

2007 DES/BRG CONFERENCE

Metal Beam Guard Fence Length of Need Calculator

In Microsoft Excel



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Design Division
Plan Development

Overview

- Automate the Design Process
- Interactive Design
- Ease of Revision
- Electronic Documentation

CAUTION!!!!!!!!!!!!!!!

Engineering Judgment IS Required!!!

- Read Appendix "A" of the Roadway Design Manual.
- Learn when and where guardrail should be used.
- GIGO... Garbage In, Garbage Out.

Where to Find...

Welcome to PLAN DEVELOPMENT'S Homepage

- [Organizational Chart](#)
- [Interactive Design Training](#) (Updated 01/05/07)

GOALS of the SECTION:

- Prepare preliminary designs and final PS&E in support of department letting schedule
- Recommend, test and implement state-of-the-art design tools within the department
- Train employees in design principles and practices

MICROSTATION 2004

- Comprehensive Set of [Cell Libraries](#) (Updated 07/06/07)
- Helpful Design [Tools Related to Using Cell Libraries](#) (Updated 07/27/07)
- [Truck Turning Templates](#)
- [Using Raster Images](#) in Microstation
- [Using Pen Tables and/or Batch Printing to Print Plan Sets](#) (Updated 07/27/07) 
- [Sign Summary Tools](#) (Updated 07/27/07) 
- [Quantity Summaries](#) (includes Landscape, Bridge and Force Account items) (Updated 07/27/07) 
- Automated [Index of Sheets and Plan Set Numbering](#) (Updated 07/27/07) 

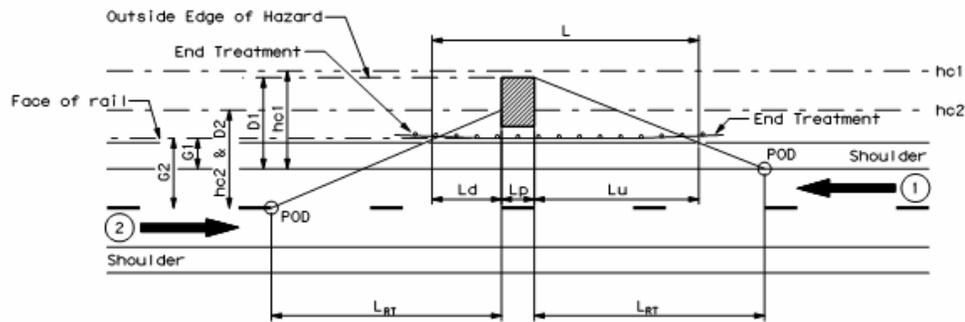
GEOPAK 2004

- [Cutting Plan and Profile sheets](#)

MISCELLANEOUS DESIGN TOOLS

- [Metal Beam Guard Fence](#) Calculator (Updated 07/27/07)  
- Automated [Time line](#) Using Bar Graph
- [Open Channel Depth](#) Calculator
- Spreadsheet for designing [Reverse Curves](#)
- [Interactive Highway Safety Design Model](#)
- [Superelevation Calculator](#)
-  Incorporating Safety into the Highway Design Process - [Products from TxDOT Research Project 0-4703](#) (12/29/06)
-  **Requires Internet Access**

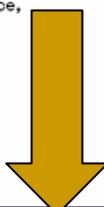
Parameters Tab



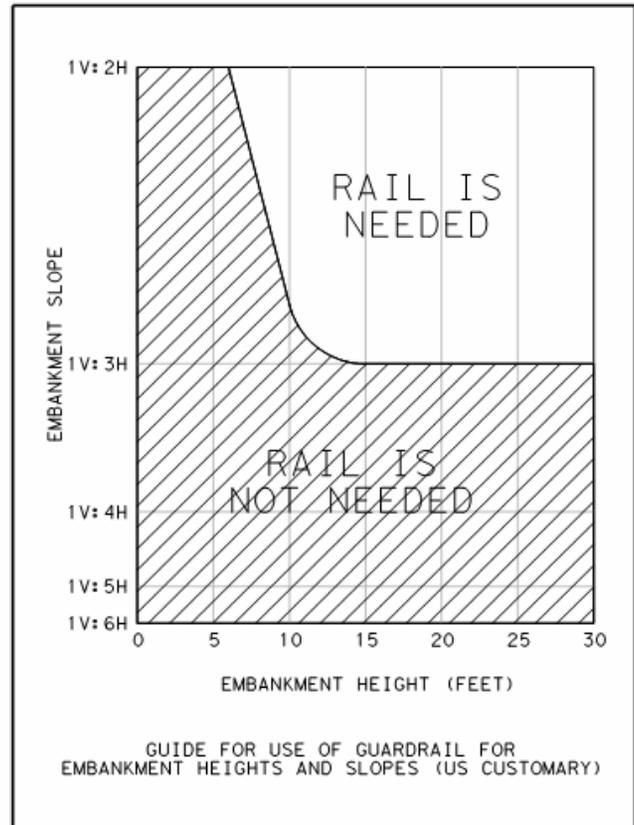
CURRENT ADT	hc	L _{RT}
750 or Less	16'	200'
More than 750	30'	250'

