BEFORE

THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

In re: C-80092154 Glenfield Borough vs. Consolidated Rail Corporation, Penn Central Transportation Company, Allegheny County and Pennsylvania Department of Transportation Alleging unsafe and hazardous conditions exist where the Glenfield viaduct crosses the tracks of Consolidated Rail Corporation, in the Borough of Glenfield, Allegheny County. Further Hearing.

TRANSCRIPT OF PROCEEDINGS

August 24, 1982

Pittsburgh, PA

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MOHRBACH & MARSHAL, INC.
27 North Lockwillow Avenue
Harrisburg, PA 17112

Pittsburgh Office
(412) 261-2892

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Stenograph Transcript of Hearing held in Hearing Room No. 1, Buhl Building, Pittsburgh, PA, on

Tuesday, August 24, 1982, at 10:00 o'clock a.m.

BEFORE: Michael A. Nemec
Administrative Law Judge

- - - - -

APPEARANCES

Albert G. Feczko, Jr., Esquire
Feczko & Seymour
800 Lawyers Building
428 Forbes Avenue
Pittsburgh, PA 15219

FOR: Borough of Glenfield

Joel E. Mazor, Esquire
1138 Six Penn Center Plaza
Philadelphia, PA 19104

FOR: Consolidated Rail Corporation

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APPEARANCES - (Continued)

Allan J. Opsitnick, Esquire
11th Floor, Allegheny Building
Pittsburgh, PA 15219

FOR: Allegheny County

Herbert G. Zahn, Esquire
Department of Transportation
Harrisburg, PA 17120

FOR: PennDOT

Barry J. Grossman, Esquire
Assistant Counsel
PA P.U.C.
G-31 North Office Building
Harrisburg, PA

17120

FOR: Commission Trial Staff

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ADMINISTRATIVE LAW JUDGE MICHAEL A. NEMEC: This morning, we have a further hearing in the case that is captioned Glenfield Borough vs. Consolidated Rail Corporation, Penn Central Transportation Company, Allegheny County and Pennsylvania Department of Transportation. The matter is docketed at C-80092154. Present this morning are Attorneys Albert Feczko, representing the Borough of Glenfield; Allan Opsitnick, representing Allegheny County; Herbert Zahn, representing PennDOT; Joel Mazor, representing Consolidated Rail Corporation; and Barry Grossman representing the Commission Trial Staff.

If there are no objections, we'll follow the Questions and Procedure that were outlined in the Notice of the hearing, and it calls for Conrail to go first.

MR. MAZOR: Thank you, Your Honor, that's correct. The Commission's Order of May 29, 1981 required Conrail to submit certain Inspection and Evaluation Reports which we are now prepared to do. I will call Mr. Parks and Mr. Parks did testify at the first hearing; however, if you wish to swear him in again.

(Witness sworn)

MR. ZAHN: If Your Honor please, may I move that the Questions and Procedure be incorporated in the record and we can then refer to them?

JUDGE NEMEC: Any objections?

MR. MAZOR: No, Your Honor.

JUDGE NEMEC: They may be incorporated.

(Questions and Procedure, dated June, 1982, at C-80092154, with respect to Consolidated Rail Corporation, are incorporated herein as follows:)

1. Consolidated Rail Corporation (hereinafter Conrail) submit into evidence its Inspection Report and Evaluation for O. H. Bridge No. 9.22 at Glenfield, PA prepared in compliance with Paragraph No. 2 of the Commission's Order adopted May 29, 1981, and submit testimony explaining its findings, conclusions and recommendations.

2. Conrail state whether it has complied with Paragraph No. 1 of the Order adopted May 29, 1981, and, if so, explain the status of the appraisal form and whether a sufficiency rating for the structure has been obtained.

3. Conrail state what it estimates would be the cost to rehabilitate the existing structure.

4. Conrail state whether, in its opinion, the existing structure should be inspected more frequently than the six months intervals which have previously been ordered.

5. Conrail state whether, in its opinion, the entire structure should be replaced, if replacement is found to be advisable in lieu of rehabilitation.

6. Conrail state whether the posted maximum load limit for the subject bridge can be modified to permit loads

greater than 16 tons for tractor-trailer combination type vehicles using the bridge in view of the maximum load capacity rating using an HS-type vehicle.

7. Conrail state whether it will agree to prepare plans, at its initial cost, to rehabilitate the subject structure, if the Commission determines rehabilitation is warranted and, if so, what period of time will be required to prepare such plans.

WARREN W. PARKS, JR., called on behalf of Conrail, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. MAZOR:

Q. Mr. Parks, give your full name and address for the record.

A. Warren W. Parks, Jr. Senior Civil Engineer with Consolidated Rail Corporation, Office of Chief Engineer, Design and Construction, located at 15 North 32nd Street, Philadelphia, Pennsylvania, 19104.

Q. And you've testified on behalf of Conrail at the initial hearing held in this matter, sir?

A. Yes, I did.

Q. And you're so authorized to so testify.

A. Yes, I am.

MR. MAZOR: If Your Honor please, I have two sets of

exhibits which we would like to have marked for identification as Conrail Exhibits 3 and 4. Copies have been provided, three to the reporter, and one to each party of record, and they also had been previously mailed to all parties.

(Conrail Exhibit No. 3, multi-page document, entitled Inspection Report and Evaluation for O.H. Bridge No. 9.22 at Glenfield, PA, dated January 19, 1982, was so produced and marked for identification.)

(Conrail Exhibit No. 4, multi-page document, consisting of letter dated 4/5/82 addressed to Joel Mazor, Esquire, signed Barry J. Grossman, Esquire; letter dated 6/11/82 addressed to Barry J. Grossman, Esquire, signed D. S. Taylor, Conrail; and copy of inventory form and calculations attached, was so produced and marked for identification.)

Q. Mr. Parks, in connection with the first question, it asks us to submit into evidence the Inspection Report and Evaluation for Overhead Bridge 9.22 at Glenfield, PA, which was prepared in compliance with the Commission's Order, and submit testimony explaining our findings, conclusions and recommendations. Referring to the exhibits, would you please briefly explain what they are first and then summarize the conclusions and recommendations.

A. Conrail submits its Inspection Report and Evaluation as Exhibit 3. This report was furnished to the Commission and all parties to this proceeding with Conrail's letter of

January 20, 1982.

Q. Exhibit 4 is what, sir?

A. Exhibit 4 was the result of a letter by the Commission dated April 5, 1982 requesting Conrail to complete a structure inventory and appraisal form along with clarifying certain portions of the Inspection Report and Evaluation including HS-type vehicles ratings.

Q. Does Exhibit 4 contain the response to that letter and that information?

A. Yes. Exhibit 4 covers the answers to the Commission's letter.

Q. Would you just briefly explain the findings, conclusions and recommendations?

A. I will go back to Conrail Exhibit 3, in which, details as to the conditions of the different parts of the structure are given. A plan showing the general plan of the bridge itself. And the calculations made on the different portions of the bridge.

Q. On Exhibit 3, where are the conclusions and recommendations to be found so that they can be followed?

A. On Pages 5 and 6, "The above-described deterioration of the sidewalk, deck slab, girders, cross-struts, pier colums and caps is for the most part caused by water," along with any deicing agents that may have been used, "draining on them. This deterioration was accelerated when water on the

roadway surface was allowed to drain through the mortar joints in the brick paving and be caught in the layer of sand below. This water eventually made its way to the various structural members below causing their deterioration. Along with the above-described causes are the age of the structure," wearing of the structure and somewhat lack of maintenance. And also, I will add another item. The type of the construction itself. "The overall condition of the bridge is poor to fair."

Conrail recommends, "Based on our computations, the inventory rating of the bridge is H-16, and since the bridge has been carrying normal traffic (posted vehicle load limit - 16 ton at 10 M.P.H. max. speed) for an appreciable length of time, there is no need to restrict the posted loading. However, the bridge should be inspected at frequent intervals for any signs of distress which may develop." The interval that we recommend will be handled in a further question. "With the bridge being nearly 60 years old and to repair the deteriorated members described above would be expensive, and it is recommended that studies be done (by others) for the replacement of this structure."

Q. And is it the deck that is the determining factor on the 16-ton limit; do you know?

A. Yes, it is. The deck is the determining factor.

Q. Now, you've complied with Paragraph 1 of that Order.

Now, if so, explain the status of the appraisal form and whether a sufficiency rating has been obtained.

A. Please refer to Exhibit No. 4. Page 6 of that exhibit is the Structure Inventory and Appraisal Sheet. Which we have completed. As far as a sufficiency rating, Conrail does not have the means to obtain that rating. It would have to be done by others who know about the system of rating.

Q. What is the estimate that it would cost to rehabilitate the existing structure?

A. Conrail has made an estimate of about $600,000 to rehabilitate the bridge. And this would actually keep the rating for capacity at 16 ton. This would not guarantee an indefinite time period for the bridge because without using core borings or concrete analyses, if the rehabilitation was done, we might find a lot more work needed to be done.

Q. Do you know roughly what items that $600,000 would embrace at this point?

A. I do not have an actual detail. I'm surmising that's a lot of the work that would be on the deteriorated concrete and the deck. Primarily, also the deck would be the major work that would have to be done.

Q. In your opinion, is it required that the inspections be made more frequently than the six months now ordered?

A. Conrail recommends the six-month inspection period be followed as existing under order.

Q. Now, do you have an opinion as to whether the entire structure should be replaced, if replacement is found to be advisable in lieu of rehabilitation?

A. Well, we made the statement just before concerning, to increase the load limit. The only way would be to build a new bridge, replacing it with a new bridge.

Q. The conclusion has been reached that nothing can be done to the present structure to bring it up to maximum loading? Is that a fair conclusion?

A. Yes.

Q. Now, the posted load limit, can it be modified in any way to permit loads greater than 16 tons for certain tractor-trailer combination type vehides using the bridge in view of the maximum load capacity rating using an HS-type vehicle?

A. Conrail considers that vehicles having an individual axle load not to exceed 12.8 tons could use the bridge. And that would be the criteria that would have to control any use by these tractor-trailer vehicles.

Q. Will Conrail agree to prepare plans, at its initial cost, to rehabilitate the structure, if the Commission determines that rehabilitation is warranted?

A. Conrail does not agree to prepare plans to rehabilitate the involved structure.

MR. MAZOR: The witness is available for cross-examination.

JUDGE NEMEC: Mr. Zahn.

CROSS-EXAMINATION

BY MR. ZAHN:

Q. Mr. Parks, do you have any ballpark figure of what it would cost to replace the bridge?

A. No, I do not.

Q. You can't give us any idea at all. Would it be over a million, over two million?

MR. MAZOR: If Your Honor please, that kind of speculation I think is totally useless. He said he has no idea. So, why go into guessing games if he can't give a figure.

MR. ZAHN: He can give us some minimum amount.

MR. MAZOR: He said he can't, sir.

MR. ZAHN: I'm not asking you, Mr. Mazor, I'm asking the witness.

MR. MAZOR: All right. If you want the same answer from the witness, he'll be glad to furnish it.

JUDGE NEMEC: All right. Answer the question to the best of your ability.

A. Well, from my rough judgment, a bridge like this with a viaduct, you would still have to have a viaduct because of the situation, let's say it would be over two million, I would say.

Q. Thank you, Mr. Parks.

JUDGE NEMEC: Mr. Feczko.

CROSS-EXAMINATION

BY MR. FECZKO:

Q. Mr. Parks, is the Inspection Report that you have identified and submitted, is that the only inspection that has been made?

A. As far as I know. As far as the detail.

Q. The Order required one each six months from the date of the Order. Has there been an inspection in July of '82?

A. I couldn't say.

Q. You don't have any information about that.

A. At the moment, I don't.

Q. Do you know whether or not the sidewalk repairs and the step reapirs as required by the Commission were completed as ordered by the Commission in its Order?

A. That, I believe, was.

Q. Have you been out there recently to look at the sidewalks or steps?

A. I have not been out for several months myself.

Q. Do you have an idea of what it would cost to perform an engineering evaluation to rehabilitate the bridge as suggested by the Commission? What the cost of that would be. Approximately.

A. Are you referring to the engineering prior to?

Q. To rehabilitation, or engineering prior to construction. Or replacement.

A. I wouldn't be able to say what that would be.

Q. Either one. To come up with plans to rehabilitate or plans to replace. You can't give any idea of what the cost would be?

A. No, I couldn's say just what that would be.

Q. Can you give us a ballpark figure?

A. Well, ballpark, I'd say it might be 10 to 12,000.

Q. That would be to do either one?

A. No. Well, this would probably be the rehabilitation.

Q. The rehabilitation.

A. To build a new bridge altogether to replace it would be more. It would probably be 25 to 30,000.

Q. Thank you very much, sir.

JUDGE NEMEC: Mr. Opsitnick.

CROSS-EXAMINATION

BY MR. OPSITNICK:

Q. Mr. Parks, the last question Mr. Zahn had asked you, I missed the question and caught the answer where you said the particular cost for something was 2 million.

MR. ZAHN: It was over 2 million.

Q. Over 2 million. I'm sorry. Was that the cost of replacement?

MR. MAZOR: (Counsel nods head.)

A. (No response by the witness.)

Q. I see Mr. Mazor indicating yes. Okay. Do you have an estimate as to the cost of rehabilitation up to the legal load limit on this structure?

A. No, I do not.

Q. You have been ballparking a couple of things. Do you have any ballpark idea?

A. Not in this type of bridge, this concrete bridge. It would be hard to say. I wouldn't chance that.

Q. Thank you. I have nothing further.

JUDGE NEMEC: Mr. Grossman.

CROSS-EXAMINATION

BY MR. GROSSMAN:

Q. Mr. Parks, would it be possible to rehabilitate the bridge, considering the structure, to accommodate legal loads?

A. I couldn't say whether it would be to get the legal loads. The figure I gave you, the 600,000 wasn't--

Q. --Well, what does this figure of 600,000, what kind of rehabilitation does it contemplate? A new deck on the bridge?

A. I cannot say. I don't have that information. I had a total cost figure.

Q. Do you know how it was arrived at? How the figure was arrived at?

A. No, that is the detail I do not have. If you want it, I could get it for you.

Q. And you do not know what it contemplates then?

A. I assume, in my own mind, the deck is the major part.

Q. You had previously testified to that.

A. Right. And, of course, your deterioration of your different other parts, like piers and such, which would be more aesthetic, to make it look better, would be helping the structure part.

