somewhat similarly located; they go from the mountains to the coast.

Q. On your main through highways is it not a fact that you have a very good sub-soil condition, but which will let water drain off?

A. In some sections, yes. I would say the conditions on route one is about the best that we have.

Q. Is it not also true in South Carolina that you have a lesser problem with frost than North Carolina has?

A. Generally speaking yes.

Q. Frost does not go as deep?

A. We of course have roads going to Caesar's Head in [fol. 236] the mountains though where the temperature goes to zero.

Q. But the frost is not deep enough in this state to disturb your roads?

A. Last year we had probably more trouble with them than in a number of years. We had more ice and snow last year.

Q. But that is an exceptional year?

A. Yes, it was exceptional

Q. Is it not a fact that your roads in this state are well constructed?

A. I think we enjoy the reputation of having as good roads as anyone in the country, of which we are very proud.

Q. Is it not also a fact that your county roads were built at greater thicknesses than a number of people thought it was necessary to build them and there was a lot of criticism and talk about it?

A. I don't know that.

Q. In your opinion does a heavy bus going at a high rate of speed do as much damage to a highway as a heavy truck?

A. It depends on the weight and the smoothness of the pavement.

Q. Let's take this situation—take a truck weighing exactly the same as a bus, both of them over 20,000 pounds, going at the same rate, will one do more damage than the other?

A. I don't think so, if they have the same wheel loads.

Q. Really the test is whether the wheel load or axle weight does the damage.

A. The wheel load is what comes in contact with the pavement. If you have rubber against concrete, regardless of what is above it, traveling at the same speed I think you have the same result.

Q. It is the axle weight or wheel load that counts?

A. On the pavement, it is. Under other conditions it would not.

Q. Why is it that the buses in South Carolina are exempt from the law and the trucks not, if they both do the same amount of damage?

A. The Legislature permits the buses to operate. We are abiding by what the Legislature does. They are our bosses.

Q. Was that upon the recommendation of the State Highway Department?

A. No.

Q. Did Mr. Moorefield recommend it?

A. Mr. Moorefield was dead when they passed that law, I think.

[fol. 237] Q. When did he die?

A. April of this year, and that law was passed shortly after that.

Q. You mean the buses were exempted at the last Legislature?

A. Yes. They permitted the width to increase from 90 to 96 inches on buses at the 1936 Legislature. They were ninety before that.

Q. The weight law does not apply to buses either?

A. I don't know.

Q. But you think one does as much damage as the other?

A. If the conditions are equal.

Q. The buses weigh considerable—those going from Florida to New York are pretty heavy weights?

A. I judge so.

Q. They have been running over the bridges on the main highways?

A. Yes.

Q. You have not heard of them going through the bridges?

A. No, I haven't heard of any going through as yet.

Q. You have not heard of any trucks going through those bridges?

A. We have had floors to break on bridges from time to time, and they have knocked the handrails off very often. That is one of the biggest damages we have had from them.

Q. What axle weight did you recommend on route number one?

A. It depends on what you mean by route number one—taking it all the way through, we have surface treatment on that road.

Q. Get down to the general proposition—you have a highway in the State known as route number one that is traveled by buses and the public generally using automobiles?

A. Yes.

Q. What axle weight can the road carry before the road would be damaged?

A. You mean for the full length of the road?

Q. I mean as to the law of the State.

Judge Glenn: To be fair to you, he has testified there is a small section on the northern end where there is one

very weak bridge—you are talking about the ninety per cent.

A. Of course to make a recommendation on that, my idea of the road is just like the old saying that a chain is [fol. 238] no stronger than its weakest link. A road is no stronger that its weakest section. If you recommend for the weak road, probably 5,000 or 6,000 pounds axle load would be plenty high for that particular section. Other sections it might go even higher than that. When we get that section reconstructed up there at Cheraw like we have under contract now, that will eliminate the only weak spot on that road.

Q. Assuming that 90% of the road has no weak spots. What axle weight would you recommend for that?

A. I would think 12,000 or 13,000 pounds axle weight could be used without doing any material damage to the road.

Q. Is it not a fact that they have been running axle weights of sixteen to eighteen thousand pounds over that road and the 90% has not been damaged as yet?

