

in the region that may technically have been considered whistle ban crossings due to an exemption from the State mandate to use the horn; and, even though the risk is reduced by the train horn, these crossings nevertheless remain among the riskiest in the region.¹⁰ This discretionary selection has indeed had the effect of abating significant risk in the region, but it follows from this discussion that the resulting statistical pattern *within* the region does not in any way call into question the potential for risk reduction at the remaining crossings where the horn is silenced. To the contrary, FRA anticipates that requiring that the train horn be sounded at remaining whistle ban crossings in Chicago would reduce accident risk at those crossings, on average, about 15 percent.¹¹

Studies Provided by Commenters

In response to the NPRM, CATS (Hafeez and Laffey) performed a separate study of the effects of whistle bans in the Chicago area and concluded that whistle bans have no effect on the collision frequency in the Chicago area. Following receipt of the CATS study, FRA asked Westat to review that report and provide an evaluation.

The CATS study used a statistical technique called Analysis of Variance (ANOVA) to determine if grade crossings that had a whistle ban experienced a higher collision rate in comparison to grade crossings where train horns are routinely sounded. This method tested the statistical significance of the effect of a whistle ban on collision frequency using the interaction between device type and whistle ban. Westat found that, besides warning device class, this method failed to account for any of the other factors that are known to affect collision rates, such as daily train and traffic frequencies, train speed, number of highway lanes, and number of tracks. Furthermore, grade crossing collisions are rare event that are not

normally distributed, but rather follow a Poisson distribution. The CATS study applied a technique designed for use with normally distributed data that does not work well for data that are not normally distributed. The result of applying this model was residuals that were not normally distributed. According to Westat, the omissions of factors known to affect collision rates coupled with an improper technique rendered the model poor for the purpose of analyzing the effect of whistle bans on collision rates.

Disagreements about methods notwithstanding, Hafeez and Laffey come to essentially the same conclusion as the Westat analysis—*i.e.*, Chicago Region no-whistle crossings may be safer on average than Chicago Region train horn crossings, at least when only certain factors are controlled in the analysis. As we have explained above, this is not a surprising outcome when discretionary selection is considered.

Further, given the analytical methods used and the small data sets available for analysis, it would be as easy for confounding variables to mask any differences as it is alleged by commenters to be for such variables to generate specious differences. Consider, for instance, that most of the Chicago-area no-whistle crossings are on the commuter rail network, while most of the train horn crossings are on lines used exclusively or almost exclusively for freight. (Hafeez and Laffey also used the same, inflated data set of no-whistle crossings that FRA had used in its earlier analysis, which was the best available at the time. It contained large numbers of freight-only crossings where the train horn was likely sounded during much of the period.)

The Northwest Municipal Conference (NWMC) also filed comments in this docket and attempted a statistical re-analysis of accident risk within its territory using the FRA method as reported in the NPRM and Nationwide studies. This analysis also compared local area train horn crossings with exempt crossings where railroads have elected to run silent. It concluded that train horn crossings are no safer than no-whistle crossings, whether one compares all crossings or just gated crossings. FRA determined that NWMC's analysis did not follow the FRA procedure appropriately, particularly as to stratification of the sample. Nevertheless, as noted above, FRA has determined that comparisons, between Chicago train horn crossings and no-whistle crossings, cannot properly evaluate train horn usefulness within the context of the Chicago Region, since discretionary selection has

likely shifted a disproportionate number of the most hazardous exempt crossings into the train horn category and other confounding variables may apply.

The NWMC analysis concludes the whistle ban is likely a spurious variable in the FRA analysis. It argues the factors used in the APF, such as train and automobile traffic, account for current accident levels rather than the whistle ban because the APF accounts for almost 80 percent of the variation in accidents. FRA's current approach adjusts for these effects. It is based on a Poisson regression that includes the factors used in the APF along with the whistle ban.

Implications of the Various Studies

This interim final rule endeavors to ensure that, to the extent practicable, these decisions are made based on safety rather than economic or political influence, with the important additional difference that communities have the option of insisting that the horn be silenced where supplementary or alternative safety measures are put in place (or where no "significant risk" is determined for the corridor).

Again, FRA is keenly aware of the hazard that a spurious variable can confound statistical analysis and designed the stratified/matched pair method used in the national studies specifically in an effort to avoid that effect. FRA has also performed longitudinal studies, as reflected in the Florida report and case studies embodied in the Nationwide report. In every case where FRA has had sufficient valid data points to draw meaningful conclusions, the effect of the train horn has been confirmed, lending empirical confirmation of the following: the judgment implicit in ICC exemption management (that restoring use of the train horn can lower risk); human factors research; State laws requiring use of the horn; the opinions of railroad professionals who are exposed to motorist behavior on a daily basis; and the assumptions Congress made in enacting the law that required FRA to issue this rule.

In any event, FRA strongly agrees with the NWMC comment that it is best to utilize a method that is responsive to demonstrable regional differences, where possible; and the interim final rule follows this pattern. The result is a significant reduction in effort that would need to be expended to institute quiet zones in the Chicago Region.

In conclusion, the comments related to safety at gated crossings, taken together with subsequent statistical analysis, support reconciliation of FRA safety concerns with the strenuously

¹⁰ Many of these very high risk train horn crossings would also benefit substantially from safety improvements such as four-quadrant gates, traffic channelization, or photo enforcement; and public investments would be recovered through reduced loss of life and injuries avoided. FRA will continue to encourage use of these techniques wherever they may be useful. While that is not the subject of this proceeding, the pendency of this proceeding has the benefit of calling attention to these possibilities for risk reduction that cannot be achieved using "standard" crossing safety measures.

¹¹ A 17.3 percent increase to a base amount yields a value of 117.3 percent (risk after implementation of a no-whistle policy). Restoring use of the horn would reduce the risk to a level 100 percent of the prior level. Seventeen and three-tenths is 14.7 percent of 117, so restoring the inflated value to the base amount is a 15 percent reduction to the no-whistle state, after rounding.