Q. How long do you think this rehabilitation would last?

A. It is indefinite, really, because you would have to take core corings and do other more complicated analyses to see what there may be further damage within the structure.

Q. Would you recommend at this point rehabilitation as opposed to reconstruction, or an entirely new structure? Or which would you recommend?

A. Conrail would probably go toward what rehabilitation would be necessary to keep the 16 tons. It feels that traffic on the structure would not be enough or heavy enough to need further work and we recommend in that case that 16 tons be kept.

Q. Is there any possibility, considering the use of the HS-loading, which is for multi-axle vehicles, that the HS rating load limits could be increased?

A. Well, on the HS, as I said before, a vehicle, a multi-axle vehicle, having a 12.8 ton limit could go across it. The total vehicle would be much higher, of course, than 16 ton.

Q. Thank you. I have no further questions.

JUDGE NEMEC: Any other questions?

(No Response.)

JUDGE NEMEC: Any redirect?

MR. MAZOR: No, Your Honor. I move the admission of exhibits that have been identified as Conrail Exhibits 3 and 4.

JUDGE NEMEC: Any objections to Conrail Exhibits 3 and 4?

(No Response.)

JUDGE NEMEC: Without objection, Conrail Exhibits 3 and 4 are admitted in the record of this proceeding.

MR. MAZOR: Thank you, Your Honor. We rest at this point.

JUDGE NEMEC: Allegheny County?

(Questions and Procedure, dated June, 1982, at C-80092154, with respect to Allegheny County, are incorporated herein as follows;)

8. Allegheny County submit comments it has to offer concerning Conrail's inspection report - its findings, conclusions and recommendations.

9. County state whether it has received a copy of the

structure inventory and appraisal form for the subject bridge, which Conrail was ordered to prepare, and state whether it has obtained a sufficiency rating for the structure and whether it will qualify for funding for rehabilitation or replacement under the Federal Critical Bridge Program.

10. County state whether, in its opinion, the subject structure should be rehabilitated or replaced and, if replaced, sho should the entire structure be replaced.

11. County state whether, in its opinion, the existing structure should be inspected more frequently than the six months intervals which have previously been ordered.

12. County state whether it will agree to perform additional studies, at its initial cost, to determine the recommended location and type of structure to replace the existing structure, if the Commission determines that replacement is required and, if so, what period of time will be required to perform such studies.

13. County state whether it will agree to prepare plans to rehabilitate the subject structure, if the Commission determines that rehabilitation is warranted and, if so, what period of time will be required to prepare such plans.

JOHN B. DRAKE, called on behalf of Allegheny County, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. OPSITNICK:

Q. Would you state your name, sir.

A. My name is John B. Drake.

Q. And your occupation?

A. My occupation is Chief Bridge Engineer for Allegheny County, Department of Engineering and Construction.

Q. You have testified prior in this particular proceeding; haven't you?

A. Yes, I testified back in January of 1980.

Q. And you're presently authorized by Allegheny County to testify in its behalf.

A. I am.

Q. Mr. Drake, does Allegheny County have any comments concerning Conrail's Inspection Report, including findings, conclusions and recommendations?

A. The County does not have any findings, conclusions or recommendations, other than, in review of the calculations for the analysis of load limits, on the 97 foot span steel girder I notice that the dead load of that particular calculation should be increased to include the gunite coating on the steel girders, which is approximately 700 pounds per foot additional dead load. However, a cursory look at the remainder of the calculations indicates that it's not going to take the capacity of that span below the legal load limit.

Q. Mr. Drake, has the County obtained a sufficiency rating

for the structure based on the structure inventory and appraisal form? And, does the County have an opinion whether or not the bridge would qualify for any type of funding for rehabilitation under the Federal Critical Bridge Program?

A. As directed by the Commission, the County received a copy of the Inspection Report which included the SI&A form, and our office obtained a sufficiency rating of 14.38. An opinion is that's low. May I explain to the Commission, the higher the sufficiency rating, the closer it is to a hundred, the better the bridge is. The more it approaches zero, the worse condition the bridge is. So this rating was 14.3 that was performed in our office. It has not been submitted to the Pennsylvania Department of Transportation to be placed on their inventory list because we haven't had time before this hearing, but it's a formality to be placed on an inventory list. Whether or not it could possibly qualify for federal funding, again, I will do a ballpark thing here, it's my understanding that District 11 here, on their federal allocations from fiscal year '82 through '86 has been slashed to somewhere around 16 million dollars. So, going through the federal route with this high priority on the sufficiency rating might qualify it but the slim pickings might indicate there's no money for the structure whether it could be replaced or rehabilitation would be in order.

Q. Mr. Drake, does the County have any opinion whether

or not the subject structure should be rehabilitated or replaced and, if replaced, is there an opinion whether or not the entire bridge should be replaced?

A. No, the County has no opinion on rehabilitation or replacement of the structure, and the County is not directly involved in the maintenance or ownership of the structure.

Q. Does the County have an opinion whether or not the existing structure should be inspected more frequently than the six-month intervals which have been ordered?

A. Allegheny County has no opinion on the frequency of inspections.

Q. Does the County agree to perform any additional studies, at its initial cost, to determine the recommended location and type of structure to replace the existing structure if the Commission determines that replacement is required and, if so, what period of time will be required to perform such studies?

A. The County will not agree to perform additional studies.

Q. One final question, Mr. Drake. Does the County agree at all to prepare any plans to rehabilitate the bridge?

A. No, the County will not agree to prepare plans for rehabilitation of the structure.

Q. Thank you. You may cross.

JUDGE NEMEC: Mr. Zahn?

JUDGE NEMEC: Mr. Fecziko?

MR. FECZIKO: No questions.

JUDGE NEMEC: Mr. Mazor?

CROSS-EXAMINATION

BY MR. MAZOR:

Q. The sufficiency rating, 14.38; right now, are there any bridges in the County that you know of that have a lower rating?

A. Yes. Bridges which Allegheny County owns and maintains, I have knowledge of four of them. I have a list obtained in 1979 which indicated at the time, and I'm presuming this 14.38 is correct and I've checked it.

Q. Yes, of course,

A. The Department may find some flaw in it. There were four structures: Wind Gap, the bridge at Acheson on Brownsville Road, Vanadiam Road Bridge, and Oakwood Bridge.

Q. Wind Gap and Vanadiam are in the process of being reconstructed at the present; are they not?

A. Vanadiam is. Wind Gap--

Q. --It's under order in any event right now.

A. Yes.

Q. Thank you, sir. That's all I have, Your Honor.

JUDGE NEMEC: Mr. Grossman?

CROSS-EXAMINATION

BY MR. GROSSMAN:

Q. How does this sufficiency rating you testified to work, sir? Is it kind of on a scale of 1 to 10 how sufficient it is for long-term survival?

A. Various elements of the structure are given a rating on that basis. Let me digress for a minute. The Wind Gap is rated at 2. The Sewickley bridge at the time of its demise I believe was rated at 3.

Q. Would you quantify demise for us? Was it demised by others or demised of its own motion so to speak?

A. I will not comment, sir. But there are factors which go from 0 to 10 on there and you use some engineering judgment. And in the case of this, on this SI&A form, there are factors which are not included in here, such as, channel and channel protection. It's not rated so it gets an N. I generally followed what the railroad, Conrail, has placed in here for the deck, which was a 4. I did tamper with the sheet in that they didn't have access to ADT, which is an item in the formula, Average Daily Traffic, and I felt something in the range of 250 to 500 vehicles a day would be appropriate. So that's placed into a formula which I don't have. If you'd like to look at this copy. This is not my work. This is the wrong one. Would you pass that to the gentleman, please? See the number 250 in there for ADT, which could result in 14.3. So, it's a cumulation of factors into the formula, or a series of formulas.

Q. But it's a scale of 0 to 100.

A. Yes, sir.

Q. Or 1 to 100. So the one bridge you testified that had 2 would be in much poorer condition than this which has a 14.

A. Correct.

Q. Do you feel that the subject bridge could be rehabilitated?

A. That was my opinion in 1980 before this SI&A form was accomplished because it was what I would call a practical approach to keeping a structure alive and upgrading it to the legal load.

Q. What type of rehabilitation would you contemplate, sir?

A. Well, on behalf of the County, I would not contemplate any. As a Registered Engineer,--

Q. As a Registered Engineer, sir.

A. --I would certainly tamper with the deck, remove the deck, do slightly more than cosmetics on the sub-structure. There are two levels of repair recommended on that which can be accomplished with today's technology using concrete and epoxy products. The deck possibly could be widened and cantilevered out over particularly the steel span, the 97 foot steel span, and you could produce, with the appropriate engineering, a structure which would handle the legal load,

which in this case was HS-20 over 36 ton.

Q. Do you feel it is practical to rehabilitate the subject structure?

A. It depends on your funding; it depends on your timing. If you're going to go on the federal route for essentially an off-system structure, you're not going to get any money before '86. Now, how important is the bridge? I can't determine that. I'm not in planning.

Q. Do you think the bridge would remain in stable condition until 1986? As an engineer.

A. I can't say because it's under a six-month period of inspections, which will monitor the structure or certain controling elements of the structure.

Q. Could the bridge be kept open to traffic during the performance of the rehabilitation as you have outlined to us today?

A. No.

Q. How would the Borough of Glenfield obtain access to the outside world?

A. I do not know, sir.

Q. It would not be possible to close one lane of the bridge because of the nature of the structure; is that correct?

A. Because of the nature of the deck and the fact there's no intermediate support, you could not sectionalize

your construction.

Q. You have heard Mr. Parks testify, using the phrase, to a ballpark figure of $600,000 for the rehabilitation. Do you agree with Mr. Parks' figure?

A. No, I do not.

Q. What figure would you give us, sir? As an engineer.

A. Well, to rehabilitate the structure, you must perform an in-depth inspection, which I would approximate that, depending on the railroad's demands for insurance, I would approximate 55 to $60,000. I would then address basically the ills of the bridge and an estimate on the cost to rehabilitate the bridge to (a) 16 tons, (b) to the legal load limit, or, it might give you some measure of that versus the replacement cost.

Q. You think the 600,000 figure is more of a guess than anything else.

A. Well, I'm not challenging Mr. Parks. I'm just saying that I think considering an in-depth inspection, which is essential, or essential to a decision to rehabilitate the bridge, you have to have engineering, which is probably going to run 75-80,000. And I'm looking at 2 million in rehabilitation.

Q. 2 million in rehabilitation.

A. A new deck.

Q. It's your recommendation, as an engineer, would be the next logical step would be an in-depth inspection of the bridge.

A. If an economic study by planners that this structure is essential to that area and essential to Allegheny County would bear that out. There have been studies done on other areas of the structure.

Q. Thank you. I have no further questions.

JUDGE NEMEC: Any other questions for Mr. Drake?

MR. FECZIKO: Yes.

CROSS-EXAMINATION

BY MR. FECZIKO:

Q. Are you aware, Mr. Drake, that the County has just put a park, or is in the process of developing a park, in the Borough of Glenfield which is serviced by this viaduct?

A. No, I'm not aware of that.

Q. And that they've authorized a grant of money to do the design work for a park in the area plus construction of the park itself.

A. Is this an industrial park?

Q. No, this is a recreation park along the river.

A. I was aware that Mr. Marmo from the Department of Development had attended these meetings as the municipal representative from that department, but I had no idea what the County had going on with one of its other arms.

Q. And you are aware that that is the only way into the area now for the residents and the businesses and the fire equipment.

A. As of right now, yes.

Q. That's all.

MR. MAZOR: Let me ask a couple questions.

FURTHER CROSS-EXAMINATION

BY MR. MAZOR:

Q. It is possible, is it not, that the type of inspection you recommend could indicate that it would be futile to rehabilitate the structure or that it couldn't be done to bring it up to legal load limit.

A. Yes.

Q. And also, would you recommend in this study, you mentioned planners and economics, that the use of the bridge in relation to the cost in what we're doing and what had to be done is also something to be considered.

A. Yes, sir.

Q. Thank you.

JUDGE NEMEC: I'm sorry, I missed your first question.

MR. MAZOR: Whether it would be possible that the in-depth inspection that the witness recommended could result in revealing that rehabilitation would be impossible. And he said, yes, it could.

JUDGE NEMEC: Any other questions?

(No Response.)

JUDGE NEMEC: Sir, given your familiarity with the area,--I assume you're familiar with not just the bridge but with the area of Glenfield?

THE WITNESS: (Drake) I used to live in Leetsdale. I worked in Pittsburgh when I lived in Leetsdale and I went through Glenfield. I've seen Glenfield change over the years.

JUDGE NEMEC: Well, in the course of rehabilitation then, or reconstruction, would it be feasible to have a temporary atgrade crossing to give ingress and egress?

THE WITNESS: All you've got to do is make grades on Route 65 and on the other side of the tracks. In answer to Mr. Mazor's question and modifying yours, if it's impossible, it's also possible. So, certainly, an atgrade crossing is possible if you make the modification to touch grade and not interfere with the railroad.

JUDGE NEMEC: Your response to me seems to indicate that it would be a relatively expensive proposition even to establish a temporary atgrade crossing.

THE WITNESS: Certainly. You've got a wall supporting the railroad. I don't recall what street. That is on the other side of the tracks, on the river side of the tracks. But just where you would establish it, again, you've got to make a study of where you're going to establish your grade crossing and then meet with Route 65. But, depending on how

much you want to spend, it certainly is possible to do that. And you'd probably have to have flag personnel out there at all times.

JUDGE NEMEC: Any other questions for Mr. Drake?

(No Response.)

JUDGE NEMEC: Thank you very much, sir.

MR. ZAHN: PennDOT calls Mr. Ekiert.

(Witness sworn.)

(Questions and Procedure, dated June, 1982, at C-80092154, with respect to Consolidated Rail Corporation, are incorporated herein as follows:)

14. Pennsylvania Department of Transportation submit comments it has to offer concerning Conrail's Inspection Report - its findings, conclusions and recommendations.