A. That is true, but we have damage, probably, there that has not shown up as yet.

Q. How long is this weak spot on route No. 1?

A. About six or seven miles.

Q. How long is route No. 1?

A. Between 140 and 150 miles.

Q. It is the whole length across the state?

A. Yes.

Q. Do you know how wide the state is at the point traversed by that road?

A. It is about 150 miles—about 70 miles to Augusta and about that to Cheraw.

Q. Would you keep traffic off that 150 miles because of the weak spot to which you referred?

A. If traffic is going to bog down in the weak spots and block the whole route of traffic, I don't think it would be safe to permit loads going through that might absolutely close the road which should be used by at least 90% of the traffic.

Q. Is it not a fact that these weak spots can be strengthened?

A. Sure, and we are doing that now. We have a contract here now to get rid of that weak place, but it may be two years before we get it completed.

Q. And that weak place has not as yet bogged down?
[fol. 239] A. Yes, sir, there has been considerable trouble there. We have had water over that road in Marlboro County six or seven times within the early part of the year; when heavy loads went in they would get stuck, bog up and practically close the road to other traffic. We had to detour the traffic.

Q. You had some floods in South Carolina several years ago?

A. Yes. In 1928 and 1929 South Carolina had considerable floods and we are threatened with some this year.

Q. Did not the Federal Government appropriate money to repair damages to the highways?

A. We had some flood relief money.

Q. How much did you get?

A. I don't remember the amount now.

Q. But you got enough to repair the roads?

A. We spent what we could. We did not get enough to build all the bridges we would like to have built by any reason, however.

Q. There is now allocated to your state and not used, ten million dollars of Federal funds for your roads.

A. That sounds a little high to me. I don't know that we have any that has not been used. We are working under Federal, W. P. A and National program funds.

Q. In addition to the Federal allocation I understand you have emergency and N. R .A. money.

A. Yes.

Q. Don't you know that ten million dollars of the Federal Aid has not been expended by your State?

A. We have to go by that ten million dollars—we have 1938 and 1939 Federal Aid that will be coming up. We are spending Federal Aid on the bridge on route one at Cheraw.

Q. The bridges that you have stated are weak you are now repairing?

A. Yes; we are trying to go back and rebuild and rewiden bridges where they are too narrow or too weak.

Q. Don't you think you have the best highway system of any state in the southeast?

A. I say we enjoy that reputation and are glad to hear other people tell us that is true.

[fol. 240] Q. Do you, as Chief Engineer of the State Highway System, think that is true?

A. I think we have the best roads I have driven through.
Q. In the southeastern part of the country?
A. Yes, that is right.

Judge Parker: What good will that do if you have a very splendid road and on that road you have — weak bridge that will not bear more than a ten-ton load, or in the opinion of the Legislature will not bear more than a ten-ton load? I am addressing this question to you.

Mr. Funkhouser: My answer to that now is that originally that bridge may have been designed to carry a ten ton load, but the policy of his department, which he stated, is to repair the bridges and highway as the traffic increases, in order to carry traffic regardless of the theory or philosophy on which the road was built, and they are actually carrying the traffic at this time. They are carrying big buses going sixty or seventy miles per hour over the State, and the fact is that if the plans and specifications call for ten-ton bridges, these bridges have been strengthened to carry the traffic, and have been for years.

Judge Northcott: This witness testified positively that this bridge was a weak spot in route one, and is not safe in its present condition for more than ten tons, if I understood his testimony.

Mr. Funkhouser: If the witness is correct, my theory is wrong.

Judge Glenn: Your answer to that is that some of the big buses, say over 20,000 pounds, going over it day in and out, may any day put it out of regular schedule.

A. Yes. And some of these days one of those bridges may fall in and be too late to correct it. That is the reason we want to build it now before we have any catastrophes of that kind. It is not safe to let them continue. A heavy truck may go through all right, and yet a wagon may follow behind and break it in. It is sometimes what we call the "last straw."

[fol. 241] By Mr. Funkhouser:

Q. What test have you made on the bridges to determine the conclusions about which you have just testified?

A. We have measured them up, taken the size of the timbers, steel, and so forth in them, and worked them out from a formula to determine what is a safe load that does

not put a load on there that it will not carry. All bridges are designed for certain loadings, and in making that design you figure them to a certain degree of safety. We may say a bridge for ten tons, but a twelve or fifteen ton truck may go over it a few times, yet we figure that is not even safe.

Mr. Funkhouser: What tests, if any, have you made to determine how much that bridge of which you are talking, will carry?

A. We have made inspections of it and measured it up, and worked it sort of backwards from what you would to design it. Several years ago we made a survey of all the bridges in the State, and from that survey we figured up what at that time we figured was a safe loading.

