Implementing Quiet Zones to Address Train Horn Noise
What is a Quiet Zone?

A quiet zone is a section of a rail line that contains one or more consecutive public crossings at which locomotive horns are not routinely sounded.

Jurisdiction of Quiet Zones fall under the Federal Railroad Administration (FRA) Locomotive Horn Rule (49 CFR 222).
Why has FRA issued this rule?

• To require trains to sound a locomotive horn at all public railroad crossings

• To permit creation of Quiet Zones

• Promote Quality of Life without Compromising Safety
FRA Locomotive Horn Final Rule

• Issued 4/27/05
• Rule became effective 6/24/05
• Amended 8/17/06
• Requires horns to be sounded to warn motorists at public crossings
• Provides exceptions where risk is minimized
• Enables communities to establish quiet zones by reducing the risk caused by lack of horns
Changes in Train Horn Requirements

• Requires the sounding of locomotive horn approaching every public crossing (replacing state law)

• Horn shall be sounded at least 15 sec but no more than 20 sec before locomotive enters crossing and not greater than ¼ mile

• Sec. 229.129 defines minimum and maximum train horn decibel levels (96dB-110dB)
<table>
<thead>
<tr>
<th>Sound Levels</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakest sound heard</td>
<td>0dB</td>
</tr>
<tr>
<td>Normal conversation (3-5')</td>
<td>60-70dB</td>
</tr>
<tr>
<td>Telephone dial tone</td>
<td>80dB</td>
</tr>
<tr>
<td>City Traffic (inside car)</td>
<td>85dB</td>
</tr>
<tr>
<td>Train whistle at 500'</td>
<td>90dB</td>
</tr>
<tr>
<td>Subway train at 200'</td>
<td>95dB</td>
</tr>
<tr>
<td>Power mower</td>
<td>107dB</td>
</tr>
<tr>
<td>Power saw</td>
<td>110dB</td>
</tr>
<tr>
<td>Pain begins</td>
<td>125dB</td>
</tr>
<tr>
<td>Pneumatic riveter at 4'</td>
<td>125dB</td>
</tr>
<tr>
<td>Jet engine at 100'</td>
<td>140dB</td>
</tr>
<tr>
<td>Death of hearing tissue</td>
<td>180dB</td>
</tr>
<tr>
<td>Loudest sound possible</td>
<td>194dB</td>
</tr>
</tbody>
</table>
Who Can Establish a Quiet Zone?

- Public Authority with jurisdiction for the roadway at the crossing
- If Quiet Zone includes more than one Public Authority
  - All agencies must agree
  - Actions must be taken jointly
- Quiet Zones may be established irrespective of state law
How are Quiet Zones Created?

• Local governments will have two ways of creating a quiet zone:
  – Show that the lack of the horn does not pose a significant safety risk
  – Implement safety measures to reduce excess risk associated with no horn
Terminology

- Supplemental Safety Measure (SSM)
- Wayside Horn
- Alternative Safety Measure (ASM)
Supplementary Safety Measure (SSM)

A safety system or procedure established in accordance with 49 CFR Appendix A to Part 222 which is provided by the appropriate traffic control authority or law enforcement authority responsible for safety at the highway-rail grade crossing, that is determined by the Associate Administrator to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties.
SSM - Supplemental Safety Measures

- Temporary Closures
- 4-Quadrant Gates
- Gates with Medians or Channelization Devices
- One-way Streets with Gates
- Permanent Closure
Wayside Horn

• A stationary horn located at a highway rail grade crossing, designed to provide, upon the approach of a locomotive or train, audible warning to oncoming motorists of the approach of a train.