15. Department submit testimony it can offer relative to sufficiency rating for the subject structure and state whether the structure will qualify for funding for rehabilitation or replacement under the Federal Critical Bridge or any other Federal funding program.

16. Department state whether, in its opinion, the subject structure should be rehabilitated or replaced and, if replaced should the entire structure be replaced.

17. Department state whether it will agree to perform, at its initial cost, the work of additional studies for replacement or preparation or rehabilitation plans, whichever

the Commission determines is required and, if so, what period of time will be requiredto perform such work.

JOHN M. EKIERT, called by the Department of Transportation, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. ZAHN:

Q. State your full name and spell your last.

A. John M. Ekiert. E-K-I-E-R-T.

Q. By whom are you employed and in what capacity?

A. I am employed with the Pennsylvania Department of Transportation in Greentree. I am the bridge engineer in charge of bridge inspections for the Department.

Q. And you're a Professional Licensed Engineer?

A. Yes, I am.

Q. Are you authorized to testify on behalf of the Department?

A. Yes, I am.

Q. Are you familiar with the structure in the case here?

A. Yes, I am.

Q. Question 14 asks the Department to submit comments as to Conrail's Inspection Report, its findings, conclusions and recommendations.

A. The Department does not disagree with the conclusions and recommendations that are in Conrail's report.

Q. Question 15 asks the Department to submit testimony regarding the sufficiency rating and whether the structure would qualify for Federal Critical Bridge funds either for rehabilitation or replacement.

A. We have reviewed the form that Conrail has submitted. In my judgment, I believe the numbers should be a little bit lower. I more concur with Mr. Drake's rating. I worked up a number also, somewhat tampering with the rating that was submitted by Conrail, inserting a few numbers here and there that weren't, that I felt may be lowered or highered, it's a judgmental thing, and I came up with a rating of a 27. Making certain specific references to certain items that need to be included. I have no idea what your numbers were.

Q. That's Mr. Drake's.

A. Yes, Mr. Drake's. But, my numbers referred to a 27 rating. That type of rating, or ratings in that range, would definitely qualify the bridge for Federal Critical Bridge funding; however, as Mr. Drake had mentioned, there are no funds available until at least 1986 for replacement or rehabilitation of the bridge.

Q. Question 16 asks the Department's opinion whether the bridge should be rehabilitated or replace and, if replaced, should the entire structure be replaced.

A. Without a further really in-depthy study showing

feasibility of what could be put in and where and costs associated with these various possible alignments, it's very difficult to say specifically what could be or couldn't be done. But, based on what I see out there and in the pictures that are showing in the report, definitely you would need a new deck and those two main girders that support the deck from pier to pier and do need replaced or major work done to them. You're almost talking about removing everything above the piers and abutments, which, you're almost replacing the bridge as it is other than the foundations. Without a further study, I have no disagreement that the bridge should be replaced. Of course, you would have to have a dollar value whether or not it is actually feasible to replace versus rehabilitate. The cost for rehabilitation as stated by Conrail I felt was low. I sort of think it would be in the $2 Million range for rehabilitation. And definitely, the engineering studies would be a lot more than the 12,000 or so that was stated. I think you're talking somewhere close to 100,000 for the engineering costs and the studies involved with where you would put the bridge. Same place, different place, use the same foundations, that type of thing. So, all of these things still need to be looked into and decided before a final decision could be made in my estimation.

Q. Will the Department agree to perform, at its initial

cost, the work of additional studies for replacement or rehabilitation, and what period of time would be required to perform such work?

A. No, the Department does not agree to perform any of the work required.

Q. If it were required to do it, how long would it take to perform such additional studies for replacement of the structure?

A. Based on the procedures that would have to be followed through the Department, you would have to advertise for a consultant to do the study. This takes approximately one month. You would get feelers back from consulting firms. Then you would rate these various consultants to come up with a possible candidate as a consulting firm to do your work. Before the agreement could be executed and all the paperwork necessary to get a consultant on board to do the work, it takes somewhere between four and six months just for that alone. So, we're talking, to get an engineering firm, six to eight months I would say. Now, your study, depending on what you would want to be looking for, that all would have to be specified in the scope of work. You could be talking six months to nine months for a study, possibly, even a year. And then you come down to the final produce of what you want to do. And it may take you, depending on what type, if it's an atgrade or another viaduct or what have you, anywhere

from, I don't know, it could take up to six months to do a design. So, you're talking, I don't know, if I added those all up in my head, a couple years before you could actually physically get into construction with a replacement.

Q. That's before you could actually come up with plans, not get into construction.

A. Before you could move to construction, correct. And then you've got to have your funding in line with that also, which, you definitely have a problem with funds.

MR. ZAHN: The witness is available for cross-examination.

JUDGE NEMEC: Mr. Fecziko?

MR. FECZIKO: I have no questions.

JUDGE NEMEC: Mr. Opsitnick?

MR. OPSITNICK: I have no questions.

MR. MAZOR: No questions.

CROSS-EXAMINATION

BY MR. GROSSMAN:

Q. Mr. Drake suggested also an economic study for the desirability of replacement, whether it's necessary, or other perhaps more creative alternatives. Do you think that should also be an element of the study?

A. Definitely that would be an element of the study. I would think that would have to be done in the preliminary phase. Because you may not want to put that structure back

in the same location. It may be more feasible to relocate it or possibly something could be done atgrade, I don't know. These questions would all have to be addressed in the study.

MR. GROSSMAN: No further questions, Your Honor.

JUDGE NEMEC: We have Mr. Drake and we have Mr. Ekiert here. And we asked Mr. Mazor ballpark figures on replacement of the structure and I assume that question dealt with replacement of the structure in the present location. Do you have any idea what a ballpark figure would be for replacement assuming the new structure would be at the same location?

THE WITNESS: (Ekiert) Exactly how long the bridge is, I'm not certain.

MR. FLEISHER: (P.U.C.) Just a little less than 700 feet.

THE WITNESS: (Ekiert) 700 feet.

MR. FLEISHER: A little less than 700.

THE WITNESS: (Ekiert) This bridge is possibly not the same specific structure, but we do have a bridge we are replacing in Beaver County, the Barkley Hill bridge. It's a P.U.C. recommended bridge. I believe the construction costs--It went over a railroad. Something similar as far as a viaduct-type structure. I believe, I don't know for sure, I think it was a little over 3-1/2 million for the replacement cost. I believe that was it. I'm not positive. So, your rehabilitation costs, at the stage of deterioration

of the bridge, you almost get to the point where you don't want to start throwing good money after bad. But that would have to still be determined during the study. So, your rehab costs are getting to a point where you almost have to, you're throwing it into the wind and it's going to fly back in your face. It's questionable in my estimation.

JUDGE NEMEC: Mr. Drake, do you have anything to add to that?

MR. DRAKE: (County) Well, when I said the 2 million, I'm addressing the rehabilitation to what it would consider a legal load limit. Although, you'd have to certainly address, if it were not possible to reach that legal load limit, to rehabilitate to some lesser capacity, viable capacity. That would still give Glenfield the bridge to use. Replacement, I had indicated that some other alignment than that structure, I was looking at $5 Million, which would include the demolition of the existing structure and additional property to be acquired by lengthening your curve. It's a very short radius curve. I-79 interchange down there has a series of curvesgirder ramps. Possibly, it could be done with some technology or methodology such as that. But I had indicated in 1980 that I thought it would take about $5 Million to demolish the existing property and to construct a new bridge.

THE WITNESS: (Ekiert) The 3-1/2 million for the

Barkley Hill is in a different type of area where you would have a lot more right-of-way costs. In other words, the 3-1/2 million, you can't take that bridge and put it back and say it's 3-1/2 million for theviaduct.

JUDGE NEMEC: I appreciate that.

THE WITNESS: (Ekiert) So, I don't disagree with what John is saying as far as the 5 million goes.

JUDGE NEMEC: Any other questions?

(No Response.)

JUDGE NEMEC: Does the Borough have a witness?

MR. FECZIKO: Yes, Your Honor.

(Witness sworn.)

(Questions and Procedure, dated June, 1982, at C-80092154, with respect to the Borough of Glenfield, are incorporated herein as follows;)

18. Borough of Glenfield submit comments it has to offer concerning Conrail's Inspection Report - its findings, conclusions and recommendations.

19. Borough state whether, in its opinion, the subject structure should be rehabilitated or replaced.

20. Borough state whether it will agree to perform, at its initial cost, the work of additional studies for replacement or preparation of rehabilitation plans, whichever the Commission determines is required and, if so, what period of time will be required to perform such work.

CHARLES HOUSER, called on behalf of the Borough of Glenfield, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. FECZIKO:

Q. Would you state your name, please.

A. Charles Houser.

Q. And you're appearing as President of Borough Council?

A. Yes, sir.

Q. And are you authorized to testify on the Borough's behalf in this proceeding?

A. Yes.

Q. Does the Borough have a regular engineer?

A. No. Well, we sometimes go get a department engineer.

Q. Does the Borough have money budgeted in the budget for engineering services?

MR. ZAHN: Objection.

JUDGE NEMEC: Objection's overruled.

Q. Does the Borough have money budgeted for engineering services?

A. No. We have a small budget. Our budget last year was for only $25,000 for the whole time.

Q. Does the Borough agree with Conrail's recommendations

that further studies in replacement and rehabilitation is needed for the bridge?

A. No, I think a new bridge should be put in there. From all the things that we've seen, the new bridge is needed. I have right here a book, a land study and utilization plan, for the Borough that has just been completed by Green Engineering. And everything that we try to bring up, this study shoots down because of the condition of the ramp and because of its deterioration as time goes by. Just last week, we had people working on the roads and they shoveled up more debris that had dropped. And I think when Conrail fixed part of the bridge, they just cemented one little section on the sidewalk, but the rest, down around the bend, there is such deterioriation that a woman fell and she was considering suing Conrail over the condition of the ramp. And just a few weeks ago, there was a young fellow that went down over there and got two flat tires because of this condition of the sidewalk and the ramp.

Q. How about the steps? Have they been repaired?

A. Well, I don't believe that Conrail repaired them, but different people that use them, they'll come in and they'll bolt them down. They have two holes which are on each side of the step and they put in a three sixteen bolt with probably a lock washer and a nut. And it's usually one of the residents around there that does that.

Q. Can you tell me whether the Borough can perform at its cost the work of additional studies for replacement or preparation of rehabilitation plans?

A. Glenfield Borough can't afford any of that. We're on a tight budget. Our budget is real tight. We have to pay for outside police protection. We have to pay for ambulance service and garbage collection. And that takes up our whole budget.

Q. Has the Borough tried to get federal funds to assist, or get funds, in performing some studies?

A. Yes, we have tried to get all kinds of funds. In fact, our Mayor writes for every grant and everything that comes. He's been writing and asking for all kinds of grants.

Q. Has there been any optimism in receiving funds in the nature of the monies that these men have indicated it would cost to perform these studies in the area of 50,000 to perform?

A. When you phone or anything to ask for funds anymore they tell you everything is shut off.

Q. Is the Borough in the process of working with Allegheny County in developing a county park along the river area which is serviced by the viaduct?

A. Yes, they are. We're getting very close to starting the preliminary work on it.

Q. This park would be for residents of the county as

well as the Borough residents.

A. Yes, it will be for just about anybody in the county because we're using county funds and we won't be able to keep anybody out.

Q. Were county funds used in the purpose of the park?

A. Yes.

Q. Was there a grant from the county?

A. Yes.

Q. Does the Borough feel that it's critical that the bridge be inspected on a regular basis by Conrail or by some outside party that has the capacity to do it?

A. Well, it should be inspected quite frequently because day after day there's more deterioration. And it should be replaced rather than inspected. There's been enough inspections and studies of Glenfield Borough to last for a lifetime. What we need is something done instead of more studies.

MR. FECZIKO: That's all I have. Cross-examine.

JUDGE NEMEC: Mr. Zahn?

CROSS-EXAMINATION

BY MR. ZAHN:

Q. You're aware, Mr. Houser, that before anything can be done you have to have a study to see what has to be done.

A. Yes, I'm aware of that.

Q. Are you also aware that funds are made available

each year for municipalities for inspection purposes? All you have to do is apply for them. Have you ever done that?

A. We've applied for some funds but I don't know if we applied for that or not.

Q. Has the Borough attempted to have its legislative representative or senator try to get funds to have this bridge rehabilitated? From funds available from the legislature?

MR. FECZIKO: Perhaps, I could interject. I didn't want to go into that. That was put in the last hearing as I recall. The letters from the senators, congressmen, the state representatives, the grants. That was all put into evidence. I didn't want to go back into that.

MR. ZAHN: Okay.

Q. So I take it that your testimony is that you want a new bridge, let somebody else pay for it.

A. Well, somebody else has to pay for it. We can't afford it.

MR. ZAHN: I have no further questions.

JUDGE NEMEC: Mr. Opsitnick?

CROSS-EXAMINATION

BY MR. OPSITNICK:

Q. Mr. Houser, the park you referred to is presently not in existence; is it?

A. Yes, it is. Well, we've been contacted by the developer, Mr. Mulren, and he's met with us several times

on it.

Q. So, you're working on it but it's not useable.

A. Not useable, no.

MR. OPSITNICK: I have no further questions.

JUDGE NEMEC: Mr. Mazor?

CROSS-EXAMINATION

BY MR. MAZOR:

Q. Sir, what kind of facilities are planned for that park; do you know? Are there ballfields? Picnic areas? Just what type of park will it be?

A. Well, at the present time, there's no ballfield. But they figure what they call a half basketball court. There'll be different things for the smaller children and there'll be picnic areas. There'll be shrubbery and trees planted. And there'll be walks.

Q. Will there be any activities accessible to the river in connection with the park?

A. There will be fishing. And right now, we have a boat dock there. But it's not at that park, it's up the street further. And I don't think we would want to run competition to the private industry. But the waterway might want to put some docks in down there, but we haven't discussed it.

Q. At the last hearing, the Mayor testified that the Borough had 244 residents. Has there been any change in that;

do you know?

A. Well, we have a few that have deceased, and we have new people moved in. But I don't know if the ratio is any different.

