

4.0 Findings

Implementation of this rule will reduce the risk of collisions at grade crossings by requiring the sounding of the locomotive horn at grade crossings unless it has been specifically determined that the crossings in question have a risk profile that justifies silencing the horn. FRA believes communities will take advantage of the many options available to compensate, in terms of risk, for the silencing of the horn. FRA is confident that the benefits in terms of lives saved and injuries prevented will exceed the costs imposed on society by this rule.

The table below presents estimated twenty-year monetary costs associated with complying with the requirements contained in the interim final rule. Given the high prevalence of existing whistle-ban crossings in the Chicago area¹ and the significant level of interest commenters from this area have shown regarding this rulemaking, Pre-Rule Quiet Zone costs for this area are presented separately from the rest of the nation.

¹ The Chicago area is comprised of the following six counties: Cook, Du Page, Kane, Lake, Mc Henry, and Will.

Total Twenty-Year Costs (PV², 7%)

	Nationwide	Chicago	Rest of Nation
<u>Locomotive Horns Sounded</u>			
Maximum Horn Sound Level	\$ 2,902,478	Not Applicable	Not Applicable
Relocations Due to Locomotive Horn Noise	\$ 1,724,590	\$ 47,927	\$1,676,663
<u>Pre-Rule Quiet Zones</u>			
Advance Warning Signs	\$ 170,493	\$ 33,504	\$ 136,989
Quiet Zones (QZ) w/ CCRI³ < NSRT			
QZ Development, Approval, Certification, Notification, & Initial Inventory Updates	\$ 1,182,292	\$ 59,537	\$1,122,755
QZs w/ NSRT < CCRI < 2xNSRT; No Collisions			
QZ Development, Approval, Certification, Notification, & Initial Inventory Updates	\$ 882,814	\$ 179,248	\$ 703,566
SSMs/ASMs Installation & Maintenance	\$ 1,575,797	\$ 156,604	\$1,419,193
QZs w/ CCRI > 2xNSRT; No Collisions			
QZ Development, Approval, Certification, Notification, & Initial Inventory Updates	\$ 335,529	\$ 211,513	\$ 124,016
Install & Maintain Safety Improvements	\$ 2,200,158	\$1,382,915	\$ 817,243
QZs w/ CCRI > NSRT; With Collisions			
QZ Development, Approval, Certification, Notification, & Initial Inventory Updates	\$ 899,259	\$ 275,733	\$ 623,526
Install & Maintain Safety Improvements	\$ 7,755,538	\$1,650,533	\$ 6,105,005
Periodic Affirmation/Inventory Update	\$ 274,066	\$ 58,426	\$ 215,640
TOTAL PRE-RULE QUIET ZONES	\$15,275,946	\$4,008,013	\$11,267,933
	Total	Non-Existing Quiet Zones	Whistle Bans Est. Post 10/9/96
<u>New Quiet Zones</u>			
Advance Warning Signs	\$ 42,605	\$ 36,832	\$ 5,773
QZ Development, Approval, Certification, Notification, & Initial Inventory Updates	\$ 787,160	\$ 726,564	\$ 60,596
QZ CCRI < NSRT			
Install & Maintain Safety Improvements	\$ 8,234,940	\$7,801,613	\$ 433,327
QZ CCRI > NSRT			
Install & Maintain Safety Improvements	\$12,349,909	\$10,852,960	\$1,496,949
Periodic Affirmation/Inventory Update	\$ 87,182	-----	-----
TOTAL NEW QUIET ZONE COSTS	\$21,501,796	\$19,417,969	\$1,996,645

² The Present Value (PV) of cost and benefit flows is calculated in this analysis. PV provides a way of converting future benefits and costs into equivalent dollars today so that benefit and cost streams that involve different time paths may be compared. The formula used to calculate these flows is: $1/(1+I)^t$ where "I" is the discount rate, and "t" is the year. Per guidance from the Office of Management and Budget, a discount rate of .07 is used in this analysis.

³ Crossing Corridor Risk Index

Federal Railroad Administration

Annual Update of NSRT/QZRI and
Notification

\$25,426

Total Twenty-Year Costs associated with implementation of this rule are estimated to be \$41,430,236 (PV, 20 Years, 7%).

In general there has been a downward trend in collisions at grade crossings nationwide due to the implementation of various private and public safety initiatives such as Operation Lifesaver and other public education and awareness campaigns. Costs presented in this analysis may be overstated to the extent that such initiatives would lead to the eventual implementation of some of the same or equivalent safety measures that this rule requires for the establishment of quiet zones. In such cases, this rule may be merely accelerating implementation and the rate of expenditures.

The safety benefit of this final rule is the reduction in casualties that result from collisions between trains and highway users at public at-grade highway-rail crossings. Implementation of this rule will ensure that (1) locomotive horns are sounded to warn highway users of approaching trains; or (2) rail corridors where train horns do not sound will have a level of risk that is no higher than the average risk level at gated crossings nationwide where locomotive horns are sounded regularly; or (3) the effectiveness of horns is compensated for in rail corridors where train horns do not sound.

