

# DeIDOT Winter Meeting

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# Who Am I?

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# Clear Zone – What Is It?

- Term Used To Designate The Unobstructed, Relatively Flat Area Provided Beyond The Edge Of The Traveled Way For The Recovery Of Errant Vehicles
- Based On A Study Of Errant Professional Test Vehicle Drivers At A GM Test Track In The 1960's.

# Clear Zone

- Remove The Obstacle
- Redesign The Obstacle
- Relocate The Obstacle
- Reduce Impact Severity With A Breakaway Device
- Shield The Obstacle With Barrier
- Delineate The Obstacle If The Above Alternatives Are Not Appropriate

# Shield The Obstacle

- Barriers Are A Hazard
- Barriers Must Meet NCHRP-350
  - What Is NCHRP-350?

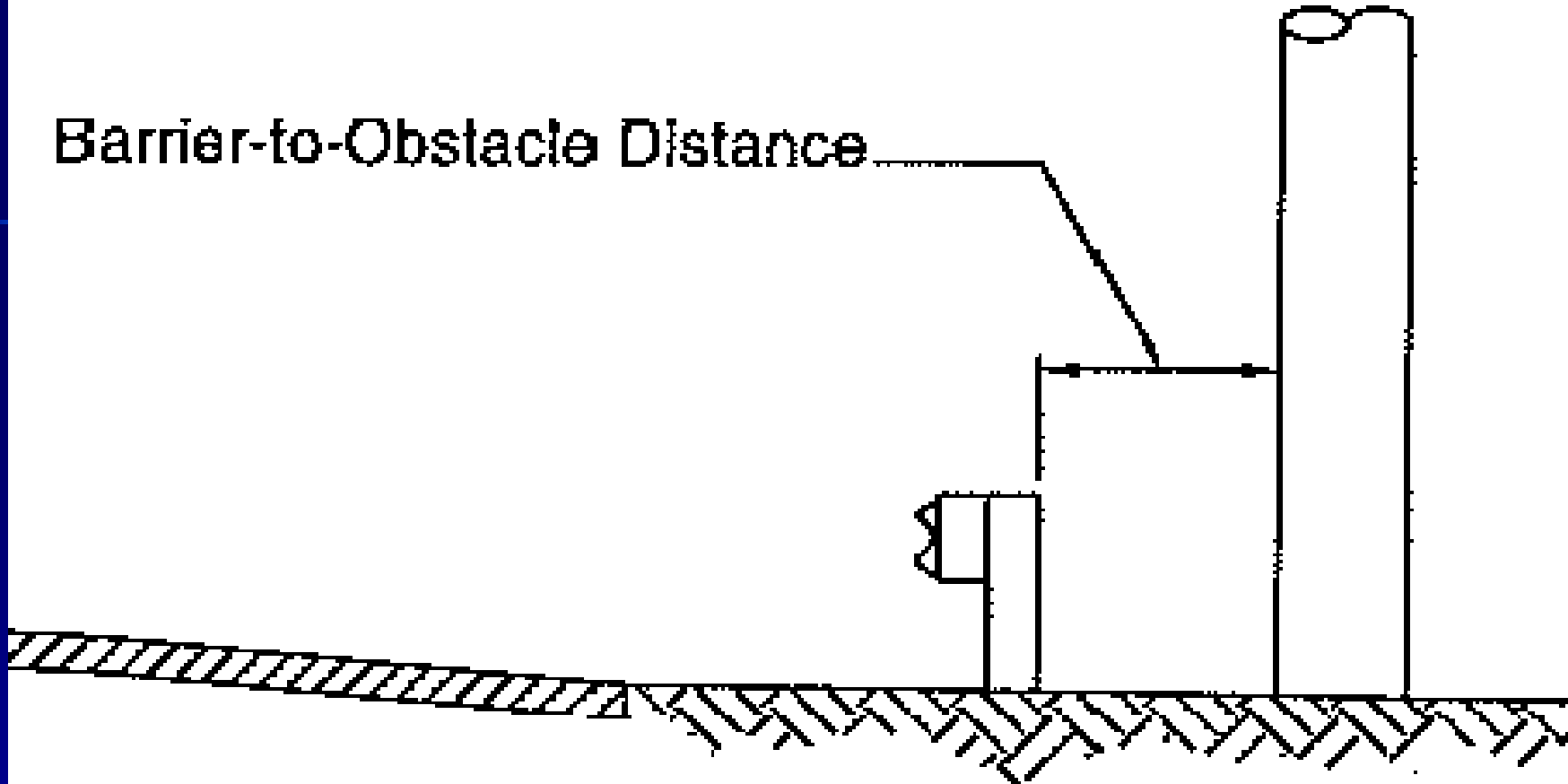
# NCHRP-350

- A Report That Defines How To Crash Test Guardrail And End Terminals
- TL-1      31 MPH
- TL-2      43 MPH
- TL-3      62 MPH
- TL-1, 2 & 3 Involve 1800 Lb Car And 4400 Lb Pickup
- TL-4, 5 & 6 Involves Tankers And Single Unit Trucks

# So What?

- Sometimes Things Are Not Installed Correctly

# Barrier-to-Obstacle Distance





# Reducing W-Beam Deflection

- Standard Deflection W/ 6' 3" Post Spacing - 3 Feet