Q. In other words, it's been fairly stable more or less.

A. Yes, it has.

Q. Thank you, sir.

JUDGE NEMEC: Mr. Grossman?

CROSS-EXAMINATION

BY MR. GROSSMAN:

Q. You stated that the Mayor previously stated that there were 244 residents? Do you know how many homes are in the Borough?

A. No, I don't.

Q. Paragraph 4 of Judge Nemec's Order, which was approved by the Commission, ordered Conrail to perform certain work including work on the sidewalks and the stairs leading to the sidewalks. And it's your testimony that this work has not been performed?

A. Some of it has.

Q. By Conrail?

A. I imagine it was a private contractor that was doing it. I imagine that Conrail paid for it. But it wasn't completed. They only went to the steps where it goes down.

But the longest part is from the steps down to Phillips Lane which the people down Dawson Avenue use. And that is the section where a woman fell just a short time ago.

Q. The citizens of the community, are they mostly elderly, or would you classify them as middle age, or young?

A. Well, it's getting up to--It depends what you call elderly or middle age.

Q. All right. I'm trying to find out how many households may be in the community. Is it mostly older couples or is it couples with children?

A. It's mostly older people, but we'd like to see some young people come in.

Q. Is there a school in Glenfield?

A. No, sir. The last school was taken out by PennDOT.

Q. It was condemned for use in I-79. Do you know how many school children there are in Glenfield Borough?

A. No, I don't.

MR. GROSSMAN: I have no further questions.

JUDGE NEMEC: Do you know how much money is anticipated to be spent on the park? The development of the park?

THE WITNESS: Well, we got money from the county and we put money into it. We hope to get 10,000 from the state. But we have to spend the 10,000 and submit the bills to the state and then they will reimburse us for that 10,000.

JUDGE NEMEC: How much have you received from the county?

THE WITNESS: I think 20,000 so far.

JUDGE NEMEC: Does the Borough maintain the road surface on the bridge at all?

THE WITNESS: Well, Conrail certainly doesn't and the county doesn't. We have to do anything that has to be done. We just had guys up there cleaning it.

JUDGE NEMEC: What I meant by the question, in the wintertime, who takes the snow off?

THE WITNESS: We do.

JUDGE NEMEC: Do you have your own equipment to do that?

THE WITNESS: No, we have to rent it.

JUDGE NEMEC: Nobody but the Borough does that. Maintains the road surface in the wintertime.

THE WITNESS: No. We have to hire someone to come in with a snowplow and then we spread cinders behind the snowplow.

JUDGE NEMEC: Any other questions?

(No Response.)

JUDGE NEMEC: Thank you very much, sir. You're excused.

MR. FECZIKO: The Borough has no further evidence to offer.

JUDGE NEMEC: Thank you. Anybody else who's present desire to submit any additional matters?

(No Response.)

MR. GROSSMAN: The Commission has a witness.

JUDGE NEMEC: Okay, we'll take the Commission's witness.

MR. GROSSMAN: The Commission Trial Staff calls Donald Fleisher.

(Witness sworn.)

DONALD FLEISHER, called by Commission Trial Staff, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. GROSSMAN:

Q. Mr. Fleisher, state your full name.

A. Donald R. Fleisher. F-L-E-I-S-H-E-R.

Q. And by whom are you employed?

A. Pennsylvania Public Utility Commission, Bureau of Rail Transportation.

Q. In what capacity?

A. As a Civil Engineer.

Q. Are you a Registered Professional Engineer?

A. Yes, I am.

Q. Are you authorized to testify on behalf of the Commission Trial Staff in this matter?

A. Yes, I am.

Q. Mr. Fleisher, from today's evidence, what would you recommend be the first step taken in this procedure?

A. Well, the very first step is--

Q. --Let's go back a step. You've heard two sufficiency ratings. 14.38 as arrived by Allegheny County, and 27 as arrived by the Pennsylvania Department of Transportation. Do you think both, or either one, are fair based on a cursory analysis of the figures submitted by Conrail, given the fact that you did not have the details of the figures.

A. They appear to be reasonable and in the area which I guess we all expected they probably would fall.

Q. Would you say that the difference between them is significant?

A. No.

Q. Given that sufficiency rating, do you think the structure would qualify for the Critical Bridge funding if available?

A. I have to rely on the other gentlemen who have testified. I think, as I understand this, any sufficiency rating under a 50 qualifies for replacement funds.

Q. You've heard testimony as to rehabilitation versus rebuilding of the bridge. Absent the specific study, do you think rehabilitation of the structure is desirable?

A. Well, the problem with attempting to rehabilitate this bridge to any great extent, such as replacing the deck, is it results in a closing down of the structure, and as a result the Borough of Glenfield has no means of ingress

and egress. This creates a tremendous problem right off the bat when you start talking about rehabilitation of the structure.

Q. Would not reconstruction of the structure also result in closing off this access?

A. No, you would not have to reconstruct in the exact same location. You could build along side of it, or perhaps, another location. In fact, this would be the desirable thing to do, to go in and put a new bridge in and try to locate it so that the old one is kept in service until such time as the new one is available.

Q. Mr. Fleisher, do you believe that the next step should be an in-depth study of alternatives for replacement of the bridge?

A. Well, the first thing I think we should do--I'm going to hedge on answering the question here. I think the existing structure has got to be kept inspected and since it's been more than a period of six months since an inspection has been performed--

Q. --Should the six-month inspections be rigidly adhered to?

A. Yes, they should.

Q. As called for in the Commission's Order adopted May 29, 1981.

A. Inspections should be performed not greater than

six-month intervals. And as soon as conditions are found by these inspections, perhaps, the frequency will have to be increased. In answer to your question about the first thing that should be done is a study? Most certainly, before you can proceed to another step, even if you decide without doing any further study that reconstruction of the bridge is the thing to do, you would have to make studies as to where the structure is going to be built, the location for a new structure. Perhaps, there should be studies performed prior to this, such as Mr. Drake has discussed. In-depth inspection of the existing structure. Even prior to this, perhaps there should be some type of study performed, such as, what is the proper thing to do.

Q. Mr. Fleisher, would you recommend, as a concomitance to engineering studies, that an economic study should be performed as to the economic consequences of construction and what the least expensive alternative might be?

A. Yes, I think this type of study would probably be warranted in this case because we're talking about spending for construction of the new bridge--

Q. --What is your estimation for construction of a new bridge? A ballpark.

A. I would have to agree that the Department's and the County's witnesses are in the right ballpark.

Q. Which would mean between three--

A. Three and five.

Q. --and five million dollars. You heard two different statements. Mr. Parks of Conrail testified that he thought a new deck at the other end of the bridge could be put on for $600,000, but PennDOT's witness, Mr. Ekiert, said it's going to be closer to $2 Million. Which of these do you think is a fair estimate of the true cost of the rehabilitation of the bridge?

A. Well, rehabilitation including replacement of the existing deck with a new deck on it, I feel would be much closer to 2 million than 600,000. I'm not sure that Mr. Parks was indicating replacement of the deck when he said 600,000.

Q. This, of course, would necessitate closure of the bridge for the period of rehabilitation with the concomitant problem of alternative access.

A. I think it would be impossible to do this type of reconstruction including a new deck and keep it open.

Q. What is there in the construction that makes this impossible?

A. In practically all of these spans, we only have two main carrying elements that span from pier to pier. And on this type of structure, it is impractical and impossible to do the deck construction at half width which would be the only way to keep it open.

Q. This would be in your engineering analysis that it would be impractical to do it.

A. Yes.

Q. And that would raise the problem of alternative access to the Borough.

A. Yes. The only way you could do it is to have other means of ingress and egress to this section of the Borough.

Q. Considering the figures reported by Conrail, is there any modification that could be made to the posting of the bridge that would perhaps allow multi-axle vehicles of greater than 16 tons access to the bridge and concomitantly to the Borough?

A. Based on the information that Mr. Parks has testified here to today and my own evaluation of these load carrying capacities to be allowed on the bridge, I think that the semi-trailer or truck-type combination vehicle loading of 28 tons should be permitted on this bridge.

Q. Is there now a federally authorized type of sign that would permit such a posting?

A. Yes, I think the Department of Transportation has the sign in their traffic signing regulations.

Q. Do you have an example of such a sign with you today?

A. Yes, I do.

MR. GROSSMAN: I offer this on behalf of the Commission

Trial Staff.

JUDGE NEMEC: We'll call this Exhibit A.

(Commission Trial Staff Exhibit A, one-page document, picture of sign indicating "Weight Limit, 16 T, 28 T, 28 T," next to pictured vehicles, was so produced and marked for identification.)

Q. What would this type of sign and posting accomplish, Mr. Fleisher?

A. Well, with the proper type of vehicle, it would permit vehicles carrying as much as 28 ton to cross the bridge; whereas, now, with the type of posting that is out there regarding the type of vehicle and the number of axles, the maximum load that is permitted to cross the bridge is 16 ton.

Q. Based on your engineering knowledge, would this modification in posting create any additional risk to this bridge, particularly that of a catastrophic failure?

A. No. All of the elements of this bridge, according to Conrail's Inspection and Evaluation Report, are capable of carrying loads much greater than those which this sign would permit. The HS-16 rating that they came up with for the structure is based on the slab, and the rating of the slab is based on axle loads. Plus, we get back to Mr. Parks' comments where he said that a vehicle with an axle loading of no greater than 12.8 ton could be permitted on

this bridge. So, no, I see no real concern for any catastrophic failure, or any failure for that matter, with vehicles using the bridge in accordance with this recommended posting.

MR. GROSSMAN: No further questions. Your Honor, I move the admission of Commission Exhibit A.

JUDGE NEMEC: Any objections to Commission Exhibit A?

(No Response.)

JUDGE NEMEC: Without objection, Commission Exhibit A is made part of the record. Does PennDOT have any questions?

CROSS-EXAMINATION

BY MR. ZAHN:

Q. Mr. Fleisher, this Exhibit A, is that an approved signing of the Department of Transportation?

A. Yes, it is. This was taken from the Department's--

Q. --Regulations?

A. Yes.

Q. Thank you. I have no further questions.

JUDGE NEMEC: Mr. Fecziko?

CROSS-EXAMINATION

BY MR. FECZIKO:

Q. Currently under the bridge, there are the railroad tracks and the street, the fire hall, and some houses; is that accurate?

A. As I recall, there is.

Q. Would this increase in the load limit affect or increase the likelihood of chunks of concrete falling more frequently, which was testified at the prior hearing and today, which currently exists if the load limit were increased?

A. I don't think you would find any significant change in this. These chunks are falling because of the deterioration of the structure and are loose and any passage of traffic creates some vibration. They're just falling down naturally from this problem. I don't see any particular problem.

JUDGE NEMEC: Mr. Opsitnick?

MR. OPSITNICK: I don't have any questions.

JUDGE NEMEC: Mr. Mazor?

CROSS-EXAMINATION

BY MR. MAZOR:

Q. Mr. Fleisher, are there any signs of this type now in use in the Commonwealth to your knowledge?

A. Yes, there are.

Q. Have there been any problems with vehicles that might have the weight indicated but not the configuration of the particular truck using the bridge? Just going by the numbers rather than the picture.

A. I can't answer that question.

Q. None have come to your attention yet.

A. No, none have come to our attention.

Q. Thank you.

JUDGE NEMEC: Mr. Fleisher, who would perform the economic study that you would suggest?

THE WITNESS: That's the $64,000 question.

JUDGE NEMEC: Well, what type of person or organization or whatever.

THE WITNESS: Well, it seems that the county probably is the party that's involved here that would be closest to this type of study. It certainly will require a rather large mix of different types of pepple. It couldn't be done by a small organization, that's for sure. Of course, the Borough could go out and hire someone to do this type of thing, but you have the economic problem.

JUDGE NEMEC: You're talking about a study of both an engineering nature and also an economic nature.

THE WITNESS: Yes.

JUDGE NEMEC: Has this type of study been performed under Commission Order in the past? That you're aware of.

THE WITNESS: I cznnot answer that question.

MR. ZAHN: I have not heard of any.

MR. GROSSMAN: I have one question.

REDIRECT EXAMINATION

BY MR. GROSSMAN:

Q. Mr. Fleisher, based on the ballpark figures and what evidence we have heard, is it not possible that the

cost of replacement of the bridge will exceed the entire value of all property of the community located in Glenfield?

A. I suppose this is so. I don't know what the valuation of the property is. But the amounts of money that we're talking about, we're talking about five or six million here.

Q. You're not stating as a probability, but it is a possibility that the cost will exceed the value of all property in the Borough.

A. I imagine it's a possibility, yes.

MR. GROSSMAN: No further questions.

JUDGE NEMEC: Any other questions?

(No Response.)

JUDGE NEMEC: Does anybody else have anything they want to add?

MR. FECZIKO: I would like to hear, if possible, what PennDOT's opinion is of this change in the sign, their engineer. If he would have an opinion on that also.

MR. EKIERT: (PennDOT) I would have no objection. I don't think you're really increasing the weight limit on any given member. You're just making certain trucks available to use the bridge. Just by one certain sign, you sort of eliminate a lot. That's really all he's doing here. Which is something that is starting to come around and being used more and more in various areas. It becomes somewhat confusing

depending on how many trucks you put on the sign. You could have a sign as big as this wall if you want. And as to the limit of how many you put on, that's definitely a question. But I have, you know, nothing.

JUDGE NEMEC: Okay. Anything else?

(No Response.)

JUDGE NEMEC: Mr. Mazor, can you, on behalf of Conrail, find out for us if and when the six-month inspection was made?

MR. MAZOR: I certainly will, and if it has not been made, I will see to it that it is.

JUDGE NEMEC: Can you do this within 10 working days from today?

MR. MAZOR: Yes.

JUDGE NEMEC: In addition, can you tell us what repairs have been made by Conrail and what repairs are pending or anticipated being made? If any?

MR. MAZOR: Certainly, sir.

JUDGE NEMEC: And can you do both of these by letter within 10 working days?

MR. MAZOR: I believe so, yes.

JUDGE NEMEC: Anything further?

(No Response.)

JUDGE NEMEC: Okay. If there's nothing further, we'll adjourn the hearing. Thank you all for your attendance.