• Locomotive Horn Rule allows Wayside Horn to substitute for the train horn on a one – for – one basis.
Alternative Safety Measures (ASM)

A safety system or procedure, other than an SSM, established in accordance with 49 CFR Appendix B to Part 222 which is provided by the appropriate traffic control authority or law enforcement authority and which, after individual review and analysis by the Associate Administrator, is determined to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties at specific highway-rail grade crossings.
FRA Quiet Zone Calculator
Update and Verify Crossing Information

Create New Zone
Zone: AVENUE A

Manage Existing Zones
Quiet Zone Type: New 24-hour Quiet Zone

Log Off

Step by Step Instructions:

Step 1: To add more crossings to the zone Click the ADD CROSSING.

Step 2: To Make changes to the default information, select the crossing from list. Enter the changes in the appropriate box, then click the UPDATE button.

Step 3: To permanently remove a crossing from the zone, select Crossing from list. Click the DELETE CROSSING button.

Step 4: Verify All Crossing Information Provided is correct. Then Click the Check Box, then CONTINUE button.

* Note: To see a list of SSMs, click on "Pre-Existing SSM".

759734B AVENUE A

759734B SE CLINTON ST

Present warn device: Gates
Number of highway vehicles per day: 004850
Total trains: 16
Day through trains : 6
Total Switching Trains : 8
Number of main tracks: 1
Number of other tracks: 1
Urban(U.)/Rural(R.): U.Collectors
Highways paved: Yes
Maximum timetable speed mph: 20
Number of highway lanes: 2
Number of years accident data: 5
Number of accidents in accident data years: 1
Wayside horn: No
Pre-Existing SSM:

ADD CROSSING DELETE CROSSING

* = Not Public At Grade Crossing  ** = Closed Crossing

To verify ALL CROSSING INFORMATION PROVIDED is correct, click on the check box here.

Note: Updating Crossing Information on the Quiet Zone Calculator DOES NOT update the crossing inventory. Be sure that an updated current and accurate inventory form is also submitted.
<table>
<thead>
<tr>
<th>Crossing</th>
<th>Street</th>
<th>Traffic</th>
<th>Warning Device</th>
<th>Pre-SSM</th>
<th>SSM</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>749166C</td>
<td>AVENUE A</td>
<td>10400</td>
<td>Gates</td>
<td>0</td>
<td>0</td>
<td>68,340.80</td>
</tr>
<tr>
<td>749167J</td>
<td>AVENUE B</td>
<td>2500</td>
<td>Gates</td>
<td>0</td>
<td>0</td>
<td>48,372.00</td>
</tr>
<tr>
<td>749168R</td>
<td>AVENUE C</td>
<td>4000</td>
<td>Gates</td>
<td>0</td>
<td>0</td>
<td>48,375.84</td>
</tr>
</tbody>
</table>

**Summary**

- **Proposed Quiet Zone:** TEST CASE THREE CROSSING
- **Type:** New 24-hour QZ
- **Scenario:** TEST CASE _28602
- **Estimated Total Cost:** $0.00
- **Nationwide Significant Risk Threshold:** 17610.00
- **Risk Index with Horns:** 32991.34
- **Quiet Zone Risk Index:** 55029.55
<table>
<thead>
<tr>
<th>Crossing</th>
<th>Street</th>
<th>Traffic</th>
<th>Warning Device</th>
<th>Pre-SSM</th>
<th>SSM</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>749166C</td>
<td>AVENUE A</td>
<td>10400</td>
<td>Gates</td>
<td>0</td>
<td>13</td>
<td>13,668.16</td>
</tr>
<tr>
<td>749167J</td>
<td>AVENUE B</td>
<td>2500</td>
<td>Gates</td>
<td>0</td>
<td>6</td>
<td>11,125.56</td>
</tr>
<tr>
<td>749168R</td>
<td>AVENUE C</td>
<td>4000</td>
<td>Gates</td>
<td>0</td>
<td>13</td>
<td>9,675.17</td>
</tr>
</tbody>
</table>

**Summary**

- **Proposed Quiet Zone:** TEST CASE THREE CROSSING
- **Type:** New 24-hour QZ
- **Scenario:** TEST CASE 28602
- **Estimated Total Cost:** $158,000.00
- **Nationwide Significant Risk Threshold:** 17610.00
- **Risk Index with Horns:** 32991.34
- **Quiet Zone Risk Index:** **11489.63**

**Select**
Gates with Medians or Channelization Devices

Channelization Device

Non-traversable Curb
Gates with Medians or Channelization Devices

No intersections or commercial driveways within 60’ of gate arm. Access to residences (4 units or less) allowed if exiting motorists can not move against the flow of traffic.

