

if there is any increased resistance, is so minor that the breakaway action will still be had.

One other comment in this project, and it was not covered in the film, is that we had a study in depth to develop this mathematical model so that it could easily be extended to other types of materials and other types of sign configuration. I will not go into that at this time because it is a little bit too detailed.

I might point out, as far as the deceleration levels I commented on with the breakaway concept, with the Minnesota deforming A-frame cantilever post, the change in velocity of the vehicle is 1 to 2 miles an hour, more usually 1 mile per hour. The *g.* forces on the vehicle are on the order of 7 to 8 *g.* for a short period of time, something like 0.03 second.

As far as the driver himself is concerned, the *g.* levels on our simulations and model studies indicate that he would only get one-quarter to one-half the *g.*, something like one or two *g.*, for a very short period of time. And according to existing impact and survival data developed by people at Holloman Air Force Base, this is well below surviving or accidents that should create any injuries.

Mr. BLATNIK. Professor, your testimony is truly most enlightening; Dean, all of you witnesses have provided most enlightening information. What really disturbs me—am I not correct that all the information we have seen as to deceleration, the dissipation of impact forces and energy, has been long known? It is quite common knowledge in the engineering field, is it not?

Dr. HIRSCH. Essentially, yes.

Mr. BLATNIK. What puzzles me is that the Interstate program itself is the most modern highway system in the history of mankind. It is 11 years old. I find it absolutely incredible if not appalling, for 11 long years we have put in literally millions of signs that were known and should have been known to be lethal all the time, and only within the last 2 years are those in charge of the construction of the roads utilizing information that is standard and simple as far as engineering knowledge is concerned. Is that not true?

Do you want to comment?

Dr. BENSON. Well, Mr. Chairman—

Mr. BLATNIK. Those who should have been utilizing information, our engineers and professors and researchers such as yourself have long known of it and it was available had anyone sought the information.

Dr. BENSON. The profession did not think it was as simple as that. I think I pointed out in my testimony that we actually started, Professor Keese and I, with this concept in 1960. It took us 3 years to get it funded. The reason we could not get it funded, I think, was that most people believed we could not do it. They did not think it was possible for us to build, particularly the cantilever type support, that would carry the windloads and which could be made to fail under the impact of traffic.

So we had to prove to the profession that this could be done; that this was a practical possibility.

Mr. BLATNIK. Someone is living in the age of darkness then. I am talking about those who should be utilizing scientific knowledge. We can decelerate a human being from 15,000 miles in outer space and