

Mr. CONSTANDY. Yes. I think it is worth keeping in mind that you cannot be concerned only with fatal accidents. The line that separates the two types is sometimes very thin.

The accidents that you did have that were fatal, however, were they run-off-the-road-type accidents?

Mr. LUNDSTROM. Both of them were. One of them involved a special car that ran off the top of our test track through a rather weak barrier and involved the death of two men.

The second accident involved a truck that, again, ran off a curve that was unprotected; it was a rollover accident into a poorly prepared roadside and again there were two fatalities.

Mr. CONSTANDY. Since your roadside improvement program you have had none, both of these happened under the old design?

Mr. LUNDSTROM. Both of them on the old designs, correct.

Since we started working on the roadside improvement program, we have had, I believe, 219 cars off the roadway unintentionally. And there has been one temporarily disabling injury accident in 219 times.

These statistics are significant. I would challenge you to look at the roadways that you drive every day and see if you could drive off the road 219 times without getting injured.

Mr. CONSTANDY. I would like to avoid doing it once.

Earlier you mentioned that the results of your work were given in a series of technical papers before technical groups. I wonder, Mr. Stonex, if you could summarize those papers, at least the more significant ones.

Mr. STONEX. Yes. Our first reference to the roadside as a practical approach to highway safety appeared in a paper which I gave at the Highway Research Board annual meeting in 1954.

Mr. CONSTANDY. In 1954?

Mr. STONEX. Yes, 1954.

Mr. CONSTANDY. Thirteen years ago?

Mr. STONEX. Yes. I would like to quote a part of that.

I said—

Many fatal accidents are a result of a too sudden stop. As highway designers, your concern is with the obstacle that caused the sudden stop and not with the obvious fact that the driver was driving too fast for conditions. As long as obstacles exist, some drivers will hit them. And the safety of a highway design should be in direct proportion to the time the driver has available between making his error and striking the obstacle.

Mr. CONSTANDY. That is your whole basic premise, is it not?

Mr. STONEX. Yes. Then I continued to point out that higher design standards have been adopted for all components of the highway. However, we still have—and this was 1954—

We still have hundreds of thousands of miles of two-lane highways where opposing traffic stream of units with hundreds of thousands of foot-pounds of kinetic energy pass within a few inches of each other. We have shoulders which are narrow, rough, soft when wet, obstructed by culvert headwalls, stones, trees; we have highways where the curves are short and sharp, sight distances so short that almost no opportunity for safe passing is provided, traffic lanes which are very narrow, deep roadside ditches, traffic types mixed from transport vehicles to pedestrians, and far too few roads to carry the traffic volume. It is no wonder the traffic accident record is as bad as it is.

Our next paper discussing roadsides is a fundamental paper given by Mr. Lundstrom at the SAE summer meeting in 1958. And among the things that Mr. Lundstrom stated was—