$$L_d \text{ \& } L_u = L_{RT} - \frac{L_{RT}}{D} \times G$$

- POD = Assumed point of departure
- hc = Horizontal Clearance Width
- hc1 = Horizontal Clearance for Direction 1
- hc2 = Horizontal Clearance for Direction 2
- L_{RT} = Length of Roadside Travel
- D1 & D2 = Distance from edge of travel lane to far side of area of concern or to outside edge of horizontal clearance, whichever is least.
- G1 & G2 = Guardrail offset from edge of travel lane
- L_u = Guardrail Length Upstream of Area of Concern
- L_p = Guardrail Length Parallel to Area of Concern
- L_d = Guardrail Length Downstream of Area of Concern
- L = Length of Guardrail Need = L_u + L_p + L_d

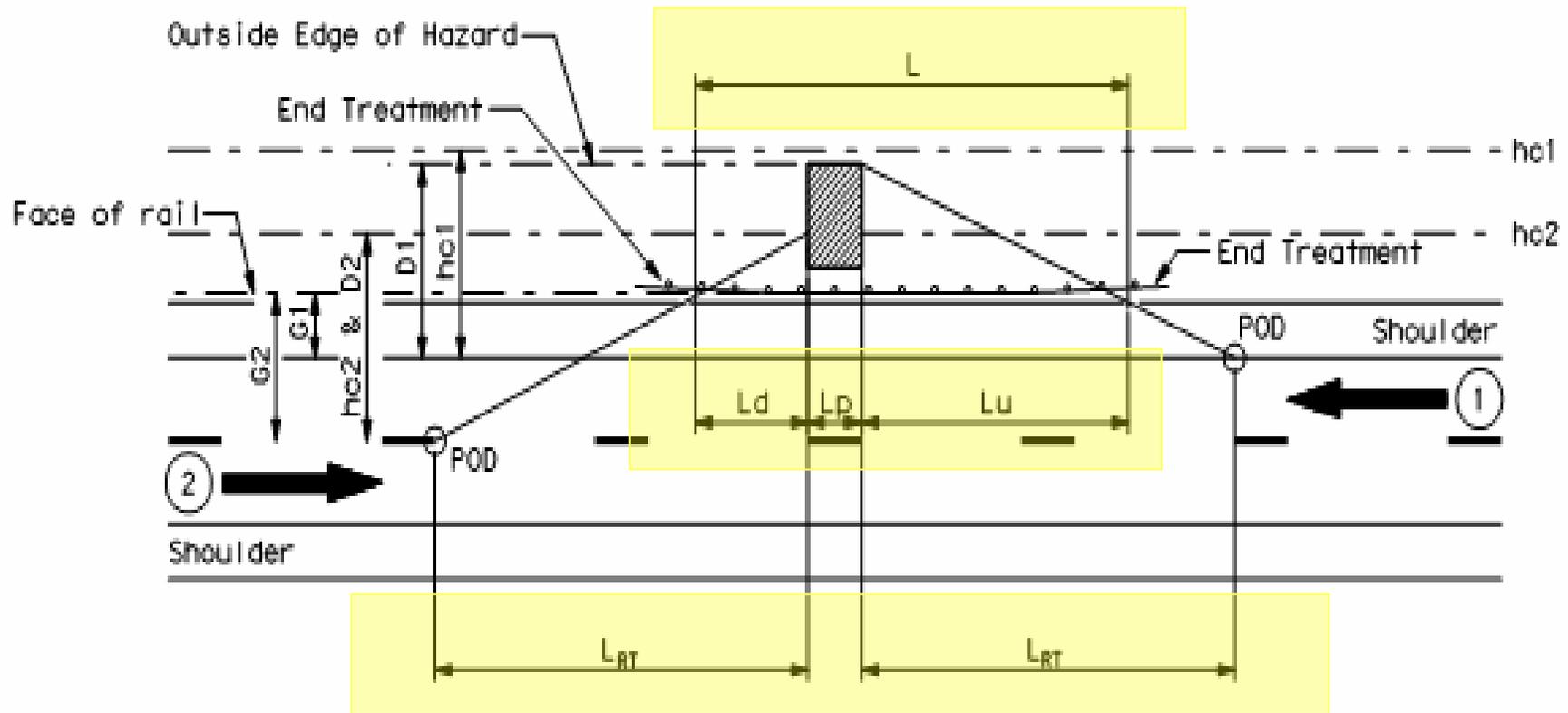


Reference: TxDOT Roadway Design Manual, Appendix A (October 2006)