- Reduce Post Spacing To 3' - 1 1/2" 2 Foot Deflection
- Reduce Post Spacing To 1'- 6 1/2" 1 Foot 3" Deflection
- Double Nest Rail – 9" Deflection
- 25 Foot Transition For Each Stiffening Method





# Barrier Height

- Standard Height – 27  $\frac{3}{4}$ " To 28  $\frac{3}{4}$ "
- Reset If There Is +/- 3 Inch Variation From Normal Height
- Proposed Changes May Include A New Height Of 32 Inches And Elimination Of The – 3 Inch Height Variation
- Add Rub Rail If The Rail Is High And There Is More Than 18" Between Ground And Bottom Of Rail

# Curbs & Guardrail

- Curbs Are Not Desirable On High-speed Roads
- Should Remove Or Limit To 4 Inch Height
- Rail Is Always Flush With Face Of Curb
- If Curb Height Is More Than 4 Inches The Barrier Must Be Stiffened
  - Add Rail To Back Of Post
  - Add Rubrail
  - Double Nest

# Curbs And End Terminals

- End Terminals Were Tested Without Curbs
- If A Curb Is Used It Cannot Exceed 2 Inches In Height
- Extend 2" Curb Through The 15:1 Taper Grading



# Weathered Guardrail

- Problems With Rail Ruptures At Splices
- 20 mil Zinc Foil Between Rails At Splices





# Extra Blockouts

- Two Blockouts Can Be Used For Any Number Of Posts
- Three Blockouts May Only Be Used Once



