

# achievements in the visual quality of roadway design

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There was a time in history when the occupations of the artist, the engineer, and the architect were combined into a single profession. Leonardo da Vinci and Michelangelo were not only painters and sculptors; they were also designers of bridges, plazas, and buildings. In those days a bridge or a plaza not only was functional but often served as an identifying feature and focal point of a community. There are numerous modern-day counterparts to the ancient achievements, such as the Golden Gate Bridge in San Francisco or the Papago Freeway in Phoenix, but it is most difficult to provide such examples of scenic splendor when one is designing, for instance, a rural highway connecting several farming communities.

During recent years, there have been criticisms of the visual quality of today's roads. Highway engineers have been described as individuals incapable of communicating in terms other than those of cubic yards of dirt. In response to such criticisms, highway designers have in the past decade implemented many innovative and attractive elements to enhance the visual quality of roadways. It is interesting, however, to compare what the engineering professors were teaching and writing years ago to what is being taught today. Most modern textbooks do speak favorably of the use of aesthetic design features in horizontal alignment; a surprising paragraph is found, however, in a textbook by Hickerson (1):

More attention should be given to roadside improvement, beautification, and scenic effects. Unsightly objects should be removed, and ugly banks or slopes should be sodded or covered with evergreen vines, such as wild honeysuckle. Large and rare trees and shrubs found in their natural state on the right-of-way should be preserved; and along barren stretches of the road, trees should be planted. All shrubby plantings along the inside edge of the highway should be limited to the dwarf varieties in order not to obstruct safe visibility.

Hickerson then suggests concepts such as the acquisition of extra right-of-way to preserve dramatic and scenic terrain for roadside development. What is surprising about

Hickerson's statements is that they were written nearly 40 years ago! Indeed, in some ways his language is stronger than that found in today's textbooks.

It is difficult to explain, then, why it has been only during the last decade that some of the most dramatic achievements have occurred in the visual quality of highway design. No doubt the appearance of divided facilities, which lend themselves more easily to landscaping treatment than do 2-lane roadways, has something to do with the increased incorporation of aesthetics as has also the increased availability of funds for such purposes or perhaps the recently increased concern for the environment. Without speculating further on the reasons behind the achievements, however, I shall discuss examples of those achievements in the sections that follow.

Perhaps the simplest way to discuss visual quality is to divide the examples of recent achievements into 3 basic categories that refer to the class of individuals whom the achievements benefit: the vehicle driver, the passenger, and the nonmotorist. Each class of beneficiary presents to the designer a different set of opportunities and constraints.

### VISUAL EXPERIENCES FOR THE DRIVER

A major constraint in offering a multitude of visual experiences for the driver concerns the need to maintain safe driving conditions. For example, in certain areas a line of sight must be maintained between drivers of vehicles entering a roadway and drivers of vehicles already on the roadway. Treatments such as sparse planting of trees in the space between the ramp and the main line can enhance the attractiveness of the approach without jeopardizing the safety of merging vehicles. That type of treatment creates another constraint for designers, however, in that safe setbacks for trees and other objects must be maintained. Figure 1 shows one means of accomplishing the setback without introducing a barren look. The use of multicolored rock, varying slope gradients, and a variety of shrubbery has created an attractive setting.

Another design constraint related to safety concerns that time span in which a driver may view scenery. A vehicle driver does not have the ability to gaze for long periods of time at specific objects adjacent to the roadway; he must maintain peripheral vision to the roadway ahead, and designers have taken advantage of opportunities to provide the driver with panoramic and sweeping views that can be seen at various locations over long stretches of roadway. Figure 2 shows how a wide median enables the driver to view the landscape without being distracted by oncoming traffic. The driver's view is further improved by the differing elevations of opposing lanes.

Figure 2 also shows how the designer has made use of horizontal geometry. Traditionally, engineers have avoided the use of highway curves unless necessary to match existing topography. In older types of design, long tangents were common, and their monotony was apparent. More recently, however, engineers have tended to use long reverse curves even in areas where topography does not require such treatment, as Van Riper has pointed out (2). Figure 2 shows that the use of long and gradual reverse curves not only is pleasing to the eye but also may tend to be less fatiguing for drivers. Safety and beauty are terms that can complement each other in highway design.