Variables Involved in Barrier Layout

TxDOT Roadway Design Manual, Appendix A, Oct 2006



$$L_d \ \& \ L_u = L_{RT} - \frac{L_{RT}}{D} G$$

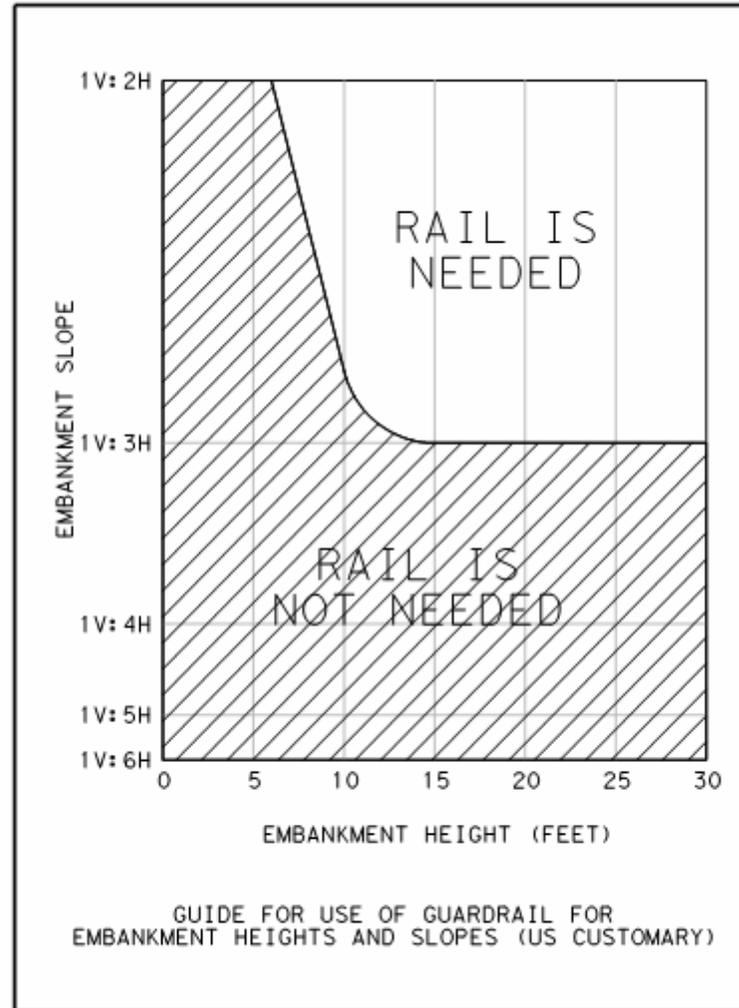
L_{RT} = Length of Roadside Travel

G_1 & G_2 = Guardrail offset from edge of travel lane

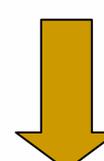
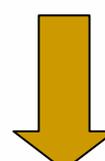
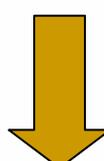
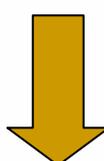
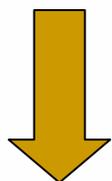
D_1 & D_2 = Distance from edge of travel lane to far side of area of concern or to outside edge of horizontal clearance, whichever is least.

Guide for Use of Guardrail for Embankment Heights and Slopes

TxDOT Roadway Design Manual, Appendix A, Oct 2006



Variable Input



Location	ADT	G ₁ (LF)	D ₁ (LF)	G ₂ (LF)	D ₂ (LF)	L _p (LF)
Sta 400+00	≤ 750	6.0	16.0			125.0
Sta 400+00, Using SGT as L.O.N	≤ 750	6.0	16.0			125.0
Sta 500+00	> 750	8.0	15.0	20.0	27.0	34.0
Sta 500+00, Using SGT as L.O.N.	> 750	8.0	15.0	20.0	27.0	34.0
Sta 600+00 (Left)	> 750	18.5	25.0			25.0
Sta 600+00 (Right)	> 750	10.0	18.0			25.0
Sta 600+00 (Left) Using SGT as L.O.N	> 750	18.5	25.0			25.0
Sta 600+00(Right) Using SGT as L.O.N	> 750	10.0	18.0			25.0
The above locations are example problems from Appendix "A" of the Roadway Design Manual. Shown with and without using SGT as part of the Length Of Need.						
TOTAL						

Summary

Automate the Design Process

- Interactive Design
- Ease of Revisions
- Electronic Documentation

Caution!!!!!!!

- Engineering Judgment
- Use Appendix "A" of the Design Manual
- Garbage In, Garbage Out

Questions??????