(Hearing adjourned - 11:25 o'clock a.m.)

- - - - -

CERTIFICATION

I, Joan Bruce, duly qualified in and for the Commonwealth of Pennsylvania, do hereby certify that the foregoing typewritten pages contain a full, true and correct transcription of my stenotype notes, taken upon the occasion set forth in the caption hereof, before the PENNSYLVANIA PUBLIC UTILITY COMMISSION, and as reduced to typewriting under my supervision.

MOHRBACH & MARSHLA, INC.

BY _____
Official Reporter

REPORTED BY:

Joan Bruce, C.R.
Mohrbach & Marshal, Inc.
27 North Lockwillow Avenue
Harrisburg, PA 17112

Pittsburgh Office
(412) 261-2892

Bureau Exhibit III
PUC #C-80092154
8/24/82 Pittsburgh
JB

RECEIVED

SEP 14 1982

SECRETARY'S OFFICE
Public Utility Commission

Inspection Report and Evaluation

For

O.H. Bridge No. 9.22

At

Glenfield, PA.

Office of the Chief Engineer - D&C
Consolidated Rail Corporation
1200 - 15 N. 32nd Street
Philadelphia, PA 19104

January 19, 1982

DOCKETED
SEP 14 1982

TABLE OF CONTENTS

Glenfield, PA

O.H. Bridge No. 9.22
Glenfield Viaduct

Detailed Inspection

On November 16, 17 and 18, 1981 a detailed inspection of this structure was made by R. A. Check, Sr. Structural Engineer, A. Bross, Engineer Bridges and Buildings, W. Parker, Bridge Inspector, and J. Howser.

The structure as built in 1926 was a 17-span viaduct. In 1953 the spans north of the span over the tracks were rebuilt to accommodate changes to the Ohio River Blvd. (LR 652, TR 65) by the Pa. Dept. of Highways. The existing bridge today consists of two (2) spans north of the tracks having a total length of about 69', one (1) span over the four (4) railroad tracks having two (2) steel girders, 16'-6" on centers, coated with gunite, about 97' in length and the south approach consisting of thirteen (13) spans having reinforced concrete T-girders, 16'-6" on centers, totaling about 512' in length. The entire length of the viaduct, abutment to abutment, is about 678' in length. The bridge supports a 20' roadway between curbs with a 5' sidewalk on the west side of the bridge. The bridge deck consists of a reinforced concrete slab varying in thickness from 12" to 15" with a roadway surface consisting of brick paving.

Reinforced concrete piers and abutments support the spans.

The inspection revealed the following conditions:

The concrete deterioration is divided into two types:

Type A - where reinforcing bars are partially exposed - generally 1" to 2" depth of concrete destroyed (spalling).

Type B - where reinforcing bars are fully exposed - generally a minimum of 4" depth of concrete destroyed (spalling).

Note: Numbers in brackets [ ] represent photograph numbers showing typical conditions.

Approaches

Both the north and south roadway approaches are in good condition.

Bridge Surface

The roadway surface consists of brick paving.[1] The roadway surface is in fair condition except for an area at Pier 2 where there is a noticeable dip in the roadway surface. The roadway curbs are in very poor condition[2] and in many places they are non-existent. Since the roadway surface consists of brick and there is no sealant between them or at the curbs water along with deicing agents is allowed to drain down to the concrete deck and other members below.

Sidewalk

New on span 14, spalling and pitted elsewhere.[3]

Piers

Pier 1 - Both columns have Type A deterioration. The column caps have Type A deterioration, are soft and hollow in spots. The pier cross-strut has Type B deterioration across the top of the member. The reinforcing bars in this area are loose and broken, with the concrete soft, hollow and disintegrating.

Pier 2 - Both columns have Type A deterioration. The column caps have Type A deterioration, are soft and hollow in spots.[4] The pier cross-strut has Type A deterioration across the top of the member.

Pier 3, and 4 - East column Type A deterioration in area of column cap. West column Type A deterioration from mid height to column cap. The column caps are soft and hollow in many spots with Type A deterioration. The pier cross-strut has Type B deterioration across the top of the member.[5] The top one-third of the strut is soft and hollow.

Pier 5 - Both columns have Type A deterioration for the top one half of their height. The column caps have Type A deterioration and in spots are soft and disintegrating. The pier cross-strut has Type B deterioration across the top of the member. The top one-quarter of the strut is soft and hollow.

Pier 6 - Both columns have Type A deterioration for the top one-fourth of their height. The column caps are soft and disintegrating with Type B deterioration. The pier cross-strut has Type A deterioration at the bottom of the strut.

Pier 7 - Both columns have Type B deterioration for the top one-half of their height.[6] No measurable reduction to the exposed reinforcing bars. The column caps are soft and disintegrating with Type B deterioration. The pier cross-strut has Type B deterioration at the west end along the top and bottom of the strut. The top reinforcing bars are exposed and broken in two. There is a crack through the strut at the west end running diagonally from mid depth, at the west end, to the bottom, at mid span.[7] The remainder of the strut is soft and disintegrating.

Pier 8 - Same as Pier 7 except for pier cross-strut where the crack is located at the east end.

Pier 9 - West column is soft, hollow, disintegrating with Type B deterioration for the top three-quarters of its height. The west column cap is soft and disintegrating with Type B deterioration. The east column cap has Type A deterioration in spots. The pier cross-strut has Type A deterioration at the west end on top. The remainder of the strut is soft and hollow.

Pier 10 - East column has Type B deterioration at top with 1" reinforcing bars reduced to 3/4" and 7/8" diameter. The west column has Type B deterioration for the top one-half of its height.[8] The concrete is soft and disintegrating with the reinforcing bars reduced to 3/4" diameter. The east side column cap has Type B deterioration with one half the bearing area disintegrated and the rest soft and hollow. The west side column cap is soft, hollow and disintegrating with Type B deterioration. The reinforcing tie bars in the cap are exposed with one half of them broken in two. The pier cross-strut has a diagonal crack running from the west column to mid span from the top to the bottom of the strut. The strut is soft and hollow with Type A deterioration.

Pier 11 - Both columns have Type B deterioration.[9] The deterioration is mainly on the outside face of the columns for the top one-half of their height. The concrete in this area is soft and hollow. The column caps are soft, hollow and disintegrating with Type B deterioration.[10] The pier cross-strut is soft along the top half of the member with Type A deterioration.

Pier 12 - Same as Pier 11.

Pier 13 - Columns, column caps and pier cross-strut are in good condition.

Pier 14 - Same as Pier 13.

Girders, Girder Cross-Struts and Deck Slab

Span 1 - Both girders showing signs of wear and age with hairline flexure cracks throughout the span. The deck slab showed signs of water seepage from above. The construction joint between span 1 and 2 is not sealed allowing water to drain from above on the members below. The girder cross-struts have Type B deterioration at the bottom of the strut. The strut also has a crack located 5' from the east girder running vertically from the top to the bottom of the strut. The reinforcing bars in the bottom of the strut are loose with many cut in two.

Span 2 - Both girders same as span 1. The deck slab has a few areas with Type A deterioration. The slab also showed signs of water seepage from above. The expansion joint between span 2 and 3 is not sealed allowing water to drain from above on the members below. The girder cross-struts have Type B deterioration along the bottom.[11]

Span 3, 4, 5, 6 and 7 - Same as above.

Span 8, 9, 10 and 13 - Both girders showing signs of wear and age with hairline flexure cracks throughout the span. Both girders in the area of the bearings are soft and showing signs of crushing. Both girders have spots throughout the span where they are hollow sounding. The deck slab is soft and hollow in many spots with water seepage from above very evident. The girder cross-struts are soft and disintegrating with Type B deterioration along the bottom of the struts.

Span 11 - Both girders showing signs of wear and age with hairline flexure cracks throughout the span.[12] Both girders in the area of the bearings are soft and showing signs of crushing. The east girder at Pier 10 is bearing on one-half of its original bearing area. The girder stirrups are exposed (no reduction) in four (4) locations between both the girders with several others beginning to become exposed. The girders were hollow sounding in spots throughout the span. The deck slab is soft and hollow throughout the span with water seepage very evident. A hole (15" x 18" x 6" deep) was located 18" from the west girder at mid span, exposing the reinforcing bars.[13] The girder cross-struts have Type B deterioration across the bottom of the struts.

Span 12 - Both girders showing signs of wear and age with hairline flexure cracks throughout the span. Both girders in the area of the bearing are soft and showing signs of crushing. The west girder for a length of 6' from the north end has Type B deterioration along the bottom. The adjacent 6' has Type A deterioration along the bottom. The east girder has two (2) small areas along its bottom with Type A deterioration. The deck slab is soft and hollow throughout the span with some Type A deterioration. Water seepage through the slab was evident. The girder cross-struts have Type B deterioration along the bottom.

Span 14 - Girders, cross and lateral bracing (all gunite coated) are in good condition.[14] In the areas where the steel members were exposed, no appreciable reduction was found. The deck slab had areas with Type A deterioration, especially at the construction and expansion joints in the slab. Water seepage evident particularly at these joints.

South Abutment

The abutment and bridge seat are in good condition. The outside support bracket on the west side has a diagonal crack in it, running from the outside towards the girder from top to bottom. This west portion of the abutment (outside the bearing area of the west girder) is not seated on the ground.

Miscellaneous

Most sidewalk support brackets located at every pier have Type B deterioration along the sloping face of the member.[15] At every joint (both construction and expansion) in the deck slab there is a separation allowing water to drain to the members below. The walkway stairs are in good condition.

Conclusions

The above described deterioration of the sidewalk, deck slab, girders, cross-struts, pier columns and caps is for the most part caused by water (along with deicing agents) draining on them. This deterioration was accelerated when water on the roadway surface was allowed to drain through the mortar joints in the brick paving and be caught in the layer of sand below. This water eventually made its way to the various structural members below causing their deterioration. Along with the above described causes are the age of

the bridge, wear and lack of maintenance. The overall condition of the bridge is poor to fair.

Recommendations

Based on our computations the inventory rating of the bridge is H-16 and since the bridge has been carrying normal traffic (posted vehicle load limit - 16 ton at 10 M.P.H. max. speed) for an appreciable length of time there is no need to restrict the posted loading. However, the bridge should be inspected at frequent intervals for any signs of distress which may develop. With the bridge being nearly 60 years old and to repair the deteriorated members described above would be expensive, it is recommended that studies be done (by others) for the replacement of this structure.

Dept. of Public Works-Allegheny Co.
Specifications for Bridge Superstructure
of Oct. 1, 1924.

Loading-

Slab - 18 ton trucks side by side
Girders - Train of 18 ton trucks
in both directions of traffic.
Axles spaced 14'-0" c/c and 12'-0" c/c
Wheels " 6'-3" c/c " 2'-9" c/c
26,000# on rear axle.

Note-

All concrete to be mixed according to the fineness-modulus water ratio method to give the following compressive strengths - Footers 2500#/□"
All other concrete 2500#/□"

All reinforcing steel to be square twisted or approved deformed bars of sectional areas shown.

Brick paving to conform to County of Allegheny, Dept. of Public Works - Bureau of Roads Specifications dated July-15-1925

Each bent to be poured in a continuous operation from the top of the footers to the top of the caps.

Each concrete span to be poured in a continuous operation from the bottom of the girders to the top of the edge stiffening ribs under the parapets.

Use $\frac{3}{4}$" Max. size aggregate in girders and floor slabs
Use $\frac{1}{2}$" " " " " parapets.

LEGEND

○ INDICATES PIER NO'S.
△ INDICATES SPAN NO'S.

Elevations of Top of Roadway at Gutters

Grades	Point		Point		Grades
	A	755.12	B	755.59	4.6%
6.37%	C	752.64	D	753.63	4.6%
6.37%	E	750.47	F	751.66	5.17%
6.37%	G	748.27	H	749.46	3.76%
6.40%	I	746.08	J	746.88	6.80%
6.42%	K	743.43	L	743.69	7.41%
6.50%	M	740.043	N	740.54	

LOCATION PLAN
Correct as built
H. R. Hinkley
Engineer in Charge

Approved June 21st 1926
J. J. Leonard
Engineer of Bridges and Buildings

REVISIONS

This sheet takes the place of Sheet-1
7-13-26
Change of Grade
6-20-26
Expansion Joint of Bent 7-8
11-19-26
Retaining wall added & N End of Viaduct Extended.
Revised as built
Nov. 1927

PENNSYLVANIA RAILROAD
CENTRAL REGION EASTERN DIVN
DIXMONT-GLENFIELD, PA.
GRADE CROSSING ELIMINATION
GLENFIELD VIADUCT
Scale 1"=20' Unless Noted June, 15, 1926
Office of Asst. Chief Engr.
Pittsburgh, Pa.
Nº 21453 Sheet 1-A of 11

BY ..... DATE ..... SUBJECT ..... SHEET NO. .....

CHKD. BY LJS DATE 1/13/92 SPRINGFIELD, MA JOB NO. W.O. 46582

RATING

STEEL GIRDERS

$d = 118.25$ (EAST GIRDER B)

	G1		AREA	Y	I_o
1	T/CON. PL	20 × 5/8	12.5	58.8125	0.407
2	T/CON PL	20 × 5/8	12.5	58.1875	0.407
3	T/CON PL	20 × 5/8	12.5	57.5625	0.407
4	T/FLG L's	2- 8 × 6 × 3/4	19.9	55.69	61.4
5	T/2L's	3½ × 2½ × ½	5.5	36.925	6.48
6	WEB PL	114 × ½	57.0	0.00	61731
7	B/FLG L's	2- 8 × 6 × ¾	19.9	- 55.69	61.4
8	B/COV PL	20 × 5/8	12.5	- 57.5625	0.407
9	B/COV PL	20 × 5/8	12.5	- 58.1875	0.407
10	B/COV PL	20 × 5/8	12.5	- 58.8125	0.407
11	RIVET HOLE	15/16 ϕ × ½	-0.469	-4.875	-0.034
12	"	"	-0.469	-9.750	-0.034
13	"	"	-0.469	-14.25	-0.034
14	"	"	-0.469	-18.75	-0.034
15	"	"	-0.469	-23.25	-0.034
16	"	"	-0.469	-26.75	-0.034
17	"	"	-0.469	-30.25	-0.034
18	"	"	-0.469	-34.25	-0.034
19	"	"	-0.469	-38.25	-0.034
20	"	"	-0.469	-42.25	-0.034
21	"	"	-0.469	-46.25	-0.034
22	"	15/16 ϕ × ½	-0.469	-99.50	-0.034
23	"	15/16 ϕ × 2	-1.875	-54.875	-0.137
24	"	2 × [15/16 ϕ × 2 5/8]	-4.922	-57.8125	-2.826

AREA (TOTAL) = 164.88 IN²

$\bar{y}$ C.G. = 4.54"

I = 415684.97 IN⁴

S_T (FT-IN²) = 634.66

S_B (FT-IN²) = 544.07

$$WT/FT = \frac{164.88}{144}(490) = 560\#/'$$

BY ..... DATE ..... SUBJECT ..... SHEET NO. .....

