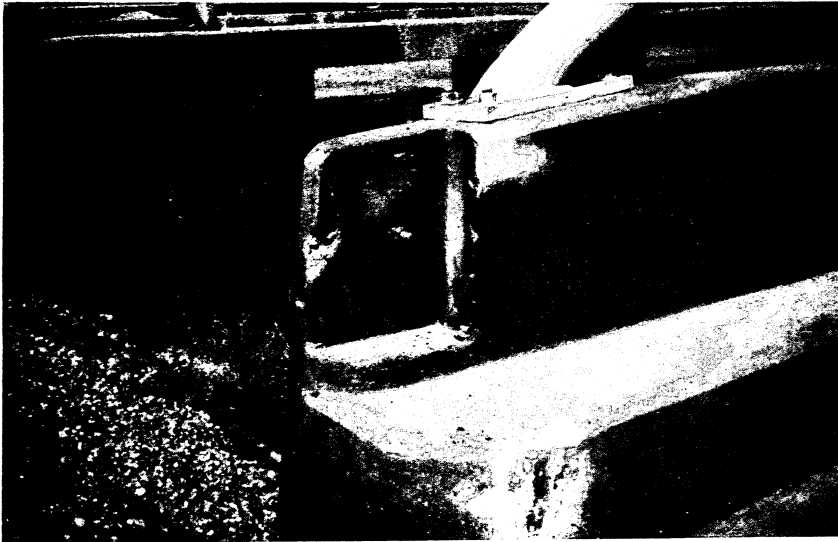


Mr. CONSTANDY. I think, Mr. Prisk, there was other evidence of an accident, likewise, on that striped panel. I think on this one there had been an accident.

Mr. PRISK. All right. In any event, this is very similar to the previous condition. The design is exactly the same. The bolt is pulled out.

Here is the way this looks on one of the bridges where the rail is not in place. You can see the location of the bolt. Some of these are a little bent—it is expecting a great deal of one bolt.



Mr. CONSTANDY. Mr. Skeels?

Mr. SKEELS. I would just like to make a comment. This shows, really, a lack of appreciation on the designer's part of the tremendous forces that are involved in these typical impacts. The guardrail itself, as you recall, the sections are bolted together with four large bolts, two at the top and two at the bottom, with a minor mounting bolt in the center.

The guardrail will stand a tensile force of about 100,000 pounds. To bolt that rail to a bridge abutment with a single bolt, that looks to me as if it might fail at 5,000 pounds, indicates a misunderstanding of what one is trying to accomplish.

I do not think the designer really realized he was trying to fasten the rail to the bridge in order to obtain the tensile strength that the rail can deliver. In other words, I do not think his goal was properly spelled out to him.

Mr. CONSTANDY. The concept was good. It failed in detail.

Mr. SKEELS. Yes, I think this is right.

Mr. CONSTANDY. Mr. Wilkes, you mentioned the other day the failure of appreciation of detail in design of some of these things. I wonder if you care to say something about it now?

Mr. WILKES. I am sure the designer of that connection was not aware of the horizontal force that would result from a vehicle struck against the rail, and did not realize it was intended this guardrail would