Quiet Zones: Safe and **without** Sound

An Overview

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Outline of Discussion

• Why?
• Quiet Zone Overview & Regulations
• Establishing a Quiet Zone
• Application:
  • SSM (Supplemental Safety Measures)
  • ASM (Alternative Safety Measures)
• Resources
Train Horns On KCSR In Laredo

- 32 At Grade Crossings
- 16 Trains Per Day
  - 8 Day Trains (6AM – 6PM)
  - 8 Night Trains (6PM – 6AM)
- Crossing Horns – 2 Long, 1 Short, 1 Long
- $32 \times 16 \times 4 = 2,048$ Horn Blasts Every Day
  - $1,024$ Horn Blasts every night
Quiet Zones: What are they?

Overview and Regulations
Background

• Definition:
  • “A quiet zone is a section of a rail line at least one-half mile in length that contains one or more consecutive public highway-rail grade crossings at which locomotive horns are not routinely sounded when trains are approaching the crossings”
    – FRA (Federal Rail Administration)

• Regulation
  • Under Train Horn Rule (Federal Law), train operators must sound train horns in advance of all public grade crossings
  • Must be done in a pattern, with minimum volume of 96 dB and max volume of 110 dB
The “Final Rule” for Quiet Zones

- Establishment (Code of Federal Regulations)
  - In response to increased collisions with whistle bans, Congress enacted this law in 2005
  - Intends to maintain public safety by requiring sounding of horns
  - Establishes process for local authorities to implement
  - Must be in accordance with 49CFR222 – Code of Federal Regulations
    - Either Self-Certifying or with FRA Approval
- Reference: Title 49 CFR, Subtitle B, Chapter II, Part 222
Establishing a Quiet Zone: What’s Required?
Quiet Zone “Minimum Requirement”

- Gates, Flashing Lights, Railroad Cabin With White Light – All Public Crossings
  - 8 out of 32Existing Crossings **Do Not** Have Gates
  - Gate Installation Costs Are $285,000 per Crossing (approx.)
  - 8 x $285k = $2.28 million
- “Train Does Not Sound Horn” Warning Signs – All Crossings
Quiet Zone “Risk”

- Increased risk without horn
- Locality has to mitigate the increased risk
- Optimize safety AND quality of life of residents

Risk Indexes
- Quiet Zone Risk Index (QZRI)
- National Significant Risk Threshold (NSRT)
- Risk Index with Horns (RIWH)

To Qualify For A Quiet Zone:
QZRI < Either NSRT or RIWH
Mitigation

There are three (3) options to make a Quiet Zone:

1. Supplemental Safety Measures (SSMs)
   - If at all crossings, compliant with Federal Regulation
   - Set of defined SSMs that are acceptable in Appendix A of CFR
   - Most Expensive Option

2. Reduce QZRI below NSRT
   - By reduction with SSMs

3. Reduce QZRI below RIWH
   - By reduction with mix of ASMs and SSMs
QUIET ZONE RISK INDEX (QZRI)

- Average of the Risk Indexes of All Public Crossings in a Quiet Zone Corridor
- Calculation Based On Risk Factors:
  - Eliminating the Train Horn
  - Any Safety Measures Installed
  - Average Daily Traffic (ADT)
  - Number of Trains

NATIONAL SIGNIFICANT RISK THRESHOLD (NSRT)

- Average of Risk Indexes of all crossings nationwide where horn is sounded
- Calculated by the FRA annually
Supplemental Safety Measures (SSMs)

• Temporary or Full-Time Closure of Public Crossings
• Automatic Gates with Median Islands or Channelization Devices
• Four-Quadrant Gates
• One Way Streets with Gates
Alternative Safety Measures (ASMs)

- Alternative Safety Measures (ASMs) may be used in lieu of SSMs, which do not fully meet requirement of SSMs
  - Engineered Alternative Safety Measures
  - Non-Engineered Alternative Safety Measures
- All ASMs subject to review, must be approved by FRA
  - Must be tested prior to approval and effectiveness shown
ENGINEERED ALTERNATIVE SAFETY MEASURES (ASMs)

• Typically a Modified SSM:
  • Combinations of medians and gates (3-Quadrant Gates with Opposing Median)
  • Medians not fully meeting SSM criteria
• Public agency must develop engineering justification and obtain FRA approval of effectiveness ratings
NON-ENGINEERED ALTERNATIVE SAFETY MEASURES (ASM)

- Enforcement (Police and Photo)
- Public Education/Awareness
- Requires Audit of Effectiveness Using Statistically Significant Methodology
- Public Agency Must Apply to FRA for Approval of Quiet Zone
- Follow-Up Monitoring Is Required
Updates Required

- Risk Indices must be re-assessed periodically
- Two tracks for updating:
  1. All intersections with SSMs
  2. Not all intersections with SSMs
- Reduce average “Risk Index Without Horns” Below:
  - National Safety Risk Index
  - “Risk Index With Horns”
Application: Meeting the Requirements
SSMs and ASMs: Risk Reduction

- Appendix A of 49 CFR 222 has detailed requirements
  - Appendix B and C show risk reduction credit
- Risk Reduction Credit
  - Each safety measure is assigned an “effectiveness” score
  - Effectiveness is based on proven risk reduction
  - Quiet Zone Risk Index must be reduced below NSRT
    - Only applies if using option 2 or 3 for compliance
SSM: Four Quadrant Gates

Approximate Cost = $650,000 each
SSM: Median Barriers

- Minimum length 100’ or 60’ to nearest Intersection
- No commercial driveways within 60’ of crossing gates

Approximate Costs:
- $15,000 for medians
- $185,000 for gates (if needed)
SSM: Temporary or Full-Time Closure

- Highest effectiveness rating
- Sends traffic to other crossings, however
- Temporary Closures – Gates closed by time of day

Approximate Cost = $5,000 each
SSM: One-way Streets with Gates

Approximate Cost = $185,000 each
Wayside Horn

- Instead of Train Horn, sends horn blast along street direction
- Considered a substitute for a horn and meets requirements

Approximate Cost = $100,000 each
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<th>No</th>
<th>Crossing Location</th>
<th>Proposed Mitigation</th>
<th>Average Daily Traffic</th>
<th>Mitigation Cost</th>
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<td>1</td>
<td>ZARAGOSA STREET</td>
<td>Close Crossing</td>
<td>1,572</td>
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<td>2</td>
<td>WASHINGTON STREET</td>
<td>Channelize, Add Gates</td>
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<td>Add Median</td>
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<tr>
<td>15</td>
<td>I 35 NB FRONT RD</td>
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TOTAL COST OF ALL MITIGATION $ 425,000
Further Resources
Online Resources

• The Train Horn Rule and Quiet Zones (FRA)
  • http://www.fra.dot.gov/Page/P0104

• Document: How to Create a Quiet Zone
  • http://www.fra.dot.gov/eLib/details/L03055

• Brochure: Guide to the Quiet Zone Establishment Process
  • http://www.fra.dot.gov/eLib/Details/L04781
Closure & Re-routing Details