

mediate-type surfaces vary all the way from relatively low-cost surface treatments to pavements that are only slightly less costly and lower in strength than the most expensive high-type pavements. Low-type surfaces range from surface treated earth roads and stabilized materials to loose surfaces such as earth, shell, and gravel.

Highways range from single-lane rural roads to high-speed multilane facilities of eight or more lanes. Single-lane roads are considered suitable only in low-traffic-density areas where the average daily traffic is fewer than 100 vehicles. A single-lane road may vary from 8 to 14 feet wide and serve traffic in both directions. By far the greatest mileage of highways consist of two lanes, but the mileages of four, six, eight, and more lane facilities are increasing rapidly. Lane widths are usually determined by a combination of factors such as speed, traffic composition, traffic volume, and, of course, cost. There is still a large mileage of highways with lanes less than 12 feet wide, but for a modern high-speed facility, 12 feet is generally considered to be a minimum acceptable lane width.

A highway shoulder is the portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses. It varies in width from practically nothing on low-traffic rural roads, to 12 feet or even more on major roads, where the entire shoulder may be stabilized or paved.

Traffic control signs, lights, and markings, are provided for the convenience and protection of motorists, but lighting of rural highways is seldom found or considered to be justified except on critical curves, intersections, long bridges, tunnels, and areas where roadside interference is a factor.

Intersections are points of conflict and potential hazards: Ingress and egress on most highways are accomplished by direct at-grade connections. Local conditions and cost of right-of-way influence the type of intersection selected as well as many of the design details. It is mostly on divided, controlled access highways that special structures are provided to eliminate intersections at grade, with ramps and speed-change lanes provided for safe entry and exit.

The gradients on secondary and minor rural roads generally follow the natural contours of the land. In mountainous terrain the grades are frequently quite steep and the sight distance critically reduced. On major high-speed highways, gradients are limited so that reasonable speeds can be maintained by both automobiles and trucks. For design speeds of 50, 60, and 70 miles per hour on the Interstate System, gradients generally are not steeper than 3, 4, or 5 percent, except in rugged terrain where 2 percent steeper grades may be permitted.

The road and street systems in the United States have grown but little in extent in recent years, the total mileage increase since 1956 being less than 1 percent per year. The Nation's needs lie generally not in a large increase in mileage, but in improvement or replacement of existing highways. As one indication of improvement progress, the mileage of unsurfaced roads and streets has been declining at an average rate of 2 percent during recent years. The effects of the expansion of urban areas and population are reflected in the fact that municipal mileage has increased an average of nearly 4 percent per year since 1956.