Roadside Development Safety Features in Highway Design Standards

HOWARD S. IVES, *Commissioner, Connecticut State Highway Department*

• THERE APPEARED in the October 15, 1961, issue of *Parade*, a Sunday newspaper magazine, the announcement of the 1961 award to the State of Maine for "America's Prize Highway." Quite naturally, this feat was a cooperative effort, involving the help of planners, designers, construction engineers, contractors, and the regional engineer of the U. S. Bureau of Public Roads, as well as the assistance of the landscape engineer in the Maine State Highway Commission. Those responsible for making this a great addition to the Nation's highway system are to be commended.

This section of road has been described in editorial comment in Augusta's *Kennebec Journal* as "the highway *with a soul*, because it was architectured to nature." It is considered a driver's road—a combination of scenery, speed and safety that have been "designed into" the landscape. It thus portrays what is known as the "complete highway," with safety, utility, economy, and beauty blended together for the service of transportation.

This finest section of Interstate Route 95 embodies all the principles set forth in "A Policy on Landscape Development for the National System of Interstate and Defense Highways," adopted by AASHO on January 25, 1961. This highway is an example of collaborative effort on the part of all —the administrator, the planner, the designer, the landscape engineer, and the contractor. This particular section of road embodies the several roadside development safety features that are such a basic part of every highway segment. Most important of these is that "divided highways should be designed as two separate one-way roads to take advantage of terrain and other conditions for safe and relaxed driving, economy, and pleasing appearance. All known features of safety and utility should be incorporated in each design to result in a National System of Interstate and Defense Highways which will be a credit to the Nation."

The alignment of this highway is such that it flows through the countryside—long, easy-flowing curves have been used in lieu of long tangents. Driver interest has been introduced, so that the road lacks the monotony of "sameness"—the one item responsible for a great amount of driver failure and many tragic accidents, because it induces so-called "turnpike trance." There is continually something new and interesting, yet not startling, as the vehicle operator traverses this sort of road.

The grades are easy and fit the topography so that neither the car driver nor the truck operator needs to be concerned with constantly changing speeds. Again, the grades flow through the topography in such a manner that interest is created and tension is reduced. There is ample

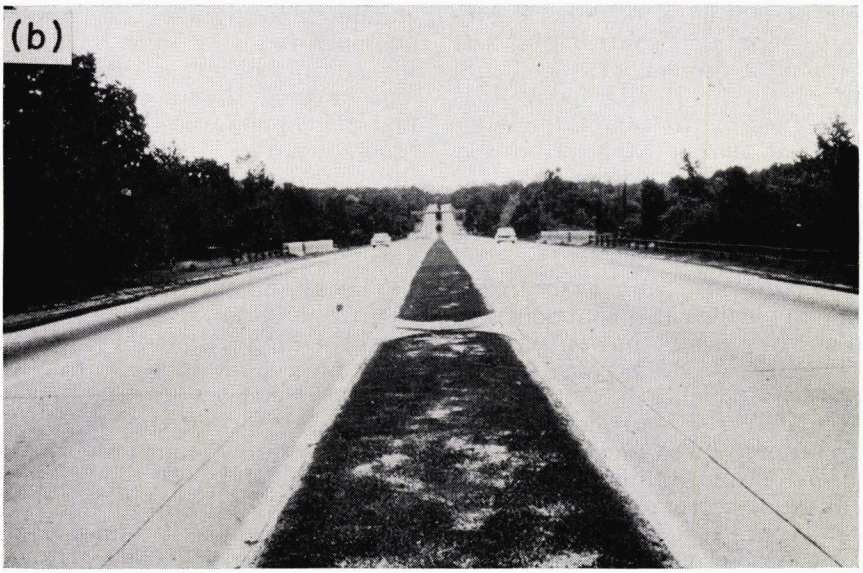

Figure 1. (a) Rural section of highway with two one-way divided roads and conservation features; and (b) road with long tangents, narrow equal-width median.

sight-distance ahead in order that emergency stops for any disabled or slow-moving vehicle may be avoided. And over each gentle roll in the grade, something new and interesting appears on the horizon.

Every highway must have some geometric elements that are the same—the same width of pavement and similarity in the construction elements. Yet the cross-section of the required roadside elements can be

Figure 2. Expressway should fit into existing terrain.