CHKD. BY MS DATE ..... GLENFIELD, PA. JOB NO. .....

RATING

STEEL GIRDERS

(WEST GIRDER-A)

$d = 119.00$

	G2	AREA	Y	I_o
1	T/CON PL 20 × 3/4	15.0	59.125	0.703
2	T/CON PL 20 × 3/4	15.0	58.375	0.703
3	T/CON PL 20 × 3/4	15.0	57.625	0.703
4	T/FLG L's 2 - 8×6×3/4	19.9	55.69	61.4
5	T/2 L's 3½×2½×½	5.5	36.925	6.48
6	WEB PL 114×½	57.0	0.00	61731.
7	B/FLG L's 2 - 8×6×3/4	19.9	- 55.69	61.4
8	B/CON PL 20 × 3/4	15.0	- 57.625	0.703
9	B/CON PL 20 × 3/4	15.0	- 58.375	0.703
10	B/CON PL 20 × 3/4	15.0	- 59.125	0.703
11	RIVET HOLE 15/16ϕ × ½	- 0.469	- 4.875	- 0.034
12	" "	- 0.469	- 9.75	- 0.039
13	" "	- 0.469	- 14.25	- 0.034
14	" "	- 0.469	- 18.75	- 0.034
15	" "	- 0.469	- 23.25	- 0.039
16	" "	- 0.469	- 26.75	- 0.034
17	" "	- 0.469	- 30.25	- 0.034
18	" "	- 0.469	- 34.25	- 0.034
19	" "	- 0.469	- 38.25	- 0.034
20	" "	- 0.469	- 42.25	- 0.034
21	" "	- 0.469	- 46.25	- 0.034
22	" "	- 0.469	- 49.50	- 0.034
23	" 15/16ϕ × 2	- 1.875	- 54.875	- 0.137
24	" 2 [15/16 × 3]	- 5.625	- 58.00	- 1.219

AREA (TOTAL) = 179.17 □"

$\bar{y}$ C.G = 4.41"

I = 465894.82 IN⁴

S_T (F-IN²) = 704.80

S_B (F-IN²) = 607.45

$WT/FT = \frac{179.17}{144}(490) = 610\ \#/$

BY ..... DATE ..... SUBJECT ..... JOB NO. .....

CHKD. BY ..... DATE .....

DEAD LOAD REACTIONS ON GIRDERS FROM DECKING

MOMENTS ARE TAKEN ABOUT ℄ BETWEEN GIRDERS

ITEM	WT	ARM	MOM
2 RAILINGS - $2 \times 3.56 \times 8/12 \times 150$	712#	+1.00'	+712 FT-#
ROADWAY SLAB FROM TOP TO BOT of SLAB - $20 \times 1.374 \times 150$	4122#	-1.25'	-5153
BASE of RAILING (RIGHT) $1.83 \times 2.10 \times 150$	576	-12.17'	-7015
BASE of RAILING (LEFT) $1.52 \times 2.10 \times 150$	473	+14.33'	+6771
SIDEWALK SLAB $4/12 \times 3.83 \times 150$	192	+11.66'	+2233
SLAB UNDER SIDEWALK $12/12 \times 3.83 \times 150$	575	+11.66'	+6700
CURB (LEFT) TO BOT of SLAB $2.06 \times 1 \times 150$	309	+9.25'	+2858
	6959#	+1.02'	+7106 FT-#

∴ LOAD ON GIRDERS

$= 6959/2 = 3480^{\#}$ ↓ BELOW

GIRDERS 16.5' ON CTRS.

$7106/16.5 = 430^{\#}$

∴ GIRDER (WEST) $= 3480 + 430 = 3910^{\#}/l$

GIRDER (EAST) $= 3480 - 430 = 3050^{\#}/l$

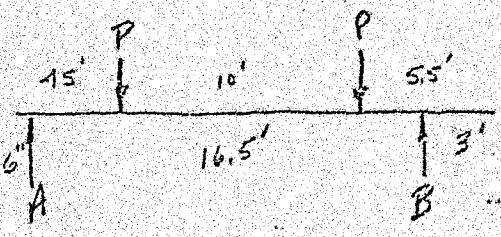
CONCRETE GIRDER DEAD LOADS

GIRDER A (WEST) $= 2.5' \times 1.6' \times 150 = 1725^{\#}/l$

GIRDER B (EAST) $= 2.75' \times 5.6' \times 150 = 2310^{\#}/l$

LIVE LOAD DISTRIBUTION ON GIRDER

* LOADS POSITIONED FOR MAX ON GIRDER A (WEST) *



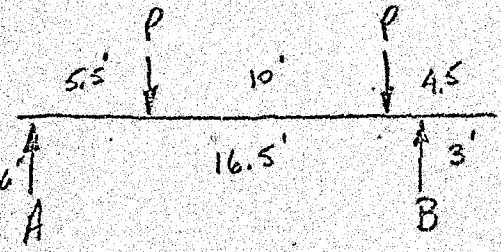
$\Sigma M_A = 0$

$-4.0P + 14.0P = 16.5B$

$\frac{18}{16.5} P = B = 1.09P$

$\therefore A = 0.91P$ MAX. ←

* LOADS POSITIONED FOR MAX ON GIRDER B (EAST) *



$\Sigma M_A = 0$

$5.0P + 15.0P = 16.5B$

$\frac{20}{16.5} P = B = 1.21P$ MAX. ←

$\therefore A = 0.79P$

MOMENTS & SHEARS

DEAD LOAD ON GIRDERS (CONCRETE)

GIRDER A (WEST)

3910 #/'
1725 #/'
5635 #/' = w_{DL}

GIRDER B (EAST)

3050 #/'
2310 #/'
5360 #/' = w_{DL}

SPAN LENGTH = 45'-0"

GIRDER A (WEST)

$$M_{DL} = \frac{5.635(45)^2}{8} = 1427 \text{ FT-K}$$

$$V_{DL} = 5.635(45)/2 = 127^K$$

GIRDER B (EAST)

$$M_{DL} = 5.360(45)^2/8 = 1357 \text{ FT-K}$$

$$V_{DL} = 5.360(45)/2 = 121^K$$

IMPACT

$$I.F. = \frac{50}{L+125} = \frac{50}{45+125} = 29.4\%$$

LIVE LOAD ON GIRDERS (CONCRETE)

GIRDER A (WEST) GIRDER B (EAST)

MOMENTS & SHEAR FROM AASHTO APP. A FOR H15 LOADING

GIRDER A (WEST)

$$M_{LL} = 296.8 \times 1.294 \times 0.91 = 349.5 \text{ FT-K}$$

$$V_{LL} = 30.3 \times 1.294 \times 0.91 = 35.7^K$$

GIRDER B (EAST)

$$M_{LL} = 296.8 \times 1.294 \times 1.21 = 464.7 \text{ FT-K}$$

$$V_{LL} = 30.3 \times 1.294 \times 1.21 = 47.4^K$$

GIRDER'S (CONCRETE) CAPACITIES

MOMENT

$n = 15$
$f_c = 1300$ psi
$f_s = 18000$ psi

EFFECTIVE FLANGE WIDTH
WEST GIRDER = 11.25'
EAST GIRDER = 5.625' + 4.833' = 10.46'

STEEL AREAS
WEST GIRDER = $18 \cdot (1.125)^2 = 22.7813\square''$ $d = 62.25''$
EAST GIRDER = $20 \cdot (1.125)^2 = 25.3125\square''$ $d = 62.25''$

FIND NEUTRAL AXIS:

WEST GIRDER

$$\frac{2.5x^2}{2} + 8.75\left(\frac{11.5}{12}\right)(x - 0.48) = \frac{15}{144}(22.7813)\left(\frac{62.25}{12} - x\right)$$

$$1.25x^2 + 8.40x - 4.03 = -2.37x + 12.31$$

$$1.25x^2 + 10.77x = 16.34$$

$$x = 1.32' = 15.84''$$

$$I_f = 8.75\,(.96)^3/12 + 8.75(.96)(1.32 - .48)^2$$

$$0.645 + 5.93 = \underline{6.575\ ft^4}$$

$$I_{RECT} = 2.5\,(1.32)^3/12 + 2.5(1.32)\left(\frac{1.32}{2}\right)^2$$

$$0.48 + 1.44 = \underline{1.92\ ft^4}$$

$$I_{STEEL} = 15\,(22.7813)/144\left(\frac{62.25}{12} - 1.32\right)^2 = \underline{35.5\ ft^4}$$

$$I_{TOTAL} = 6.575 + 1.92 + 35.5 = 44.0 \text{ FT}^4$$

$$\therefore S_{TOP} = \frac{44.0}{1.32} = 33.33 \text{ FT}^3$$

$$S_{BOT} = \frac{44.0}{\left(\frac{62.25}{12} - 1.32\right)} = 11.38 \text{ FT}^3$$

$$\therefore M_{TOP} = 33.33 \times 1.3 \times 144 = 6240 \text{ FT-K}$$

$$M_{BOT} = 11.38 \times 1.3 \times 144 = 2130 \text{ FT-K} \leftarrow$$

$$\therefore M_{CAP} = 2130 \text{ FT-K} \quad \text{(WEST GIRDER)}$$

EAST GIRDER

$$\frac{2.5x^2}{2} + 7.96(.96)(x - .48) = \frac{15}{144}(25.3125)\left[\frac{62.25}{12} - x\right]$$

$$1.25x^2 + 7.64x - 3.67 = -2.64x + 13.68$$

$$1.25x^2 + 10.28x = 17.35$$

$$x = 1.44' = 17.28''$$

$$I_F = 7.96(.96)^3/12 + 7.96(.96)(1.44 - .48)^2 = 7.63 \text{ FT}^4$$

$$I_{RECT} = 2.5(1.44)^3/12 + 2.5(1.44)\left(\frac{1.44}{2}\right)^2 = 2.49 \text{ FT}^4$$

$$I_{STEEL} = \frac{15}{144}(25.3125)\left(\frac{62.25}{12} - 1.44\right)^2 = 37.03 \text{ FT}^4$$

$$I_{TOTAL} = 7.63 + 2.49 + 37.03 = 47.15 \text{ FT}^4$$

BY RAC DATE 12-21-61 SUBJECT O.H. BRIDGE NO. 1.22 SHEET NO. ___ OF ___

CHKD. BY MS DATE ______ GLENFIELD, PA. JOB NO. ______

RATING

$\therefore S_{TOP} = \frac{47.15}{1.44} = 32.74 \text{ FT}^3$

$S_{BOT} = \frac{47.15}{\left(\frac{62.25}{12} - 1.44\right)} = 12.58 \text{ FT}^3$

$\therefore M_{TOP} = 32.74 \times 1.3 \times 144 = 6129 \text{ FT-K}$

$M_{BOT} = 12.58 \times 1.3 \times 144 = 2355 \text{ FT-K}$ ←

$\therefore M_{CAP} = 2355 \text{ FT-K}$ (EAST GIRDER)

WEST GIRDER	EAST GIRDER
$M_{LL_{AVAIL}} = M_{CAP} - M_{DL}$	
$= 2130 - 1427$	$= 2355 - 1357$
$= 703 \text{ FT-K}$	$= 998 \text{ FT-K}$

FROM SHEET 5 M_{LL} (H-15)

$\therefore$ RATING

WEST GIRDER	EAST GIRDER
$\frac{703}{349.5}(15) =$ **H30**	$\frac{998}{464.7}(15) =$ **H32**

$\therefore$ THE CONCRETE GIRDERS RATE IN EXCESS OF THE 16 TON POSTED LIMIT IN MOMENT.

SHEAR

THE MAX. SHEAR STRESS IS TAKEN AT A DISTANCE EQUAL TO THE EFFECTIVE DEPTH FROM THE FACE OF THE SUPPORT.

$\therefore$ DISTANCE $(X) = 62.25 + 18 = 80.25'' = \underline{6.69'}$

$\therefore$ THE DEAD LOAD SHEAR AT THIS POINT IS

WEST GIRDER

$V_x = \omega\left(\frac{l}{2} - x\right)$

$= 5.635\left[\frac{45}{2} - 6.69\right]$

$V_x = 89.1^K$

EAST GIRDER

$V_x = \omega\left(\frac{l}{2} - x\right)$

$= 5.36\left[\frac{45}{2} - 6.69\right]$

$V_x = 84.8^K$

$V_{CAPACITY} = \frac{A_v f_y d}{s} = \frac{[10 \times 0.20]\ 18 \times 62.25}{14} = 160^K$

$V_{LL_{AVAIL}} = V_{CAP} - V_{DL}$

$= 160 - 89.1$

$V_{LL_{AVAIL}} = 70.9^K$

$V_{LL_{AVAIL}} = V_{CAP} - V_{DL}$

$= 160 - 84.8$

$V_{LL_{AVAIL}} = 75.2^K$

$SHEAR_{LL}$ FOR H15 LOADING FROM SHEET 5

$\therefore$ RATING

$\frac{70.9}{35.7}(H15) = \underline{H29}$

$\frac{75.2}{47.4}(15) = \underline{H23}$

$\therefore$ THE CONCRETE GIRDERS RATE IN EXCESS OF THE 16 TON POSTED LOAD LIMIT!

