We have in our files, as I am certain you have in your files, photographs of cases where the guardrail has threaded through the car interior, creating injury and death.

Now the second problem on typical installations of guardrail is that the posts are separated by too large a spacing. Frequently it is found that the guardrail beam is weak enough to deflect so that when a collision is between the posts, the car is trapped and stopped at a high deceleration rate or it simply travels over the rail.

Now in the consideration of roadside obstacles along our highway network, utility poles, and particularly lamp poles for roadway lighting, are prominent. Early in the proving ground program we demonstrated the feasibility of using a tripod lamp pole constructed of thin wall tubing with flush mounted base plates having low shear resistance. By thus distributing the inertia and minimizing resistance at the base, we were able to collide with a prototype breakaway pole, producing only very minor sheet metal damage and almost no possibility of injury to the occupants.

Later in the testimony we will show a record of this early work and demonstrate the current status. This early design was considered to be too expensive and so recently we have gone into additional tests which we will describe later in our program this morning.

Early in the proving ground program we recognized that ordinary traffic signs, mounted then at a height of 42 inches, could be significant hazards. The problem with this installation is that, at normal traffic speeds, collision with the sign support bends it away near ground level; the inertia of the sign is high enough that the mounting bolts are pulled apart or through the sign, and the sign starts to fall. Before it falls far enough, the car runs into it at windshield level. Some of the standard signs weigh as much as 25 pounds and the sign will usually break the windshield and sometimes penetrate it.

The proving ground demonstrated conclusively that if the sign is mounted 60 inches or more above the road, the car will pass below the sign before it falls far enough to be struck by the windshield.

This concept was recognized in the 1961 edition of the Manual on Uniform Traffic Control Devices, where a minimum height of 5 feet, 6 inches on expressways is prescribed.

Now, extensive development of guardrail designs induced a growing feeling that current bridge rail design are inadequate. Reports of increasing numbers of failures in the field as the construction of the Interstate System proceeded substantiated this feeling.

During the planning of access to a new circular test track facility in 1961 and 1962, increasing emphasis was placed on the development of a bridge parapet that would be impenetrable to any type of vehicle, that would produce minimum injury to occupants and minimum damage to the vehicle, and that would redirect the vehicle in the direction of the roadway.

Later in the day we will show some film on this where we are changing from the concept of the flexible beam guardrail on the highway to a rigid beam that is needed on the bridge rail where there can be no possibility of the vehicle penetrating the guardrail.

Mr. CONSTANDY. That parapet is most impressive. I think the movies you have will clearly show it.

Is it not also possible to use that parapet design as a median barrier?