Q. So you made measurements?

A. Yes.

Q. And you came to the conclusion that it would not be safe for anything over ten ton trucks?

A. Yes.

Q. What have you done to strengthen that bridge since you came to that conclusion?

A. We have replaced the floor of that bridge a time or two I think. I think we put a bat or two under it. We have strengthened the underpinning on it.

Q. Have you strengthened the bridge since you came to that conclusion?

A. We have strengthened it from time to time, and even if we do strengthen it that would not make the bridge safe over that road. We strengthened the bridge to keep it up.

Q. Will you please answer me my question? Have you or not strengthened that bridge since you came to the conclusion it was not safe for vehicles of more than ten tons?

A. I don't recall when that was done.

Q. Was it within the last year?

A. We have strengthened it from time to time—you see [fol. 242] we have had floods and have had to strengthen it.

Q. And you have been strengthening it from time to time?

A. Yes.

Q. And you have not wanted to leave the public in any danger?

A. No, we tried to keep it safe.

Q. And you have strengthened it to meet the demands of the traffic?

A. Right.

Q. So, after your inspection and you found that it was safe for only ten tons, you have brought it up to the necessary strength to carry the traffic of today?

A. I don't think so, but we try to keep it as safe as we can to carry the traffic by so doing.

Q. Is it safe to carry those buses that go through there to Florida?

A. They are passing over it.

Q. In your opinion?

A. I would say it is not too safe.

Q. If you know about it, have there been any warning signs put up there that the bridge is unsafe?

A. No.

Q. Or any warning to the officials of the companies operating those buses that it was unsafe?

A. No.

Q. So you, as Chief Engineer of the State Highway Department, feeling that that bridge is unsafe to carry passengers across, never have warned anyone?

A. We have tried to keep it strengthened so that no one would fall in.

Q. Is that not the answer—whatever design that bridge was built for, it has been strengthened to carry the traffic that passes over it, and the demands of the traffic.

A. It is carrying it but it may fall in at any time. I will be very glad when a new bridge is placed there. I will be glad when we can dismantle that old one, because it is more or less of a hazard.

Q. Have you any sign on that bridge as to what load it will carry?

A. I don't recall.

Q. Don't you know that you have not got one on it?

A. I have not been across it right recently.

[fol. 243] Q. Have you taken any steps to put one on it?

A. I don't remember that exactly, either.

Q. So, with that grave danger to the lives of the traveling public, you don't recall whether you have taken time to put up a danger sign there?

A. I don't think we have put up one there.

Q. You know you have not. It is not a question of thinking?

A. I don't recall.

Q. Is not what you have testified as to this particular bridge true generally as to all of the weak bridges of which you have spoken that you have strengthened them as the demands of the traffic needed?

A. Yes, in a limited way that is true. We have a number of bridges that are narrow and we have not been able to do anything about widening them. We have lots of narrow bridges that we have tried to widen, but you really have to rebuild them.

Q. You are widening them as you get to them?

A. Yes.

Q. And it takes sometime to follow out a well-planned program?

A. Yes, with plenty of funds it takes time to follow out even a well-planned program, but I hope some day we will have them all corrected.

Q. What would you recommend as to the limit of the axle weight or wheel weight of trucks and buses traveling on the highways of this state?

A. On our standard pavement I think the axle weight of around 13,000 pounds would be about right, not exceeding that, and even with that we have roads that that would be too much for.

Q. What?

A. We have roads that even 13,000 pounds axle loadings would be too heavy for.

Q. I am talking generally about your highways—do you say 12,000 or 13,000 pounds per axle?

A. Yes.

Q. Do you think your roads will carry that much?

A. Our pavements will.

Q. And the vehicles of greater axle weights are going [fol. 244] over the whole road now?

A. Yes, and we are having some failures.

Q. Can you say that those failures are due to trucks and buses, as a highway engineer?

A. They are due to a number of causes. That is probably one cause—subgrade conditions, floods, and a little frost of course, but I do know that we have this situation I described down at Tillman, where we have been detouring heavy traffic off of No. 17; it put ruts in it, and we are trying to prevent that now.

Q. After that occurred, did you strengthen that road?

A. Yes, we spent about $12,000 fixing that road up.

Q. And you testified in chief that you have not had any trouble.

A. Yes, but they have not had that traffic on it.

Q. So, if there is a failure on the highway, you strengthen that to meet the demands of travel?

A. Yes.

Q. And that is just like any other industry—for instance if there is a failure of machinery they strengthen or replace it?