STEEL GIRDERS

97'-3" C-C BRGS.
16'-6" C-C GIRDERS

IMPACT - $I.F. = \frac{50}{L+125} = \frac{50}{97.25+125} = 22.5\%$

LIVE LOAD DISTRIBUTIONS AND DEAD LOADS ON GIRDER SAME AS PREVIOUSLY CALCULATED.

UNIFORM DEAD LOADS

GIRDER A (WEST)

$w = 3.910\ ^k/_1$
$w = 0.610\ ^k/_1$ } $w_{DL} = 4.520\ ^k/_1$

$M_{DL} = 4.52(97.25)^2/8 = 5344$ FT-K

$V_{DL} = 4.52(97.25)/2 = 220^k$

GIRDER B (EAST)

$w = 3.050\ ^k/_1$
$w = 0.560\ ^k/_1$ } $w_{DL} = 3.610\ ^k/_1$

$M_{DL} = 3.61(97.25)^2/8 = 4268$ FT-K

$V_{DL} = 3.61(97.25)/2 = 176.^k$

LIVE LOADS

FROM AASHTO APP. A FOR H15 LOADING

MOMENT (LL) = 896 FT-K
SHEAR (LL) = 42.84 K

$M_{LL} = 896 \times 1.225 \times 0.91 = 999$ FT-K

$V_{LL} = 42.84 \times 1.225 \times 0.91 = 47.8^k$

$M_{LL} = 896 \times 1.225 \times 1.21 = 1328$ FT-K

$V_{LL} = 42.84 \times 1.225 \times 1.21 = 63.5^k$

FROM SHEETS 1 & 2

GIRDER A (WEST)

$S_{PROVIDED} = 607.95 \times 12 = 7289.4\ in^3$

$M_{CAPACITY} = 7289.4 \times \frac{16}{12} = 9719.2\ ft\text{-}k$

$M_{DL} = 5349\ ft\text{-}k$

$M_{AVAIL_{LL}} = 4375.2\ ft\text{-}k$

$M_{LL_{HIS}} = 999\ ft\text{-}k$

GIRDER B (EAST)

$S_{PROV} = 544.07 \times 12 = 6528.84\ in^3$

$M_{CAP} = 6528.84 \times \frac{16}{12} = 8705.12\ ft\text{-}k$

$M_{DL} = 4268\ ft\text{-}k$

$M_{AVAIL_{LL}} = 4437.12\ ft\text{-}k$

$M_{LL_{HIS}} = 1328\ ft\text{-}k$

∴ RATING

$\frac{4375.2}{999}(HIS) = \underline{H65}$

$\frac{4437.12}{1328}(HIS) = \underline{H50}$ ←

∴ STEEL GIRDERS IN MOMENT RATE IN EXCESS OF POSTED LOAD LIMIT (16 TON)

FROM SHEETS 1 & 2

$A_{WEB_{PROV}} = 57.0 - 27(0.469)^{\text{RIVET HOLES}} = 44.337\square''$ $\quad f_{V_{PROV}} = 9.5\ ksi$

GIRDER A (WEST)

$V_{PROV\ (CAP)} = 44.337 \cdot 9.5 = 421.2^K$

$V_{DL} = 220^K$

$V_{AVAIL_{LL}} = 201.2^K$

$V_{LL_{HIS}} = 47.8^K$

GIRDER B (EAST)

$V_{CAP} = 421.2^K$

$V_{DL} = 176^K$

$V_{AVAIL_{LL}} = 245.2^K$

$V_{LL_{HIS}} = 63.5^K$

∴ RATING

$\frac{201.2}{47.8}(HIS) = \underline{H63}$

$\frac{245.2}{63.5}(HIS) = \underline{H58}$ ←

∴ THE STEEL GIRDERS IN SHEAR RATE IN EXCESS OF THE POSTED LOAD LIMIT (16 TONS)

BY ..... DATE ..... SUBJECT ..... SHEET NO. ..... OF .....
CHKD. BY ..... DATE ..... GRANTLAND, FL JOB NO. .....
RATING

CONCRETE DECK

* FOR DECK BETWEEN CONCRETE GIRDERS *

SPAN LENGTH = CLEAR SPAN

$= 16.5 - 2.5 = 14.0'$

$\therefore$ SPAN LENGTH = 14.0'

IMPACT - I.F. $= \frac{50}{L+125} = \frac{50}{14+125} = 36\% > 30\%$ $\therefore$ USE 30%

MAIN REINFORCEMENT PERPENDICULAR TO TRAFFIC

FROM MANUAL FOR MAINTENANCE INSPECTION OF BRIDGES (1978) ART. 5.3.2 (p. 34)

$E = 0.45 + 3.75 \Rightarrow 0.1(14) + 3.75 = 9.35$

$M_{HS} = 0.25\left[\frac{P}{E}\right]S = 0.25\left[\frac{(12 \times 1.3)}{9.35}\right](14) = 5.84$ FT-K

$w_{DL} = \frac{11.5}{12}(150)_{\text{CONC.}} + \frac{3/4}{12}(120)_{\text{ASPH}} + \frac{4}{12}(120)_{\text{BRICK}} = 190\,\#/\square' = 0.190\,K/\square'$

$M_{DL} = wl^2/8 = .190(14)^2/8 = 4.655$ FT-K/FT. WIDTH

$A_{S_{PROV}} = \#5$ ROUND BARS @ 4½" $\quad A_{BAR} = 0.3068\,\square"$

$A_{S_{PROV/FT\ WIDTH}} = 0.3068\left[\frac{12}{4.5}\right] = 0.8181\,\square"$

$A_{S_{REQ'D}} = \frac{M}{ad}$ $\quad \begin{cases} M = \text{FT-K} \\ a = 1.29 \text{ for } f_c = 18{,}000 \text{ \& } f_c = 2500 \\ d = 12 - 1.5 = 10.5" \end{cases}$

RATING

$$A_{s_{DL\ REQ'D}} = \frac{M_{DL}}{a\,d} = \frac{4.655}{(1.29)(10.5)} = 0.344\ \square''$$

$$A_{s_{AVAIL_{LL}}} = 0.8181 - 0.344 = 0.4741\ \square''$$

$$A_{s_{LL_{HS}\ REQ'D}} = \frac{M_{LL_{HS}}}{a\,d} = \frac{5.84}{(1.29)(10.5)} = 0.431\ \square''$$

$\therefore$ RATING

$$\frac{0.4741}{0.431}(HS) = \underline{HS16.5}$$

* FOR DECK BETWEEN STEEL GIRDERS *

SPAN LENGTH (S) = $16.5' - 2(1.54'') = 13.42' < 14'$ USE (HAUNCHES)

IMPACT = 30%

$$M_{DL} = .19(14')^2/8 = 4.655\ \text{FT-K}$$

$$A_{s_{REQ'D}} = 0.8181\ \square''$$

$$M_{LL_{HS}} = 0.25\left[\frac{(12\times1.3)}{(0.4(14)+3.75)}\right]14 = 5.84\ \text{FT-K}$$

$$A_{s_{DL\ REQ'D}} = \frac{4.655}{1.29(10.5)} = 0.344\ \square''$$

$$A_{s_{AVAIL_{LL}}} = 0.8181 - 0.344 = 0.4741\ \square''$$

$$A_{s_{LL_{HS}}} = \frac{5.84}{1.29(10.5)} = 0.431\ \square''$$

$\therefore$ RATING $= \frac{0.4741}{0.431}(HS) = \underline{HS16.5}$

SUMMARY

	RATING MOMENT	SHEAR
GIRDERS:		
REINFORCED CONCRETE	H 30	H 23
STEEL	H 50	H 58
DECK	H 16	—

Conrail Exhibit IV
R.R.C. #C-80092154
8/24/82

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA PUBLIC UTILITY COMMISSION
P. O. BOX 3265, HARRISBURG, Pa. 17120

April 5, 1982

IN REPLY PLEASE
REFER TO OUR FILE

RECEIVED
SEP 14 1982
SECRETARY'S OFFICE
Public Utility Commission

RECEIVED
APR 12 1982
LAW DEPARTMENT

Joel Mazor, Esquire
Consolidated Rail Corporation
1138 Six Penn Center Plaza
Philadelphia, PA 19104

O.H. BR 9.22
MAIN LINE
LC 2202

Re: C-80092154, Glenfield Borough

Dear Mr. Mazor:

Our staff engineers have requested the following clarifications of the report required by the administrative law judge and submitted by your engineering staff in the above-captioned case:

1. Please complete a structure inventory and appraisal form as required by Paragraph No. 1 in the order adopted May 29, 1981. Contact County of Allegheny for guidance in this endeavor.

2. Please expand your load capacity rating analysis calculations to show the maximum rated loading using an HS-type vehicle.

3. Please supply an estimate of the cost of repairs to rehabilitate the existing structure.

4. Please define the terms such as "soft and hollow", "soft and disintegrating", "bars are loose and broken", "bars ***** broken in two", and "bars ***** cut in two" used in the report and determine whether these are accurate descriptions of the conditions of the structure and whether these conditions materially affect the strength of that component of the structure.

5. Please explain the difference of the effect of Types A and B concrete deterioration on the strength of structure components.

CHIEF ENGINEER
APR 14 1982

PHILA., PA.

DOCKETED
SEP 15 1982

6. Please explain the effect of Type B deterioration for considerable portion of the height of Piers 7, 8 and 9.

7. Please explain the effect of Type B deterioration and reinforcing bar reduction in Pier 10.

8. Please explain the effect of crack through the strut at Piers 7, 8 and 10.

We appreciate your cooperation in obtaining the answers to these additional questions.

Yours truly,

Barry J. Grossman
Assistant Counsel

BJG:wm

CONRAIL

F BR 9.22

BR. 9.22

June 11, 1982

SUBJECT: Glenfield, Allegheny County, Penna. - PUC Docket No. C-80092154, OH Bridge No. 9.22, Glenfield Viaduct over Main Line Tracks, LC 2202, MP 9.22, WO #46588, Pittsburgh, Div., Central Region (FILE: Br. 9.22 - WWP)

Mr. Barry J. Grossman
Assistant Counsel
Pennsylvania P.U.C.
P. O. Box 3265
Harrisburg, Penna. 17120

Dear Mr. Grossman:

We refer to your letter of April 5, 1982 requesting clarification of certain items of Conrail's Inspection Report and Evaluation dated January 19, 1982 as required by the administrative law judge in connection with the subject structure.

The following are our answers to questions contained in your above-mentioned letter:

1. Completed structure inventory and appraisal form attached.

2. Expanded load capacity ratings and calculations using HS-type vehicle attached.

3. No repairs contemplated at this time.

4. "Soft and hollow" - lacking firmness, hardness, and having a cavity within (not solid throughout) - strength of member not affected.

   "Soft and disintegrating" - lacking firmness, hardness and breaking into small pieces, particles, parts. - strength affected to the extent of loss of section.

   "Bars loose and broken", "bars ... broken in two", "bars ... cut in two" - bars are not stressed, no bond with concrete and separated into two parts. - strength of member reduced, not necessarily the strength of the structure.

FILE COPY

WWP/cdw

5. The difference in the effect of Type A and B concrete deterioration on the strength of the structural components is as follows:

   Type A Deterioration - This type of deterioration has no effect on the strength of the structural member because there is no loss of bond between the concrete and the reinforcing bar.

   Type B Deterioration - This type of deterioration has a significant effect on the strength of the structural member because there is a loss of bond between the concrete and the reinforcing bar. However, in the case of the concrete girder (West Girder Span 12) the Type B deterioration is over a small area and this does not significantly affect the strength of the member. The Type B deterioration in the struts and sidewalk brackets does not directly affect the strength of the structure.

6. The effect of Type B deterioration for a considerable portion of the height of Piers 7, 8 and 9 is insignificant. The remaining concrete in the pier provides adequate strength to carry the posted load.

   (NOTE: Using only one-half the pier column area, the pier rating is H27.)

7. The effect of Type B deterioration and reinforcing bar reduction in Pier 10 is insignificant. Reasons same as for question 6.

8. The effect of the crack in the strut at Piers 7, 8 and 10 is negligible. However, the crack width and length should be checked at frequent intervals to determine if it is progressing and at what rate.

If there are further questions, please contact this office.

Very truly yours,

(Signed) D. S. Taylor

J. T. Sullivan, P.E.
Chief Engineer
Design and Construction
Room 1200
(215) 596-3845

cc: Mr. R. A. Peteritas, Director
Bureau of Rail Transportation
Pennsylvania P.U.C.
P. O. Box 3265
Harrisburg, Penna. 17120

Mr. Kenneth W. Walker, P.E.
Chief Utility Engineer
Penna. Dept. of Transportation
1120 T & S Building
Harrisburg, Penna. 17120

Mr. John B. Drake
Chief Bridge Engineer
County of Allegheny
517 County Office Building
Forbes & Ross Streets
Pittsburgh, Penna. 15219

Mr. Albert G. Feczko, Jr., Solicitor
Glenfield Borough
800 Lawyers Building
Pittsburgh, Penna. 15219

bcc: J. E. Mazor - 1138, Six Penn Center Plaza
*F. D. Day - 634, Six Penn Center Plaza
L. R. Kubacki - 1101, 15 N. 32nd Street
M. K. Clark - 301, Pittsburgh, Penna.
*J. S. Richter - 301, Pittsburgh, Penna.
S. G. Hess - 100, Pittsburgh, Penna.
Engineer, Construction - Pittsburgh, Penna.

*Copy of inventory form and calculations attached.

