We had been drilled over the years in plant safety and the extension of this concept to the road system was natural for us to take.

Mr. CONSTANDY. Yes. I think it is kind of interesting, your efforts along this line were motivated as an industrial safety project, this particular plant being the road system.

Mr. LUNDSTROM. That is correct. We could not tolerate injury on our control road system any more than we could tolerate injury from some careless practice in the plant itself.

Mr. CONSTANDY. Could you continue then?

Mr. LUNDSTROM. All right. In describing the proving ground then, as we saw it in perhaps 1956, the general layout of the road system was somewhat unique in that all of the major operations had been one-way traffic. Let me repeat again, as early as 1924, the men who laid out the proving ground recognized the importance of one-way traffic and all of the major roads from that time until now have been one-way traveled.

Mr. CONSTANDY. That is an important feature in your safety record, is it not?

Mr. LUNDSTROM. I am positive this is perhaps the most important feature that we have had over the operation from 1924 to the present time.

Now in 1956, or thereabouts, we discovered to our dismay that our roads were lacking in roadside safety. They had been built much as were the roads throughout the States and the country road systems; they lacked the wide shoulders that are known today to be important; they did have obstructions along the roadside; they had deep ditches in places that were thought to be necessary to remove surface water; they had steep backslopes or cuts through hills. In general these were the problems confronting us in 1956 and it was quite obvious in studying the accidents, one by one, that our most severe problem was related to these roadside hazards.

Early computations or early studies of accident statistics indicated that approximately 70 percent of our accidents were of this single-car-running-off-the-road type.

The proving ground, as I indicated earlier, is typical rolling country. There is nothing different about it than any State or country road you might see in Michigan—curves, hills, lakes, level country, very ordinary type of operation, very ordinary type of environment.

But we did, again in studying accident records, find that our test drivers, try as we may, would leave the test road about once every 250,000 miles of operation. In other words, this is a vehicle out control. And then what might happen to this vehicle out of control would depend very importantly on what the condition of the roadside was. And in that year 1956 or thereabouts, we admittedly had these hazards as are so often encountered on the public highway.

Mr. CONSTANDY. At what speeds are the vehicles operated?

Mr. LUNDSTROM. The proving ground system operates over all of the speed ranges encountered on public highways and a considerable number of tests beyond the legal speed limits. This is necessary so that we do go beyond what the customer will demand of his car in normal service.

We also use higher speeds as a way of accelerating the test of a car. So we do run typically many miles at speeds over legal speed limits.