The Regulatory Evaluation prepared for the NPRM presented two safety benefit scenarios; one assumed a constant collision rate and the other a 4% annual decline in collision rate. No comments were received regarding these two collision rates. FRA has reviewed trends in collision rates for whistle-ban crossings going back to 1980 and determined that these two rates probably bound the range that will be experienced over the twenty-years that this analysis covers. FRA developed a regression model that closely fits the rates since 1980. This model was used to develop relevant collision forecasts for the next twenty years. None of the forecasted annual collision rates indicates a decline of greater than 4 percent per year. Appendix C presents these findings in detail.

The tables that follow present safety benefits under both scenarios.

**Total Twenty-Year Safety Benefits Monetized (PV, 7%)
Constant Collision Rate (0% annual decline)**

	Nationwide	Chicago	Rest of Nation
<u>Locomotive Horns Sounded</u>			
Maximum Sound Level	-----	Not Quantifiable	-----
Casualties Prevented (Cancellation of W-Bans)	\$8,837,888	\$424,759	\$8,413,129

Pre-Rule Quiet Zones: Value of Injuries and Fatalities Prevented by Implementing Safety Measures

	Nationwide	Chicago	Rest of Nation
QZs w/ NSRT < CCRI < 2xNSRT; No Collisions	\$ 8,376,011	\$ 2,465,999	\$ 5,910,012
QZs w/ CCRI > 2 x NSRT; No Collisions	\$19,664,084	\$14,164,517	\$ 5,499,567
QZs w/ CCRI > NSRT; With Collisions	\$44,114,379	\$16,277,752	\$ 27,836,627
Total	\$72,154,474	\$32,908,268	\$ 39,246,206

New Quiet Zones: Value of Injuries and Fatalities Prevented by Implementing Safety Measures

	Total	Non-Existing Quiet Zones	Whistle Bans Est. Post 10/9/96
CCRI greater than NSRT	\$30,675,161	\$25,965,858	\$ 4,709,303
TOTAL	\$111,667,523		

**Total Twenty-Year Collisions and Casualties Prevented⁴
Constant Collision Rate (0% annual decline)**

	Nationwide, Including the Chicago Area		
	Collisions	Injuries	Fatalities
<u>Pre-Rule Quiet Zones:</u>			
Cancellation of W-Bans	57	13	1
QZs w/ NSRT < CCRI < 2xNSRT; No Collisions	16	7	2
QZs w/ CCRI > 2 x NSRT; No Collisions	35	17	7
QZs w/ CCRI > NSRT; With Collisions	48	23	8
Pre-Rule Quiet Zone Total	156	60	18
<u>New Quiet Zones:</u>	36	34	8
TOTAL	192	94	26

FRA also estimates that reductions to highway vehicle, rail equipment, and track damage over the next twenty years will total nearly \$600,000 assuming a constant collision rate.

⁴ These estimates represent the sum of forecasted collisions and resulting casualties. These are rarely whole numbers. The totals in the table are only the integer portion of the actual forecasts.

**Total Twenty-Year Safety Benefits Monetized (PV, 7%)
Declining Collision Rate (4% annual decline)**

	Nationwide	Chicago	Rest of Nation
<u>Locomotive Horns Sounded</u>			
Maximum Sound Level	-----	Not Quantifiable	-----
Casualties Prevented (Cancellation of W-Bans)	\$6,102,371	\$291,582	\$5,810,789

Pre-Rule Quiet Zones: Value of Injuries and Fatalities Prevented by Implementing Safety Measures

	Nationwide	Chicago	Rest of Nation
QZs w/ NSRT < CCRI < 2xNSRT; No Collisions	\$ 5,223,028	\$ 1,574,618	\$ 3,648,410
QZs w/ CCRI > 2 x NSRT; No Collisions	\$13,433,811	\$ 9,676,700	\$ 3,757,111
QZs w/ CCRI > NSRT; With Collisions	\$30,137,393	\$11,120,388	\$19,017,005
Total	\$48,794,232	\$22,371,706	\$26,422,526

New Quiet Zones: Value of Injuries and Fatalities Prevented by Implementing Safety Measures

	Total	Non-Existing Quiet Zones	Whistle Bans Est. Post 10/9/96
CCRI greater than NSRT	\$21,976,553	\$18,602,675	\$ 3,373,878
TOTAL	\$76,873,156		

**Total Twenty-Year Collisions and Casualties Prevented
Declining Collision Rate (4% annual decline)**

	Nationwide, Including the Chicago Area		
	Collisions	Injuries	Fatalities
<u>Pre-Rule Quiet Zones:</u>			
Cancellation of W-Bans	37	8	0
QZs w/ NSRT < CCRI < 2xNSRT; No Collisions	9	4	0
1QZs w/ CCRI > 2 x NSRT; No Collisions	22	11	4
QZs w/ CCRI > NSRT; With Collisions	31	15	5
Pre-Rule Quiet Zone Total	99	38	9
<u>New Quiet Zones:</u>	24	22	4
TOTAL	123	60	13

FRA also estimates that reductions to highway vehicle, rail equipment, and track damage over the next twenty years will total approximately \$400,000 under a declining collision rate of 4 percent annually.

Additional benefits that are not quantified in this analysis include reductions in train delays resulting from collisions, and community disruption where horns are sounded resulting from limiting the duration and level of sound emitted by horns. It is very difficult to quantify the value of “quality of life” and other indirect safety benefits which may result from silencing locomotive horns at locations where they currently sound. FRA believes that these benefits are substantial and significant.