A. Yes.

Q. I believe you stated that you recommend an axle weight of 12,000 or 13,000 pounds per axle for these highways?

A. I think that is about right, particularly for our pavements, but we have roads in the state that will not bear that.

Q. Please answer my question. Can you carry an axle weight in this state of 12,000 pounds with a gross limit of 20,000 pounds?

Judge Glenn: We will take his testimony in connection with the testimony of the other witnesses. Some of them testified the unit would weight ten or twelve thousand pounds, and therefore it would not afford over 8,000 pounds pay load.

By Mr. Funkhouser:

Q. I show you a drawing here of a particular trailer combination, and as I understand from the testimony of the engineer, if there is an axle weight of 12,000 pounds on each of the two rear, there would be 6,000 on the front, making a total of 30,000 pounds. Would you think the roads would be sufficiently strong to carry that?

[fol. 245] A. As far as the pavements are concerned, they would get by with 12,000 axle load, just as well as 20,000 gross on two axles with maybe 16,000 pounds. You see that 20,000 pounds gross load, as I understand, you can probably put 80% of that on each axle, which would make a 16,000 pound axle load. As far as the pavements are concerned, that 16,000 pound load would be more stress than the 12,000.

Q. The pavement carries all right the 16,000 pound load?

A. I think some have been going over at more than that.

Judge Parker: Did you not tell me you thought that the better roads were carrying 18,000 axle loads?

A. They probably will under good subgrade conditions. As a matter of fact, they had a train wreck at Allendale and the engine of the train went on across the pavement without breaking up the pavement. But that is a very good condition of the pavement there.

By Mr. Funkhouser:

Q. Mr. Williamson, I believe you stated that to take this bridge that was designed for ten ton trucks—did you design that bridge for that or for more than that?

A. More than that.

Q. How long is that bridge?

A. I don't recall.

Q. Approximately.

A. It is probably three or four hundred feet.

Q. Then that bridge, 300 feet long, would stand ten 10 ton trucks, each truck being ten feet long?

A. Our normal procedure in designing bridges for loadings is to have trailer trucks pass, one in each line of traffic, about thirty feet between them. So you have a long span that you can probably put several of the trucks in that span.

Q. If it is 300 feet long, how many ten ton trucks under the way the bridge would be designed will it carry?

A. I will say the length of the spans are not that long. Each individual span would have to carry its own load.

Q. So you can have a number of ten ton trucks?

[fol. 246] A. Yes.

Q. What is the difference in having two ten ton trucks one following the other than having a tractor trailer following each other?

A. With the same loads?

Q. Yes.

A. On the bridge there, the effect of it would be practically the same. The total load is what counts on there.

Q. Do you know the American Association of State Highway Officials?

A. Yes, sir, I know that organization.

Q. I believe some of your highway officials are members of that organization?

A. Yes, sir.

Q. Are you a member?

A. Yes, sir.

Q. Do you know the formula adopted by that Association for determining the load that a bridge should carry?

A. I don't remember. I know there is a formula. I don't remember it off hand.

Q. Isn't it true that the approved engineers' practice is to design bridges according to that formula?

A. Yes, sir.

Q. You say you don't remember if off hand?

A. Yes, sir.

Q. Isn't it true that total gross weight, which is represented by W. equals coefficient times L., plus 40?

A. That sounds like it.

Q. Aren't you designing all your bridges in this State according to that formula?

A. Yes, that is our formula, I believe, in designing our bridges.

Q. Doesn't that formula of W. equal C. times L. plus 40 give you the same strength for bridges that the 18,000 pounds axle weight does for highways?

A. I don't follow you exactly on that: I don't know.

Q. You don't know? Are any of your bridges in the State designed according to that formula today?

A. That is probably the formula we use.

[fol. 247] Q. How long have you been using that formula?

A. I cannot say that either.

Q. You have been using it for some years?

A. We have had every design of bridge construction to keep up with the progress of the times, and the changing, and I think we have kept pretty well along with the Association's recommendations.

Q. Is that the formula used by the Bureau of Roads?

A. I think so.

Q. And isn't that the formula that the Bureau of Roads requires to be used when you get Federal Aid money?

A. Yes, when we design our bridges for Federal aid, that is the formula we use. We use the plans and specifications that they approve.

Judge Glenn: They have to approve them before they give you the money?

A. That is right.

By Mr. Funkhouser:

Q. Doesn't that formula for bridges take care of any loads for 16,000 pounds per axle weight, it takes care of the wheel weights?

