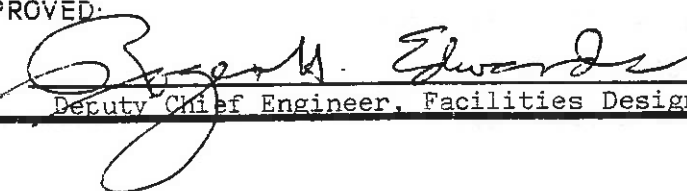


PREL.		CAPE
TO:	FEB 3 1978	<b>ENGINEERING INSTRUCTION</b>
Dir Prt <b>SUPERSEDED BY</b> <u>EI 95-013</u> <b>EFFECTIVE 3/7/95</b>		NEW YORK STATE DEPARTMENT OF TRANSPORTATION SUBJECT: GUIDE RAIL SELECTION CRITERIA Subject Code: 7.26-2.10.01.03
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APPROVED:  Deputy Chief Engineer, Facilities Design Subdivision		

The following is a method for selecting guide rail taking into consideration lower speeds and flatter angles of impact. The Highway Design Manual will be revised in the next revision to incorporate this method.

Guide rail selection will be based on the deflection criteria shown in Table 10-3 and Figure 10-X. The designer should determine how much unobstructed distance will be available behind the guide rail for deflection. He should then choose the type of guide rail that permits the greatest deflection without exceeding the available deflection distance. This will result in the safest and most economical choice because the more flexible railings cost less and result in less vehicle deceleration upon impact.

The deflections in Table 10-3 are based on a 4,000 pound vehicle impacting the barrier at a 25° angle and a 60 mph speed. The 25° angle is equivalent to a 32 foot lateral offset from the vehicle to the barrier. (See Figure 10-Y.) Although more severe impacts are possible, they would be relatively rare so this has been selected as the design impact to determine maximum anticipated deflections. The deflections in Table 10-3 should be used on any highway with a design speed of 60 mph or more and of sufficient roadway width to permit a lateral vehicle offset of 32 feet or more.

For highways with a design speed less than 60 mph and/or a maximum vehicle offset less than 32 feet, the deflections shown in Table 10-3 should be adjusted by the factors shown in Figure 10-X. First determine the maximum lateral vehicle offset by subtracting the width of vehicle (7 ft) from the total roadway width. (See Figure 10-Y.) Enter Figure 10-X with this lateral offset and project horizontally to the appropriate design speed. Then project vertically to determine the deflection factor. Multiply this factor by the deflection shown in Table 10-3 to determine the maximum anticipated railing deflection under the lower speed and offset conditions.

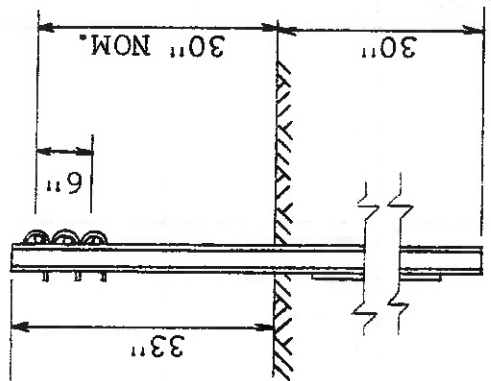
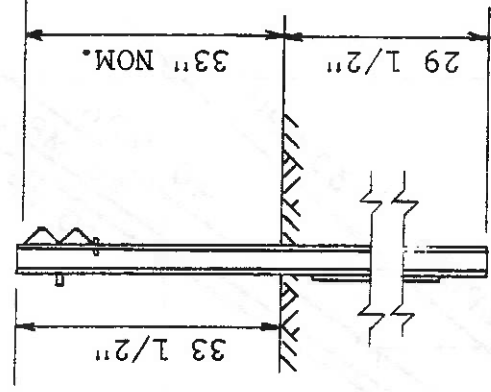
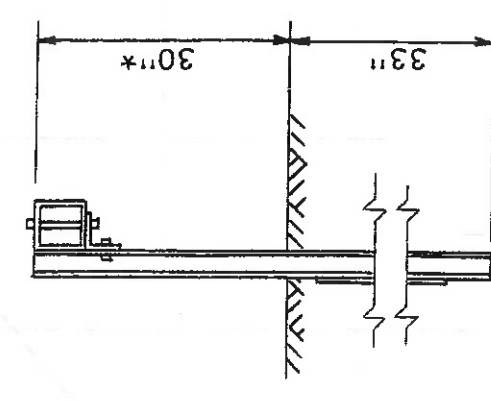
For example: Assume a highway project with a roadway width of 30 feet (22 ft pavement and 4 ft shoulders) and a design speed of 40 mph. Enter Figure 10-X with the maximum lateral vehicular offset of 23 feet (30 ft minus 7 ft vehicle width), project horizontally to the 40 mph curve and then project vertically. The appropriate deflection factor would be 0.69. Therefore, for this sample case, the maximum anticipated deflection would be...

