SUPERELEVATION OF HIGHWAY CURVES*

By J. W. Lowell

MANY people look upon superelevation as a convenience to automobile traffic and especially the speed fan. Some take into consideration the factor of safety, but few have given serious thought to the question of maintenance which is equally important.

Any observing person who uses the road knows that curves are generally in worse condition than the straight road. This condition appeared simultaneously with the motor vehicle and has likewise grown with it. One need only to be in an automobile and feel the thrust against the side of the car when rounding a curve to appreciate why pavements ravel, rut and wear out fast. It is hard to realize the severity of the thrust given to the pavement surface and to the wheels and tires of a car when rounding a curve, but we know it is sometimes great enough to cause heavy cars to tip completely over. A curve on a road race-course just after a race is a good example of accelerated disintegration of roads on curves.

Safety to traffic is a problem which must be given serious consideration, for fatalities are increasing at an enormous rate. Superelevating curves will not be a panacea for all road troubles, but it should lessen the fatalities on curves, which is one of the places where many occur. The strain on automobile wheels sometimes breaks them, causing serious accident. This can be eliminated by superelevation which does away with thrust. Superelevation makes both road tracks alike and there remains no object to cross over to the wrong side. With the crowned road there is a tendency for drivers to take the inside of the curve to avail themselves of the superelevation formed by the crown.

Supereleyation will result in convenience for all motor traffic which constitutes the majority of vehicles. Both driving and riding will be safer, smoother, more economical and more comfortable.

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However, roads are built to accommodate all kinds of traffic and therefore must be designed for the horse as well as the motor. These represent the extremes in speed and stability of footing.

If we superelevate for motors at high speed the horse cannot keep his footing, therefore the maximum superelevation attained should not exceed 3/4 in. per foot of width for hard surfaced roads such as concrete and brick and 1 1/4 ins. per foot of width for stone, gravel or dirt roads. With these slopes horses should pull comfortably, for they are not greater than the ordinary crown.

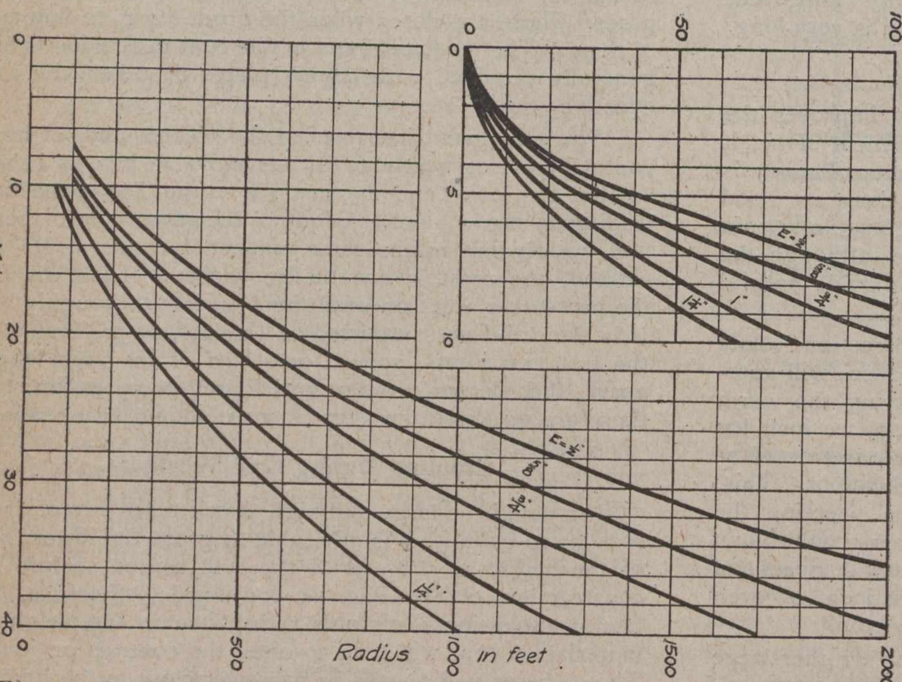

Fig. 1—Curves for Superelevation of 1 in. to 1½ ins. Per Foot for Speeds Up to 40 Miles Per Hour

Just to what extent this small amount of superelevation will be of value is illustrated by Fig. 1, showing the speeds that may be attained on various sized curves for these small superelevations. Analyzing the curves with the thought in mind that the sharpness of curve controls the speed, it is evident that the permissible superelevation compensates for speeds that are likely to occur on most curves from the sharpest to the flattest. Should the speed be excessive and not entirely compensated, we have at least by our superelevation minimized its effect.

Naturally the smoothness and wearing quality of road surface influence the effectiveness of superelevation to a small extent where only part compensation is attained, but after all, we have this condition on roads as now built.

There are probably many ideas as how best to construct a superelevated curve. The problem can be made just as complex as the designer desires. The simplest method is to construct the entire curve at full elevation by raising the outer edge, keeping the inner one to grade and changing from crown the superelevation in a distance of about 30 ft. on the straight road.

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