A. I think so. We design our roads as prescribed by the Federal Bureau. Our bridges we build now are designed for heavier loads than a few years ago.

Q. The bridges on those Federal Aid roads will carry the loads according to that formula?

A. The ones built by that formula, yes.

Q. That is not my question. Those curved places and shoulders carry loads according to that formula?

A. Some of them are not.

Judge Parker: He didn't ask you that question. He asked you whether they would carry it, not whether they were built for it?

A. Not all of them, no.

By Mr. Funkhouser:

Q. Which ones won-t, of the arteries across the State?

A. That depends on whether we build them as Federal projects or not.

Q. I am talking about Federal aid?

A. The Federal aid bridges throughout the State on the [fol. 248] main arte- traffic?

Q. Aren't the main arteries Federal aid projects?

A. No, sir.

Q. Aren't the main arteries across this State federal aid highways?

A. Generally yes, but it is not all with Federal aid money. Some of them are constructed with State money.

Q. I am asking you about the main arteries across the State; are they Federal aid highways?

A. Some of them are, yes.

Q. I ask you specifically?

Judge Parker: Answer the question direct Aren't those main arteries across the State—you said many of them were Federal aid projects.

A. Not Federal aid projects. We have constructed roads in the Federal aid system without Federal Aid.

Judge Glenn: They are all roads constructed by Federal aid, but there may be miles in them which have some other history than actual Federal aid.

A. I remember Black River out of Manning—we constructed that road a few years ago with Federal aid, and made exceptions to the bridges. The bridges were not constructed with Federal aid. That is very often the case. If we have a bridge on the road that we feel is adequate to carry the traffic, we omit the bridge.

Judge Glenn: The bridge at Catawba River at Rock Hill was built before Federal aid was ever heard of and it is adequate today, but not a Federal bridge. That is what you are talking about?

A. Yes, sir.

By Mr. Funkhouser:

Q. Is route 17 a Federal aid highway?
A. Yes, sir, I think so.
Q. Is route 15 a Federal aid Highway?
A. Yes.
Q. Is route 29 a Federal aid highway?
A. Yes, sir.
[fol. 249] Q. Is route 21 a Federal aid highway?
A. Yes, sir.
Q. Aren't those main arteries or highways that are used by interstate commerce crossing this State?
A. Yes, sir.
Q. And isn't it a fact that the bridges on those particular roads will all carry the traffic that the formula designs, to-wit: W equals C times L plus 40—your bridges?
A. No, sir I don't think so.
Q. Which ones are not?
A. No. 1, you see, that bridge at Cheraw is one.
Q. That is being repaired?
A. That is on number 1. When we get it built the new bridge it will, but the bridge under its present condition won-t. No. 17, for instance, we have a number of creosote timber bridges through Ridgeland and Hardeville; they aren't safe for very heavy loading.
Q. These bridges are now carrying the traffic that goes across them?
A. Yes, sir.

Q. And have been carrying it ever since the Federal aid roads were built, haven't they?

A. Yes, sir.

Q. And that bridge of which you spoke is the bridge you stated you strengthened?

A. Yes, sir.

Mr. Ross: May I ask the witness a few questions?

By Mr. Ross:

Q. Is there any authority in the State of South Carolina for the highway department, or any other authority to change the limits which the Legislature has put on weight and size? Is my question plain?

A. I don't believe the question is clear.

Q. Does your Commission or Department have any authority to change the weight and size and restrictions to meet special needs?

A. I don't know of any like that.

Q. It requires an Act of the Legislature to change that? [fol. 250] A. Yes, sir.

Q. Does the State Legislature give the State Highway engineer authority to issue permits to move certain vehicles?

A. The loads which are beyond the limits as specified by law, a permit for a special movement? We issue those from time to time, yes. A load that is excessive in width and weight, under certain conditions we issue special permits for their movement.

Q. Speaking now from the standpoint of the observation of the State Highways, in your judgment would it not be a practical thing and a desirable thing to have some agency either the State or Federal, to have some authority to change these restrictions from time to time to meet special conditions that might arise?

A. I don't know just what you are driving at. It would if you had a specific maximum limit for some reason—a road might get into such a condition that it would not be suitable for carrying that load, it might be desirable that we had some quick way of changing it so as to take care of that particular situation.

Q. To change the weight to relate to the law?

A. Yes, such as we might have a flood, or a wash-out of the bridge and couldn't get the road back very quickly to take care of the maximum load as allowed.

Q. Wouldn't it be a practical thing for your Department to recommend some agency that had the power to change the restrictions, either to lower them or bring them up to meet the special conditions as they might change from time to time?