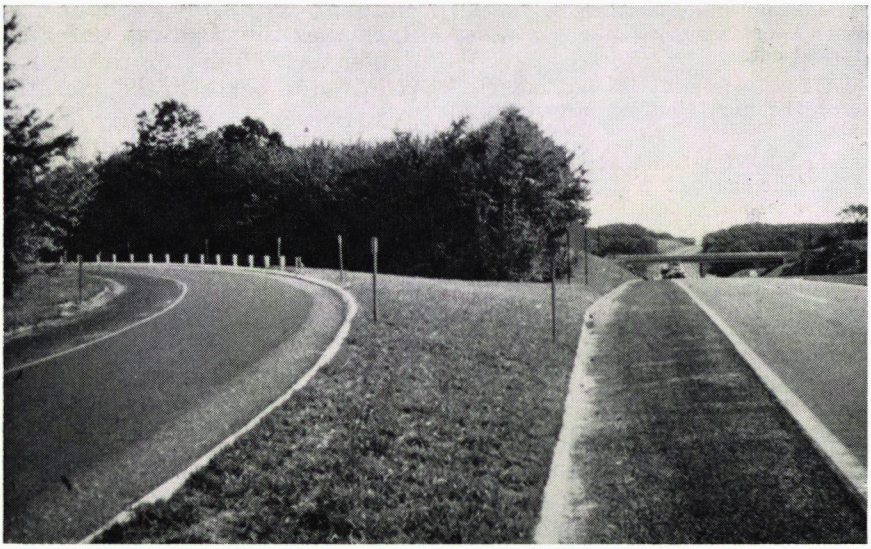

Figure 3. Conservation of natural resources can be an asset to safe travel.

changed to fit the existing conditions. Roadside slopes should be well-rounded and molded into the existing terrain. The flatter the slope, be it cut or fill, the easier it is to stabilize and maintain. Consequently, the vehicle that suddenly goes out of control is damaged less if it traverses an easy slope. Thus the highway is made safer.

Conservation is an important safety factor in highway design. By the preservation of existing natural landscape features, vegetation as well as other important elements, greater safety can be enjoyed by the motorist.

The constant annoyance of headlight glare can be a great detriment to a vehicle operator. By conserving many of the natural resources much of this can be avoided.

As an example of how headlight glare can be a hazard to safe vehicle movement, the following is quoted from an article in a Connecticut newspaper on December 14, 1961.

> *Auto Rams House, Tree* . . . K said he was blinded by headlights of an approaching auto last night with the result that one nearby house lost its front steps and a railing, and a neighboring home its electricity. Police said K's auto swerved off the road here, went 100 feet up an embankment, turned right, crossed the street onto a lawn, sideswiped a tree, went through a fence, and tore down some shrubs and bushes.
>
> The car continued on and tore the steps and railing off a house, went through a hedge and rammed into the electric meter on another house, recrossed the street, and hit a parked car.
>
> The John Lyons family was without electricity for the night but no injuries were reported.
>
> K was scheduled for court appearance December 22. The charge? Failure to drive in the proper lane.

Obviously this is one accident in a million, one that perhaps would not ever happen again—and, thankfully, it did not result in a tragedy. However, it does point emphatically to the need for that roadside development safety feature—conservation of plant materials and the necessary attention given to the blinding headlight glare.

K. A. Stonex, assistant director of the General Motors Proving Ground, recently brought to the attention of a group of engineers in a midwestern city the need to separate lanes widely not only to avoid cross-median accidents but also "to allow vehicle operators to use their high-beam headlights for better, more complete, night-time visibility" without blinding the operator of the on-coming car.

Planting is an important landscape development feature, and, functionally performed with a comprehension of the correct design and use of plant materials, can be a tremendous asset in the esthetic appearance of the "complete highway." The following are a few functional values that may be achieved by well-designed and installed plantings:

1. Protecting the side slopes against erosion. Eroded material that reaches the travelway is a hazard, and every obstruction that can be eliminated from the travelway will make for a safer road.
2. Reducing maintenance operations by erosion control. Every man and every piece of equipment constitute a traffic hazard, and their elimination within the highway limits makes the roadway safer for the driver as well as for the maintainer required to perform the operations.
3. Screening unsightly objects and views. Nothing creates driver tension more than roadside clutter and an unsightly, dirty scene flashing before the driver's eyes.
4. Isolating the highway from the roadside border developments, and thus preventing pedestrian trespass and reducing traffic annoyance for nearby residential areas.
5. Providing advance warning to traffic by indicating structure openings, guiding traffic turns, and framing desirable outlooks and views so that operator interest is created.
6. In the median areas, to supplement valuable conserved vegetation, installing plantings to obscure headlight glare, to function as crash barriers and to prevent the drifting of snow in the snow-belt States.
7. Installing shade trees, where feasible, for comfortable vehicular travel in the hot, glaring sun.
8. Improving the appearance and esthetic interest. A pleasant drive is usually a safe one, and plantings can

