

Example #6: Designing a Crest Vertical Curve

Design a length of vertical curve for a crest curve based on SSD and the following information:

Design Speed = 40 mph

$g_1 = 1.25\%$

$g_2 = -2.75\%$

Solution:

Determine the change in grade elevation $A = |g_2 - g_1| = |-2.75 - 1.25|$

$A = 4.0\%$

AASHTO Design Controls for SSD (Exhibit 3-76) - **Min. SSD = 305 ft**

Assuming $S > L$

$$L = 2S - 2158/A$$

$$L = 2 \cdot 305 - 2158/4$$

$$L = 610 - 539.50$$

$$L = 70.5 \text{ ft}$$

Assumption is correct $S > L$,
We have found the minimum length of curve!
Remember MoDOT recommends a length of curve of at least 300 ft when possible.

What if we had started with this assumption ? $S < L$

$$L = AS^2/2158$$

$$L = 4 \cdot 305^2 / 2158$$

$$L = 172.43 \text{ ft}$$

$S < L$,

Assumption is wrong, would have had to use the other formula to obtain the correct answer