### VISUAL EXPERIENCES FOR PASSENGERS

Passengers, unlike drivers, have the opportunity to look at specific objects directly adjacent to the roadway for longer periods of time. The highway designer can, by preserving or by enhancing the natural beauty of original features, provide such opportunities. In many cases, a visual amenity can be created through the use of natural elements such as rock formations in the right-of-way that can be left in place.

In addition to retaining a natural setting, in some cases it can actually be enhanced and a new viewing experience created. Figure 3 shows the gradual slope and improved shoreline that increase the natural beauty of a small lake and forest without introducing elements so foreign as to give it an urban character.

**Figure 1.** Obstruction setbacks do not need to look barren.



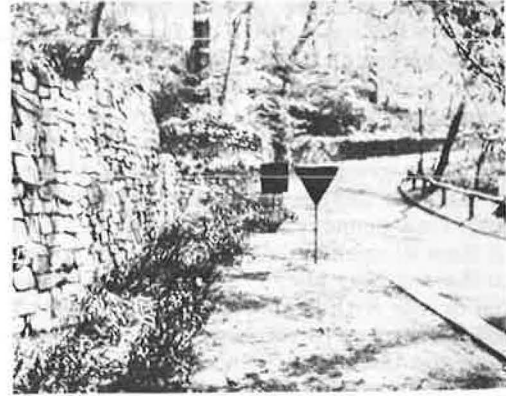
**Figure 2.** Long reverse curves enhance the driver's view and eliminate the monotony of long tangents.



**Figure 3.** Existing natural features such as shorelines can often be improved.



**Figure 4.** Urban parkways can be aesthetically treated.



**Figure 5.** Attractive planting schemes and cobblestone walkways provide visual benefits to motorists and pedestrians alike.



## VISUAL EXPERIENCES FOR NOMOTORISTS

Passing motorists see highway improvements for a relatively short period of time, but local residents must look at them daily. If poorly designed, they are a constant eyesore for an indefinite number of years. Designers have recognized this problem, particularly in urban areas, and have developed numerous techniques to deal with it. Figure 4 shows the preservation of the unique character of an attractive glade in an urban area; the use of a rock retaining wall, discrete signing, and the low wooden railing allow a parkway to blend easily into the natural setting.

Another example of providing attractiveness in an urban setting is shown in Figure 5; the use of cobblestones and planting refutes the notion that asphalt and concrete are the only materials engineers are capable of working with. What could have been a simple channelization project has become a desirable permanent feature of the community, and it accommodates pedestrians as well as motorists.

## SUMMARY

This brief depiction of some of the achievements in visual quality during the past several years is not intended to be a comprehensive listing. I have attempted to show that highway designers have been and are capable of creating facilities that are functional in character, that retain features of the natural terrain, that introduce new and pleasant visual experiences, and that provide those experiences to drivers, passengers, and nonmotorists alike.

The noted architect Crosby pointed out that, from a distance of more than 400 ft, an object such as a building becomes part of the environment (3). To expand that thought, I would say that once a structure—building, bridge, or highway—has been built, its impact on the existing environment multiplies because it has become a part of that environment. It is a feature of the environment as permanent as a river or a forest.

That aspect of highway construction was recognized by engineers 40 years ago and continues to be recognized today. With each passing year and with each cubic yard of earth moved and replaced by concrete, the achievements of highway designers in preserving and enhancing the visual environment advance. The accomplishments of the past several years are only the beginning of a trend that will continue to improve the visual quality of transportation systems.

## REFERENCES

1. Hickerson, T. *Route Surveys and Design*. McGraw-Hill, New York, 1936, p. 24.
2. Van Riper, D. *Esthetics in Highway Design*. *Civil Engineering*, April 1972, pp. 49-51.
3. Crosby, T. *Architecture: City Sense*. Van Nostrand Reinhold, New York, 1965, p. 27.