# Guardrail Modifications

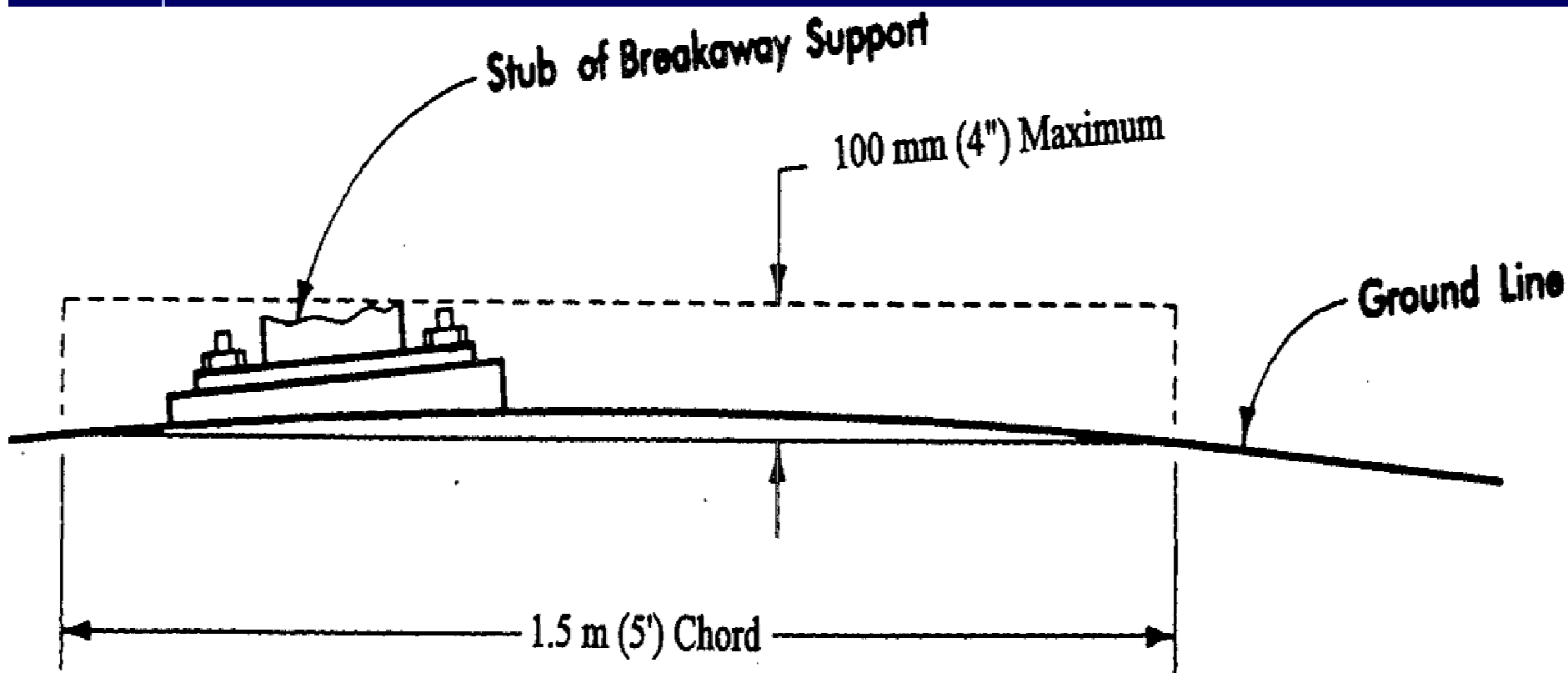
- Remove Steel Blockouts
  - Collapse On Impact And Allow Snagging On Posts
  - Remove Steel Back Plate – Not Needed
- Remove Steel Washers From Face
  - Reduces The Potential From Vaulting By Allowing Rail To Separate From Posts

# Posts

- Need 2 Feet Of Support Behind The Post To Ensure Proper Performance
- If There is Less Than 2 Feet Increase Post Length By 1 Foot From 6 To 7 Feet

# Site Grading Requirements

- Pay Attention To Standard Drawings
- Need Flat Terrain In Front Of The Terminal To Reduce Vehicle Roll
- If You Can Drive Around The Terminal, Grading Should Be Adequate
- Foundation Tubes Cannot Be Higher Than 4" Above The Ground
- Strut Should Be Flush With The Ground





