

The vertical curve, therefore, must be adequate to permit a driver to see such an obstruction over a hilltop and give ample time to stop his car if it is traveling at design speed on a wet pavement and the tires are worn. This does not mean smooth tires, a heavy water film and a panic stop. Hydroplaning would result in such an instance.

Deceleration rates are used in developing the length of deceleration lanes and the determination of exit ramp speeds.

Even the 12-foot lane width that is used universally in modern highways is developed scientifically. It is not a function of the physical width of the vehicle, but it is an overall width plus lateral insulation space that is needed to safely accommodate the natural weaving of a vehicle traveling at the design speed, and it is for the purpose of minimizing driver strain that can be a factor on narrow pavements.

The width of the right-hand shoulder of the Interstate System is based on the physical width of the legal vehicle and it being able to clear traffic on the traveled way, yet not apply loads closer than 2 feet to the shoulder line.

It is difficult to maintain structural stability close to the shoulder line because of weather and moisture conditions.

Even the limiting curvature on high-speed highways is based on scientific facts. The curvature is limited by the allowable superelevation rate and the side friction factor of the pavement. The latter two values are generally set at the coefficient of rubber tires and ice, so vehicles will not slide off the pavement during icing conditions.

Highway location itself requires great talent and is an art that relatively few people possess. A person must have a thorough knowledge of design standards and visualize the manner in which the road will fit into the topography when it is built.

It is a continuous linear design which is entirely a different matter than a spot location design, such as a small park or building location. It involves the combining of controlling curves, sight distances and grades, together with the accommodation of necessary appurtenances to give a safe and functional operation, a pleasing appearance, cause a minimum of disruption during construction and in the community, and gives the most economical construction.

We find that often highway location and design is subject to criticism by nonhighway people and especially after the road has been completed. We believe if these critics were assigned the responsibility of going out and actually locating and designing a highway, they would develop a keen appreciation and respect for the ability of the professional highway engineer.

After the location survey has been completed, a high degree of professional competence is required in the design of the project. The laying of grade lines, the determination of the size, type and location of minor drainage structures and the selection of bridge types and the completion of their structural design involves large sums of public funds and expert know-how is absolutely essential.

The design standards that we have developed have resulted in completed Interstate System sections that have no obstructions closer than 12 feet to the pavement edge. This is the first time that a highway system has been provided that can make that claim.

The traveled way and shoulder design, together with the the control of access feature, separation of grades, the dividing of roadways and