

down this slope. He can negotiate a pretty steep hill. However, if he comes to the bottom and runs into a V-ditch or bunch of trees or a sharp back slope or rocks, that is where he really gets into his trouble.

In the rock cuts, these probably should be protected. One way might be to face them with a fairly low concrete wall that would at least make it smooth. It is pretty hard to make it soft, but you can make it smooth.

I have mentioned ditch bottoms. They should not be allowed to be V-shaped. They should be gradually rounded so that a car going through it will pass through and not be brought to an abrupt stop against or toward the back slope. Obviously, trees should not be tolerated close to the roadside. Trees should not be planted on the slope itself, as we saw them on the pictures.

One other item on the slope. In some cases the slope can be flattened and carried out farther from the road to protect an underdrain. In other words, if an underdrain is extended, it becomes less hazardous, and the slope can be flattened to cover it up. Carry it back a hundred feet from the road, and flatten your slope to cover it up, and you do not have to worry about the head wall or the end of the pipe.

Mr. CONSTANDY. Mr. Huff?

Mr. HUFF. Of course the advantage of the flat slopes has been demonstrated over and over. We might say that this was first brought strongly to our attention a good many years ago by one of the automobile manufacturers whose representative is sitting to my right. We should be grateful for the groundwork and the basis upon which this important feature was developed.

I might add that on the Interstate System it is entirely possible that we would have enough right-of-way to develop flatter slopes than on most of the roads that we have already built. However, highways where right-of-way has been a problem will constitute one of the greatest difficulties in developing flat slopes on already constructed highways.

In my opinion it is most important that we do move to developing slopes in the area of 6 to 1, which is recommended by the yellow book, on all new highways and on those which have already been built where it is possible.

Mr. CONSTANDY. Thank you, Mr. Huff. Mr. Wilkes?

Mr. WILKES. I do not believe I have any comments to add to those that have been made previously.

Mr. CONSTANDY. It is a little out of your field. Mr. Ricker?

Mr. RICKER. I do not know that I have much to add, except that in many parts of the country such as in Pennsylvania we have almost continuous cuts and fills as we traverse the hilly and mountainous areas; and it is literally not possible to get the flat slopes that might be desirable, the same way with the rock cuts that are exposed.

There is another area here which is probably not for discussion today, but the variation in scenery that is obtained by having rock cuts or changes in topography may result in drivers being more alert and staying awake longer; and I do not know that we have any data yet which shows that they can drive these roads safer, but I suggest there is a possibility.

Mr. CONSTANDY. Thank you, Mr. Ricker. Mr. Chairman, that concludes the presentation of the slides on the nine projects. It had been my intention at this point to ask Mr. Prisk to make some summary