Revision ☐

ION 423

ALLEGHENY 4 City/Town GLENFIELD

Highway Route ☐☐☐☐☐☐☐☐ On ☐ Under ☐

Feature Intersected CONRAIL

Facility Carried by Structure GLENFIELD VIADUCT

3 Structure No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐

4 Location

10 Min. Vert. Clearance, Inv. Rte. 9999

11 Milepoint ☐☐☐☐☐

12 Road Section No. ☐0101010

13 Defense Bridge Description ☐☐☐

14 Defense Milepoint ☐☐☐☐☐

15 Defense Section Length ☐☐☐

16 Latitude

17 Longitude

18 Physical Vulnerability ☐

19 By-pass, Detour Length

20 Toll Bridge ☐ On Toll Road ☐ On Free Road ☒

21 Custodian

22 Owner

23 F.A.P. No.

CLASSIFICATION

24 Fed. Aid System

25 Administrative

26 Functional

90 Date Last Inspected 11/1/82

	By	Date
Transfer of Data		
Maintenance Insp.		
Condition Analysis		
Appraisal		
Cost Estimate		
General Review		

STRUCTURE DATA

27 Year Built 2600

28 Lanes on Str. 02 under

29 ADT 30 Year

31 Design Load 9-1924 - 18 TON TRUCKS

32 Appr. Rdwy. Width w/Sh'ld 020

33 Br. Median ☒ None ☐ Open ☐ Closed

34 Skew 00

35 Structure Flared ☐ Yes ☒ No

36 Traffic Safety Features 11999

37

38 Navigation Control ☐ Yes ☒ No

39 -Vertical 000 ft

40 -Horizontal 0000 ft

41 Struct: Open ☐ Closed ☐ Posted ☒

42 Type Service 1516

43 Structure Type-Main 131011

44 -Approach 111014

45 No. of Spans-Main 001

46 -Approach 001/0

47 Total Horiz. Clear. 25.0 ft

48 Max. Span Length C-C 0097 ft

49 Structure Length 000678 ft

50 Sidewalk: Rt. 0.2 ft, Lt 5.0 ft

51 Br. Rdwy. Width (curb-curb) 20.0 ft

52 Deck Width (out-out) 28.2 ft

53 Vert. Clear. over Deck 99.99 -

54 Underclearance-Vert.

55 -Lateral-Right ft

56 -Left ft

57 Wearing Surface BRICK PAVING

CONDITION

	Material	Condition Analysis	Rating (9-0)
58 Deck	REINFORCED CONC. SLAB CONC.	DETERIORATION OF SLAB	4
59 Superstructure	STEEL & REINFORCED GIRDERS	DETERIORATION OF CONCRETE MEMBERS	5
60 Substructure	CONCRETE PIERS & ABUTMENTS	DETERIORATION OF PIERS	4
61 Channel & Channel Protection			N
62 Culvert & Retaining Walls			N

63 Estimated Remaining Life

64 Operating Rating 27 TONS (HS)

65 Approach Roadway Alignment

66 Inventory Rating 16 TONS (HS)

APPRAISAL

	Deficiencies	Rating (9-0)
67 Structural Condition	DETERIORATION OF STRUCTURAL MEMBERS	5
68 Deck Geometry		7
69 Underclearances-Vertical & Lateral	ADEQUATE	
70 Safe Load Capacity	16 TONS	6
71 Waterway Adequacy		N
72 Approach Roadway Alignment	ADEQUATE	

PROPOSED IMPROVEMENTS

73 Year Needed 00 Completed Describe (Item 75)

74 Type of Service 54

75 Type of Work

76 Improvement Length ft

77 Design Loading

78 Roadway Width ft

79 Number of Lanes

80 ADT 81 Year

82 Prop. Rdwy. Improvement Year

83 -Type

COST OF IMPROVEMENTS

NONE CONTEMPLATED

84 $ .000.

85 Prelim. Eng. Cost $

86 Demolition Cost $

87 Substructure Cost $

88 Superstructure Cost $

REMARKS:

C-Supersedes Structure Inventory & Appraisal Sheet, page 31 of July 1972 Recording Coding Guide

AS PER PUC LETTER REQUESTING TO EXPAND LOAD CAPACITY RATING ANALYSIS CALCULATIONS TO SHOW THE MAXIMUM RATED LOADING USING AN HS-TYPE VEHICLE.

STEEL GIRDERS

FROM PREVIOUS CALC'S PAGES 17 & 18

	GIRDER A (WEST)	GIRDER B (EAST)
$M_{CAPACITY}$	= 9719.2 FT-K	8705.12 FT-K
M_{DL}	= 5344 FT-K	4268 FT-K
$M_{AVAIL_{LL}}$	= 4375.2 FT-K	4437.12 FT-K

LIVE LOADS

FROM AASHTO APP. A FOR HS 15 LOADING

MOMENT (LL) = 1105.55 FT-K
SHEAR (LL) = 48.84 FT-K
IMPACT = 22.5%
LL DISTRIBUTIONS SAME AS PREVIOUS CALC'S ∴

M_{LL+I} = 1105.55 × 1.225 × 0.91 = 1232.41 FT-K
V_{LL+I} = 48.84 × 1.225 × 0.91 = 54.44 K

1105.55 × 1.225 × 1.21 = 1638.70 FT-K
48.84 × 1.225 × 1.21 = 72.4 K

∴ RATING (MOMENT)

$\frac{4375.2}{1232.41}$ (HS15) = HS 53' $\qquad$ $\frac{4437.12}{1638.70}$ (HS15) = HS 40'

∴ STEEL GIRDERS IN MIMENT RATE IN EXCESS OF POSTED LOAD LIMIT (16 TONS).

GIRDER A (WEST)

$V_{CAPACITY}$ = 421.2 K
V_{DL} = 220.0 K
$V_{AVAIL\ LL}$ = 201.2 K
$V_{LL+I\ (HS15)}$ = 54.44 K

GIRDER B (EAST)

421.2 K
176.0 K
245.2 K
72.4 K

∴ RATING (SHEAR)

$\frac{201.2}{54.44}$ (HS15) = HS55

$\frac{245.2}{72.4}$ (HS15) = HS50

∴ THE STEEL GIRDERS IN SHEAR RATE IN EXCESS OF THE POSTED LOAD LIMIT (16 TONS).

CONCRETE GIRDERS

FROM PREVIOUS CALC'S PAGES 12 THRU 16

WEST GIRDER

$M_{CAPACITY}$ = 2177 FT-K
M_{DL} = 1427 FT-K
$M_{AVAIL\ LL}$ = 750 FT-K

EAST GIRDER

2198 FT-K
1357 FT-K
841 FT-K

LIVE LOADS

FROM AASHTO APP. A FOR HS 15 LOADING
MOMENT (LL) = 409.05 FT-K
SHEAR (LL) = 42.75 K
IMPACT = 29.4%
LL DISTRIBUTIONS SAME AS PREVIOUS CALC'S ∴

M_{LL+I} = 409.05 × 1.294 × 0.91 = 475.79 FT-K
V_{LL+I} = 42.75 × 1.294 × 0.91 = 50.34 K

409.05 × 1.294 × 1.21 = 632.64 FT-K
42.75 × 1.294 × 1.21 = 66.94 K

∴ RATING (MOMENT)

$\frac{750}{475.79}(HS15) = \underline{HS23}$ - $\frac{841}{632.64}(HS15) = \underline{HS20}$ -

∴ THE CONCRETE GIRDERS RATE IN EXCESS OF THE 16 TON POSTED LOAD LIMIT IN MOMENT.

	WEST GIRDER	EAST GIRDER
$V_{CAPACITY}$ =	160.0 K	160.0 K
V_{DL} =	89.1 K	84.8 K
$V_{AVAIL\,LL}$ =	70.9 K	75.2 K
V_{LL+I} =	50.34 K	66.94 K

∴ RATING (SHEAR)

$\frac{70.9}{50.34}(HS15) = \underline{HS21}$ ✓ $\frac{75.2}{66.94}(HS15) = \underline{HS16.85}$ ✓

∴ THE CONCRETE GIRDERS RATE IN EXCESS OF THE 16 TON POSTED LOAD LIMIT IN SHEAR.

CONCRETE DECK

SINCE THE DECK RATING IS BASED ON THE WHEEL LOAD & THE WHEEL LOAD FOR H & HS IS THE SAME THE RATINGS IS THE SAME.

∴ RATING (FOR DECK) = 16 TON (WHEEL LOAD)

SUMMARY

IN TERMS OF HS TYPE LOADING

	RATING	
	MOMENT	SHEAR
GIRDERS:		
STEEL	HS 40	HS 50
REINFORCED CONCRETE	HS 20	HS 16.85
DECK		HS 16

NOTE: ALL PREVIOUS RATING COMPUTATIONS ARE FOR INVENTORY RATING.

THESE THAT WILL FOLLOW WILL BE FOR OPERATING RATING

$\therefore f_{allow} = 25$ ksi FOR REINFORCING STEEL
$\therefore f_b = 22.5$ ksi FOR STRUCTURAL STEEL
$\therefore f_v = 13.5$ ksi FOR STRUCTURAL STEEL

NOTE: ALL PREVIOUS COMPUTATIONS ARE VALID HERE EXCEPT FOR THE CAPACITY OF THE MEMBERS.

OPERATING RATING
UNDER H-TYPE LOADING

CONCRETE GIRDERS

	WEST GIRDER	EAST GIRDER
M_{CAP}	$12.60 \times \frac{25}{15} \times 144 = 3024$ FT-K	$12.72 \times \frac{25}{15} \times 144 = 3052.8$ FT-K
M_{DL}	1427 FT-K	1357 FT-K
$M_{LLAVAIL}$	1597 FT-K	1695.8 FT-K
$M_{LL_{HIS}}$	349.5 FT-K	464.7 FT-K
RATING	H68 (MOMENT) ✓	H54 (MOMENT) ✓

V_{CAP}	$\frac{[10 \times .20]25 \times 62.25}{14} = 222.3^K$	222.3^K
V_{DL}	89.1^K	84.8^K
$V_{LLAVAIL}$	133.2^K	137.5^K
$V_{LL_{HIS}}$	35.7^K	47.4^K
RATING	H56 (SHEAR) ✓	H43 (SHEAR) ✓

STEEL GIRDERS

WEST GIRDERS

$M_{CAP} = 7289.4 \times \frac{22.5}{12} = 13667.6$ FT-K
$M_{DL} = 5344$ FT-K
$M_{LLHAUL} = 8323.6$ FT-K
$M_{LLHIS} = 999$ FT-K

RATING = H125 (MOMENT) ✓

$V_{CAP} = 44.337 \times 13.5 = 598.5^K$
$V_{DL} = 220.0^K$
$V_{LLHAUL} = 378.5^K$
$V_{LLHIS} = 47.8^K$

RATING = H119 (SHEAR) ✓

EAST GIRDERS

$65289 \times \frac{22.5}{12} = 12241.6$ FT-K
4268 FT-K
7973.6 FT-K
1328 FT-K

H90 (MOMENT) ✓ ←

598.5^K
176.0^K
422.5^K
63.5^K

H100 (SHEAR) ✓ ←

DECK

BETWEEN CONCRETE GIRDERS

$M_{CAP} = A_s a d = 0.8181 (1.76)(10.5) = 15.12$ FT-K
$M_{DL} = 4.655$ FT-K
$M_{LLHAUL} = 10.465$ FT-K
$M_{LLHIS} = 5.84$ FT-K

RATING = H27 (MOMENT) ✓ ←

OPERATING RATING

UNDER HS-TYPE LOADING

CONCRETE GIRDERS

WEST GIRDER

$M_{LL+AVAIL}$ = 1597 FT-K
$M_{LL+HSIS}$ = 475.79 FT-K

RATING = HS 50 (MOMENT) ✓

$V_{LL+AVAIL}$ = 133.2 K
$V_{LL+HSIS}$ = 50.34 K

RATING = HS 39 (SHEAR) ✓

EAST GIRDER

1695.8 FT-K
632.64 FT-K

HS 40 (MOMENT) ✓

137.5 K
66.94 K

HS 30 (SHEAR) ✓

STEEL GIRDERS

WEST GIRDER

$M_{LL+AVAIL}$ = 8323.6 FT-K
$M_{LL+HSIS}$ = 1232.41 FT-K

RATING = HS 101 (MOMENT) ✓

$V_{LL+AVAIL}$ = 378.5 K
$V_{LL+HSIS}$ = 54.94 K

RATING = HS 104 (SHEAR) ✓

EAST GIRDER

7973.6 FT-K
1638.7 FT-K

HS 73 (MOMENT) ✓

422.5 K
72.4 K

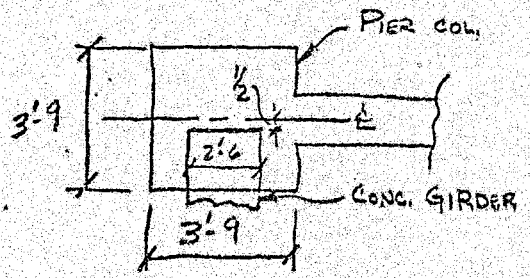
HS 87 (SHEAR) ✓

DECK

SAME AS PREVIOUS FOR OPERATING RATING HS 27 ✓

PIERS

INVENTORY RATING



$f'_c = 2500$ psi

BEARING AREA IS

$\left[\frac{45}{2} - \frac{1}{2}\right] \times 30 = 660\square''$

USE: 1/2 THIS AREA $= 330\square''$

ALLOWABLE $f_p = 0.25 f'_c = 0.25(2500) = 625$ psi

$\therefore$ PIER CAPACITY $= 0.625 \times 330 = 206.25^K$

DEAD LOADS ON PIER (FROM PREVIOUS CALC'S)

	WEST	EAST
w_{DL} =	5.635 K/FT	5.360 K/FT
V_{DL} =	127 K	121 K
$V_{LL_{AVAIL}}$ =	79 K	85 K

LIVE LOADS (H15) (FROM PREVIOUS CALC'S) PLUS IMPACT

$V_{LL_{H15}}$ =	35.7 K	47.4 K

$\therefore$ RATING = H 33 H27 ←

BY ..... RATING .....

SUMMARY

	Inventory Rating		Operating Rating	
	Moment	Shear	Moment	Shear
Steel Girders				
West	H65, HS53	H63, HS55	H125, HS101	H119, HS104
East	H50, HS40	H58, HS50	H90, HS73	H100, HS87
Concrete Girders				
West	H32, HS23	H29, HS21	H68, HS50	H56, HS39
East	H27, HS20	H23, HS16	H54, HS40	H43, HS30
Concrete Deck	H16, HS16		H27, HS27	

Overall Rating of Bridge 15: H16, HS16 } Inventory Rating

H27, HS27 } Operating Rating

P.U.C. #C-80092154
Commission Ex 6A
8/24/82 Pittsburgh
[signature]