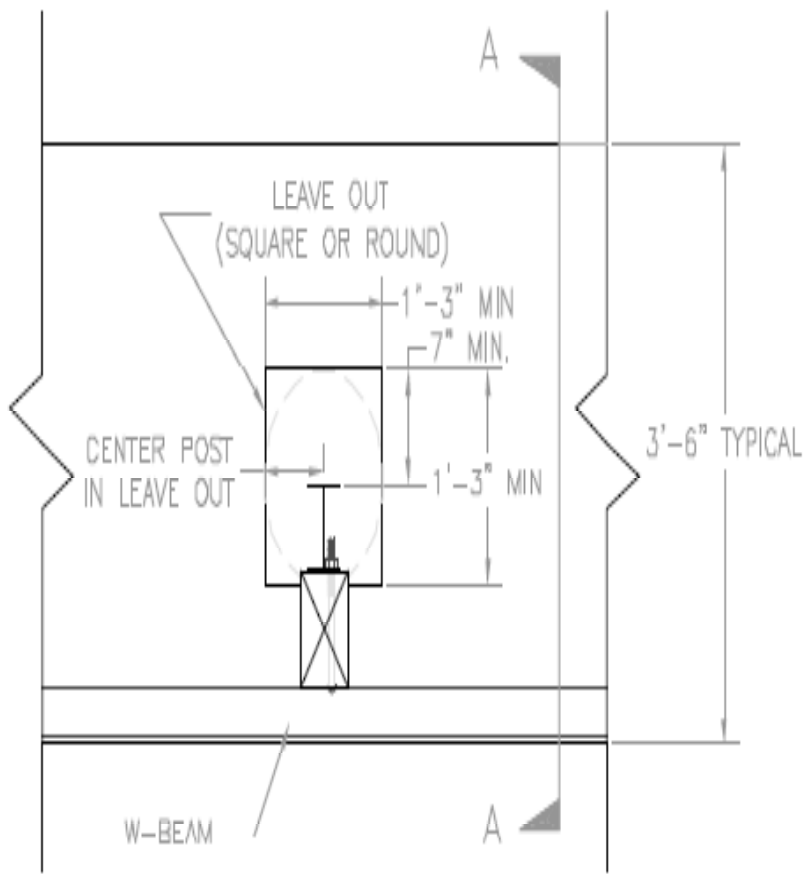
**ET-2000  
(NCHRP 350)**



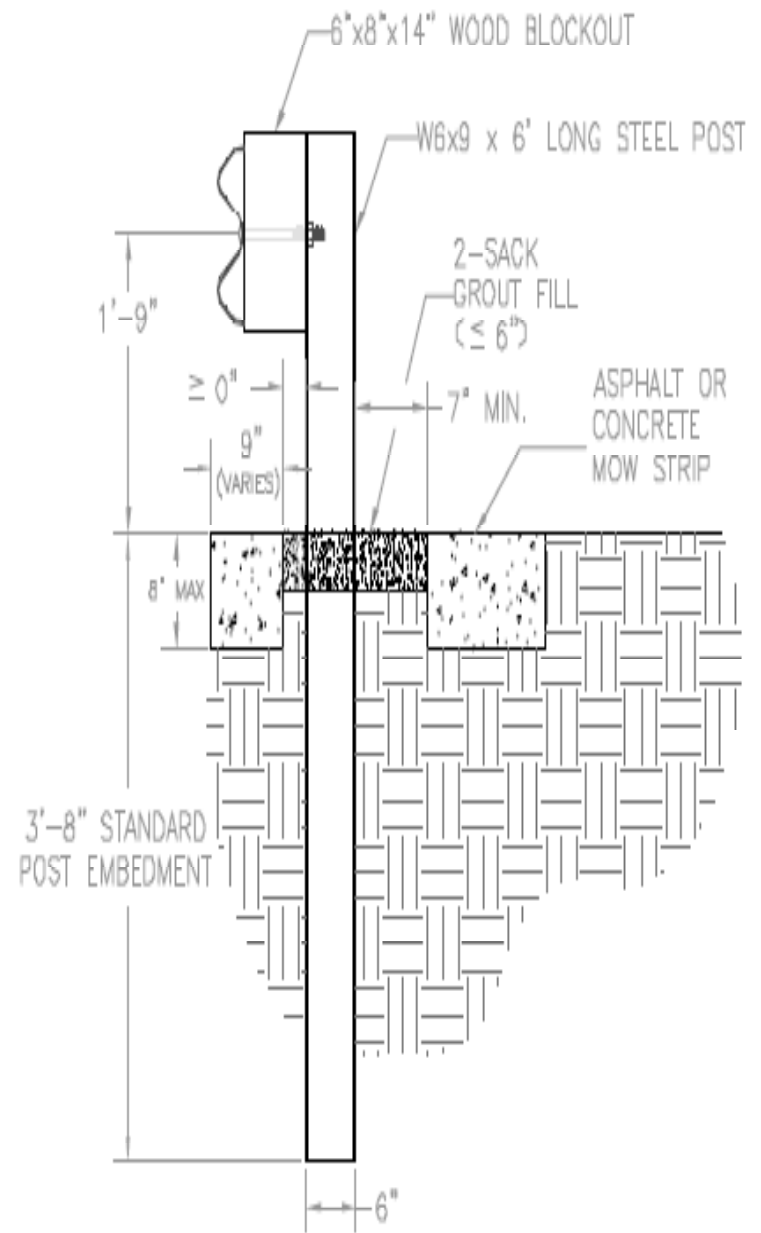


# Mowing Strips

- Strong Posts Are Designed To Absorb Crash Loads Through Rotation
- Asphalt\Concrete Around Posts Prevents Movement And Can Lead To Early Post Failure And Rail Rupture
- Should Consider Using A 15" x 15" x 6" 120 psi Grout Mix Around Posts
  - Place Posts At Front Of Opening



STEEL POST DETAIL



SECTION A-A

# Other Items

- Make Sure Cables On Terminals Are Taught
- Make Sure Bolts Are Tight
- If Wood Post And Block Outs Are Used, Toe Nail On The Side To Prevent Rotation
- Dispose Of Excess Materials Appropriately

# Questions?

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