100’ Minimum Length Median

6” Minimum Curb Height
Gates with Medians or Channelization Devices
Near Parallel Roadways

60’ Minimum Length

100’ Median
Gates with Medians or Channelization Devices

1’ Maximum from tip of gate to edge of median

Median must be 6” or greater
Curb must be six inches or greater
Channelization device must include a raised curb
One Way Street with Gate(s)
One Way Street with Gate(s)

Gate arm should extend to within one foot of the far edge of pavement

Two foot Maximum from Gate Tip to Gate Tip
Four-Quadrant Gates
What are Four-Quadrant Gates?

• A system of gates designed to provide a full closure of the crossing eliminating the opportunity to drive around a single lowered gate.

• Has two types of gates:
  - Entrance Gates
  - Exit Gates
Standard Two Quadrant Crossing

Entrance Gates Shown in Red
Standard Four Quadrant Crossing

Exit Gates shown in Red
Typical Vehicle Detection System Using Loop Detectors

Loop Detectors shown in Red
Wayside Horn
92dB Minimum at 100’ from centerline of track

Wayside Horn

92dB Minimum at 100’ from centerline of track
What is a Wayside Horn?

• Stationary horn system located at the crossing
• Sounds like a locomotive horn
• Reduces noise pollution in neighborhoods located near grade crossings
• Improves safety for motorists and pedestrians
How does a Wayside Horn work?

• Activated by railroad warning circuitry
• Directs the sound toward oncoming motorists
• Warning sounded until train reaches the crossing
• Quiet Zone Indicator notifies train crew that the Wayside Horn is working properly and it is not necessary to sound the locomotive horn
Considerations for use of Wayside Horns

- Not enough distance to implement raised medians
- One-way street is not a viable alternative
- Cost of 4 quadrant gates is prohibitive
- Cost effective for the community
Sound Contour for Train Horn and Wayside Horn

The following slides show a sound contour of a train horn compared to the Wayside Horn.

- **Red area** is the 92dB sound contour.
- **Blue area** is the 80dB sound contour.
Wayside Horn Sound Contour
Quiet Zone Procedures

1. The City will need to determine which treatments are desired at each location

2. Submit a Notice of Intent (NOI) to Create a New Quiet Zone. NOI to be sent to all affected railroads, the state regulatory agency for highway-rail grade safety and the associate administrator of the FRA.

3. There will be a 60-day comment period for all railroads and state regulatory agencies.
Quiet Zone Procedures

4. Diagnostic Team Review of all crossings to discuss treatments.

5. Update the Grade Crossing Inventory Forms for every crossing to be included in the New Quiet Zone.

6. Install Advance Warning Signs conforming to MUTCD requirements and install treatments.

7. Update the National Grade Crossing Inventory to reflect the current conditions at each public crossing within the Quiet Zone.
Quiet Zone Procedures

8. The City will be required to submit a Notice of Quiet Zone Establishment (NOE). NOE to be sent to all affected railroads, the state regulatory agency for highway-rail grade safety and the associate administrator of the FRA.

9. The City will be required to submit periodic updates, including updated USDOT Grade Crossing Inventory Forms, must be submitted to FRA every 4.5-5 years.
For Additional Information please contact:
Robert Albritton
Director of Sales & Marketing
(817) 820-6347
Or by email at
ralbritton@railroadcontrols.com