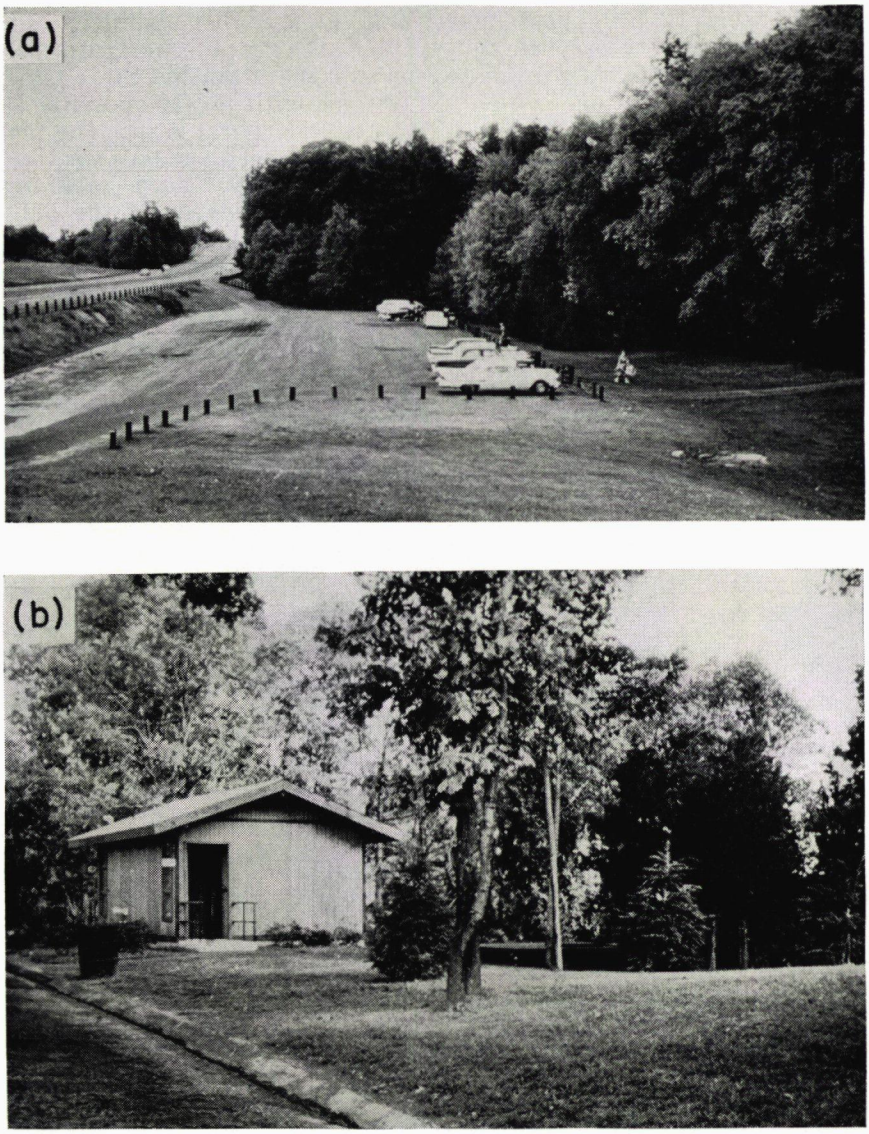

Figure 4. Rest areas (a) are an essential safety factor and should be equipped with modern comfort facilities (b).

create an important asset in motor travel.

These are but a few of the functional values of roadside plantings as an important landscape development safety factor.

Finally, there is the safety rest area, equipped with modern comfort facilities, that is an essential roadside safety factor. The tired driver must have a place to drive off the travelway, stop, rest, and relax. The truck operator needs such a place as

much, if not more, than the passenger vehicle driver. Safety experts encourage such stops to promote trouble-free transportation.

Many know of the plea set forth in the recent AASHO sessions in Denver to attain Federal financial participation for modern comfort facilities in safety rest areas. In numerous instances, especially on the midwestern highways, such convenience facilities are lacking. Safe vehicular operation demands that this important roadside safety factor be given immediate and whole-hearted attention and support.

It is the responsibility of every chief highway administrator to develop and maintain his State's highway system with every possible safety factor incorporated into the planning and design. This makes for the "complete highway," such as Maine has recently developed. If the principles of sound landscape development are combined with good engineering practices, safer transportation arteries will be achieved. Maine is an exemplary guide in creating a highway transportation system that is utilitarian, economical, beautiful, and safe.