Horizontal Curve Design

CE 322
Transportation Engineering
Dr. Ahmed Abdel-Rahim

Example 2

A horizontal curve is designed with a 2000-ft radius. The curve has a tangent length of 400 ft and the PI is at station 103+00. Determine the stationing of the PT.

Example 3

A horizontal curve on a two-lane highway is designed with a 700-m radius, 3.6-m lanes, and a 100 km/h design speed. Determine the distance that must be cleared from the middle of the inside lane to provide sufficient sight distance for desirable and minimum SSD.

\[
R = R - \frac{3.6}{2} = 700 - 1.8 = 698.2
\]

From Table 3.1a, SSD = 205

\[
M_s = R \left(1 - \cos \left(\frac{90 \times \text{SSD}}{\pi \times R} \right)\right) = 698.2 \left(1 - \cos \left(\frac{90 \times 205}{\pi \times 698.2}\right)\right) = 7.51 \text{ m}
\]

Example 4

On a 2500 ft radius horizontal curve, what \( M_s \) is required to provide desirable SSD and PSD if the design speed is 50 mph?

At 50 mph, required SSD is 475 ft (from Table 3.1b), so

\[
M_s = 2500 \left(1 - \cos \left(\frac{90 \times 475}{\pi \times 2500}\right)\right) = 11.3
\]

At 50 mph, the required PSD is 1,800 ft (from Table 4.3b), so

\[
M_s = 2500 \left(1 - \cos \left(\frac{90 \times 1800}{\pi \times 2500}\right)\right) = 160.3 \text{ ft}
\]

PSD is difficult to provide on horizontal curves, so usually only SSD is provided.