Subject: Guide Rail Selection Criteria

Cable with 16' post spacing -  $11' \times .69 = 7.6'$   
Cable with 12' post spacing -  $9.5' \times .69 = 6.6'$   
Cable with 8' post spacing -  $8' \times .69 = 5.5'$   
Cable with 4' post spacing -  $7' \times .69 = 4.8'$   
Cor. Beam with 12'-6" post spacing -  $8' \times .69 = 5.5'$   
Cor. Beam with 6'-3" post spacing -  $6' \times .69 = 4.1'$   
Cor. Beam with 4'-2" post spacing -  $5' \times .69 = 3.5'$   
Box Beam with 6' post spacing -  $5' \times .69 = 3.5'$   
Box Beam with 3' post spacing -  $4' \times .69 = 2.8'$

RHE:BS  
Attachments

TABLE 10-3  
SUMMARY OF GUIDE RAIL DEFLECTION CHARACTERISTICS

TYPE				
Post Deflection Post Spacing Guide Rail				
		<p><u>CABLE</u> 3I 5.7</p> <p>11', 9.5', 8', 7', 16', 12', 8', 4'</p> <p>3-3/4" Dia. Steel Cables</p>	<p><u>CORRUGATED BEAM</u> 3I 5.7</p> <p>8'    6'    5' 12'-6", 6'-3", 4'-2"</p> <p>W Section Steel</p>	<p><u>BOX BEAM</u> 3I 5.7</p> <p>5', 4', 6', 3'</p> <p>6"x6" Steel Tube</p> <p>* 33" Outside of Superelevated Curve with 30" below ground.</p>