A. That might probably get a little complicated; it might be a little difficult to enforce. That could, of course, be worked out, I think.

Q. Suppose you had an extremely bad road, or an unusually bad condition, wouldn't it be a practical thing if somebody had the power in your department to study the facts and make a recommendation and put them into effect to save the roads?

A. I think so. It would be a very good thing to do so for a period of 30 to 60 days or something like that. That may be as long as necessary, and then put the limitation on.

By Mr. Funkhouser:

[fol. 251] Q. Isn't it a fact that the South Carolina Act Prohibits tractor-semi-trailers having 12,000 pounds on each axle?

A. Prohibits that?

Q. Yes.

A. I don't know. I am not familiar with the law on that.

Q. You don't know about that?

A. No, sir, I have nothing to do with the law enforcement. That is work I am not so up to date on.

Q. You know that the law does not permit over 20,000 pounds gross load, do you not?

A. Yes, sir.

Q. And you don't know there is a 10,000 pound axle limit on vehicles with more than two axles?

A. I don't remember that.

Q. And you don't know whether or not you can carry 12,000 pounds on an axle, do you?

A. Under the present law?

Q. Yes.

A. I don't know, sir.

Q. But you think that the roads will stand an axle weight of 12,000 or 13,000?

A. The pavements will.

Q. And lots of them are going over the other highways that are not paved, isn't that true?

A. Yes, a good many of them are and some of those are in force.

Q. If you take a tractor-semi-trailer with an axle weight of 12,000 pounds per axle, then you would have a gross load of 30,000 pounds?

A. If you put 12,000 on two of them and 6000 on the others it will make it 30,000 pounds.

Q. Wouldn't that be safe?

A. The paving would stand that load, I think.

Q. How about a four wheel truck and you have 16,000 pounds on the rear axle, how about that, is that safe?

A. A 16,000 pound loading will damage the pavement more than a 12,000 pound loading.

Q. Do you consider a load of 16,000 pounds on the rear axle safe?

[fol. 252] A. From the highway standpoint?

Q. Yes.

A. It is apt to do it some damage. It will stand it maybe for a good long while, but it is bound to break it down a little earlier than if it had a lighter load.

Judge Parker: He is making the distinction between what is safe for bridges and what is safe for roads. He stated in answer to the question I asked that he thought that 18,000 pounds axle load was not too great for the better paved roads, so far as the roads themselves were concerned. That is what I understand his testimony to be. He has gone a great deal further, but he said as far as the better roads are concerned an 18,000 pound weight per axle would not be excessive, and he said all of those roads have bridges on which the weight of 10 tons is the maximum and beyond which it is not safe. I don't know that he has changed that. He said a great deal about the different type of roads, but I understand that to be the purport of his testimony now.

By Mr. Funkhouser:

Q. With this axle load which you say of 12,000 to 13,000 pounds—that is what you think would be safe for the South Carolina situation?

A. Yes, for the different roads.

Judge Parker: Here is what I am trying to clear up. You are asking questions for one situation in South Carolina and he is answering for another. You are asking as to the South Carolina situation not to include bridges, and he is answering to include bridges.

Mr. Funkhouser:

Q. Is this 16,000 pounds axle safe for bridges?
A. A good many of them it is not.
Q. How about on Route 17?
A. On Route 17 we have a number of bridges below Charleston there that would probably not be safe for a loading of that kind.
Q. What would those bridges below Charleston be safe for?
A. I would say 10 ton loading.
Q. Per axle?
A. No, sir, gross load.
[fol. 253] Q. How much per axle?
A. I consider bridges as having total load on them.
Q. I ask you per axle?

Judge Parker: I think he has answered that clearly. I think that answer gives the axle load as the test for pavement strength, but the total load of the truck is the test for bridge strength.

By Mr. Funkhouser:

Q. Isn't it true, Mr. Williamson, that the formula W equals C times L plus 40 makes the test of the load going over the bridge the length of the vehicle?
A. Yes, that takes into account the length of the vehicle.
Q. Are any of those bridges long enough to have more than two trucks on them at the same time?
A. Yes, we have some.
Q. Are any of those bridges wide enough to have two trucks to pass on them at the same time?
A. All of them are.
Q. Isn't it a fact that those bridges have been strengthened and built up to the necessity of the traffic upon them?
A. I believe it says the load for the traffic that is using them.

Judge Parker: I want to ask you a question when you get through. I want to ask about the width of the truck.