

rigidity of the base connection of the steel post to the concrete foundation. Consequently, our breakaway concept was developed. We worked on structural details to accomplish this.

And I must say to arrive at the details, which you can see illustrated here and which will be illustrated in the movie which we will show in just a minute, required very close coordination between researchers and practicing highway engineers familiar with highway design installation and maintenance of these devices. Too frequently researchers in a university operate in an "ivory tower" situation, and while they work experimentally, they are uneconomical or impractical from some practical standpoint. So consequently the design we are about to show has come fourth.

The immediate attention was placed on a means, and the reason we arrived at a sign similar to the one you will see and will first see in the movie, is because there were a large number of these two- and three-post supports, steel I-beams, and what we call cantilever design, in existence.

Our immediate objective was to find a solution which could quickly be applied to go out and modify these existing hazards, as well as look at new concepts and maybe more efficient, more economical solutions to the problem. Consequently, A-frames, signs with timber supports, signs with supports of aluminum, and other concepts were investigated.

I think probably this would be a good time to show the movie.

Mr. W. MAY. Just before we start, another statistic. According to the Bureau of Public Roads, there were 6,163 accidents involving vehicles in collision with fixed objects which occurred on Texas highways in 1964. The 1,201 figure you mentioned represents about 20 percent.

Dr. HIRSCH. Yes. They were signs. Some of the others were light poles which I think Dr. Rowan will comment on later.

Mr. W. MAY. I see.

Dr. HIRSCH. And possibly trees and culvert wall.

Mr. BLATNIK. Mr. Wright.

Mr. WRIGHT. Mr. Chairman, I want to ask one or two questions at this point, if I may. First, let me congratulate Dr. Benson and his colleagues for the fine work in Texas they have been doing. It is forward-looking work.

One figure he has mentioned that was particularly interesting to me—your studies seem to coincide with others that have been made. We had some yesterday relating to the incidence of accidents and fatalities resulting from a car going off the highway and striking a fixed object along the right-of-way. I believe you said 65 percent of the fatalities in the group of accidents studied by your institute resulted from this type of obstacle.

Do you have any figures that would tell us relatively how many of those resulted from cars veering off to the right and, how many might have resulted in cars veering into a median strip to the left?

Dr. KEESE. Mr. Wright, quite early in our studies, one of the things involved was a study of highway medians, and the encroachment of vehicles onto that median and the development of the median guard-rail to prevent the vehicle from going into the opposing traffic lanes.

I do not have the report with me that indicates the number of these that did cross the roadway, but since these were urban studies, I would