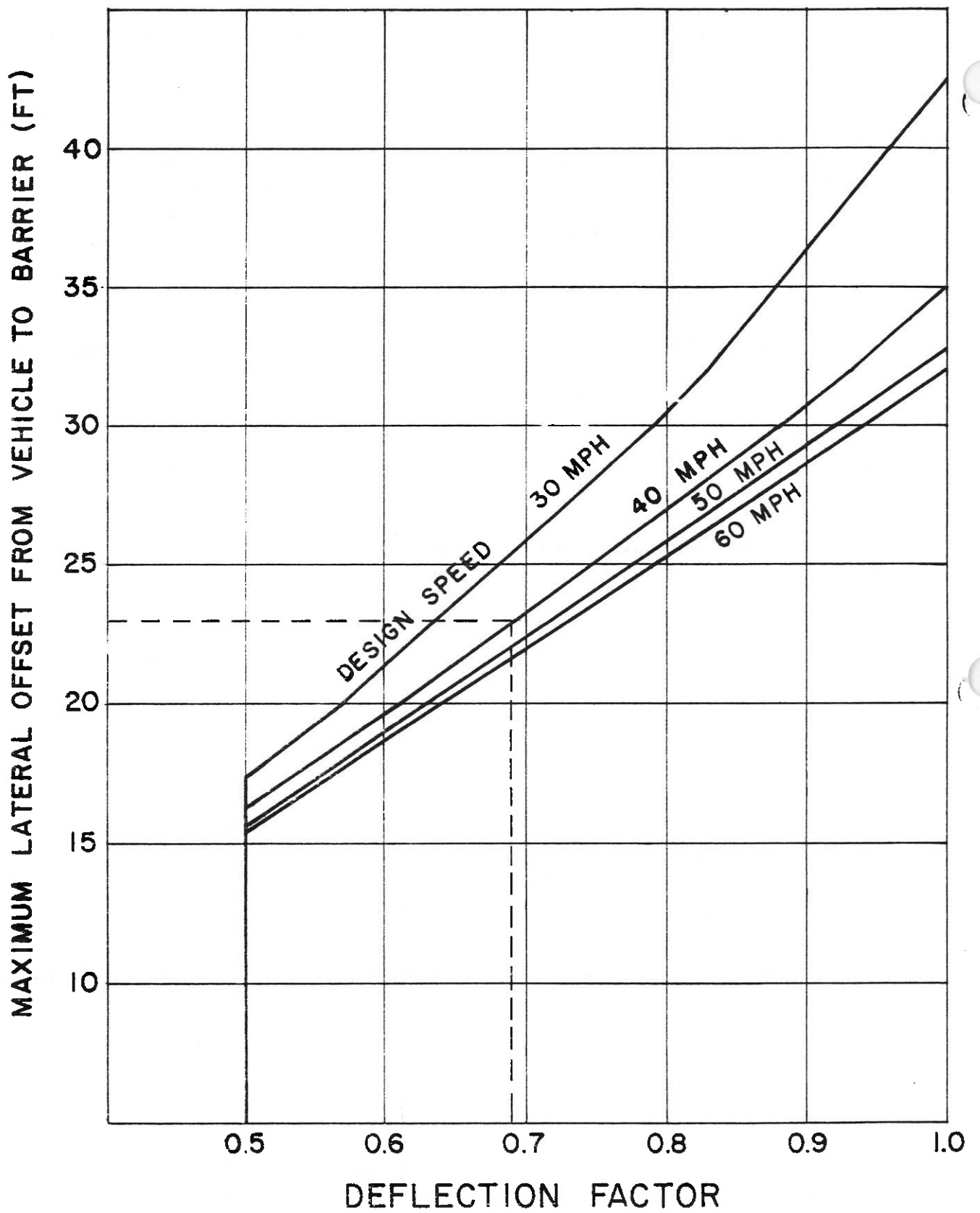


FIGURE 10-X  
GUIDE RAIL DEFLECTION FACTOR

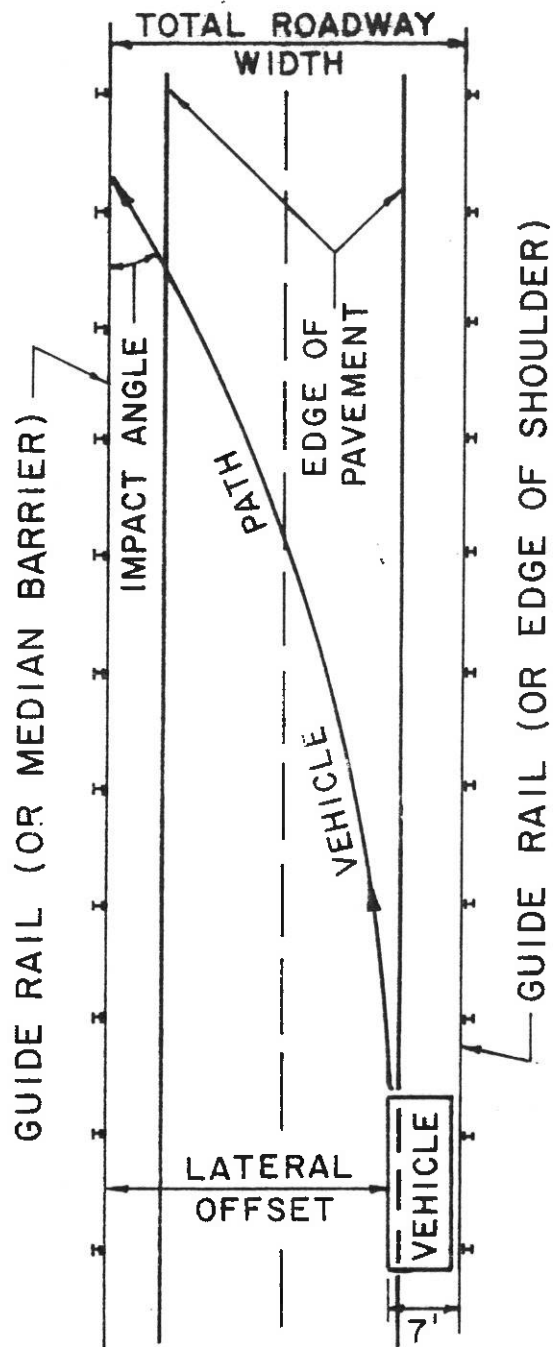


FIGURE 10-Y  
 VEHICLE IMPACT CONDITION