

including a small margin of error associated with test instrumentation and setup. Accordingly, the interim final rule requires that railroads progressively test their locomotives and reduce the air pressure (or alter the aperture) on all horns to produce a maximum volume of no more than 110 dB(A) as measured 100 feet in front of the locomotive at roof height. FRA expects that most freight railroads and Amtrak, whose locomotives operate over a variety of highway-rail crossings across the Nation, will set their horns near the maximum allowed to provide effective warning at passively signed crossings. FRA expects that commuter authorities which operate primarily over crossings with flashing lights and gates may set horns in the lower portion of the allowed range. This overall process, by enforcing a maximum below the known sound level of some center-mounted horns, may modestly reduce noise in some communities.

It should be noted that FRA did not find it possible to do as the NTSB suggested in its comments to the docket, which was to "select a sound level that will maximize safety at all highway-rail grade crossings." To reach every driver with the horn (including each driver with a stereo turned up to maximum volume under all conditions of traffic conditions, pavement surface, weather, etc.) would require a volume so great that the effects on communities and crew members would be clearly unacceptable. However, in selecting the maximum level FRA has taken into consideration the NTSB's findings from its study of passive crossings. Further, FRA has completed additional work on sound detectability that suggests more favorable results at actively signed crossings where the driver has a heightened awareness of the possible presence of a train and where a very high signal-to-noise value should not be required. Dissemination of NTSB and FRA studies should put railroads in a favorable posture to determine horn loudness appropriate to their operating conditions, achieving the lion's share of the potential risk reduction.³ Further, our heightened understanding of the

limitations of the train horn should help clarify the need to implement of active warning systems where they are not already provided as funding becomes available.

The final issue concerns the manner in which the horn is sounded. The actual pattern of "two long, a short and a long" is well established, and FRA finds no reason to alter it. It is necessary to sustain the warning provided by the horn through a period of 15 to 20 seconds prior to arrival of the train at the crossing in order to reach motorists situated at various points on the roadway under varying angles of intersection and differing vehicle and train speeds. It is not possible to just give a "toot," as suggested by some, and still provide the unmistakable and persuasive warning needed to deter risky motorist behavior.

FRA did note in the NPRM, however, that the traditional practice of requiring that the horn be sounded approximately one-quarter mile before the crossing is excessive when train speeds are well under about 45 miles per hour. Accordingly, FRA proposed that it might be possible to use a time-rather than distance-based criterion. Representatives of the Brotherhood of Locomotive Engineers (BLE) seized upon this suggestion in their testimony, affirming that this could be accomplished. Accordingly, the interim final rule requires that the horn must begin to be sounded between 15 and 20 seconds prior to the arrival of the train on the crossing and while the lead locomotive is moving over the crossing, but for a distance no greater than one-quarter mile (1,320 feet). This time-based approach should reduce unwanted noise without compromising the usefulness of the warning provided. Sounding the horn over a distance greater than one-quarter mile would add no value, since the loss of volume associated with the distance involved would almost certainly prevent any effective warning. FRA expects that railroads will leave existing whistle boards in place to assist engineers in estimating where to begin sounding the horn, given the speed of the train approaching the particular crossing.

H. Post-NPRM Ban Impact Studies

Following publication of the NPRM, various commenters indicated they had more accurate data and information regarding which crossings are subject to whistle bans. The Wisconsin Rail Commissioner, the Maine DOT, and the City of Chicago DOT provided a sufficient amount of new data with respect to affected crossings to warrant a revision to the FRA "Updated

Analysis of Train Whistle Bans" (January 2000). Chicago area commenters (Hafeez and Laffey) also performed an independent study of the effects of whistle bans in the Chicago Region and concluded that whistle bans do not affect accident frequency in the Chicago Region. Commenters from Wisconsin indicated that there were a significant number of whistle ban crossings in Wisconsin that did not have active warning devices but had good safety records.

FRA therefore contracted with Westat, Inc., a nationally respected statistical research firm. The purpose of the Westat Inc., contract was to: (1) Revise the 2000 FRA analysis of whistle bans to reflect the more accurate data received post publication of the NPRM, (2) obtain independent, expert review regarding FRA's methodology, and if necessary, recommendations as to ways to improve it; and (3) evaluate the points raised by representatives from the Chicago Region and the State of Wisconsin by performing regional studies of the effects of whistle bans in the two areas.

Westat—2002

In the initial effort, Westat, Inc., utilized the same study period as FRA's update (1992–1996) (Zador, Paul L., April 1, 2002). The methodology employed was a refinement on FRA's stratified method comparing accident histories of crossings with similar predicted risk. Westat concluded that on a nationwide basis (excluding Florida), adverse whistle ban effects were statistically significant at levels well below the conventional significance level of 5 percent, regardless of warning device class. All three classifications of warning devices experienced a higher accident rate in whistle ban areas as follows (National data excluding Florida only and excluding Florida and the Chicago Region):

| Warning device class | Percent difference | |
|----------------------|--------------------|---------------------|
| | (with Chicago) | (excluding Chicago) |
| Passive | 52.6 | 64.2 |
| Flashing Lights | 43.2 | 69.1 |
| Gates | 44.4 | 57.6 |

FRA had asked Westat to attempt regional analysis where the crossings appeared to be sufficiently numerous to permit at least some comparisons (*i.e.*, Wisconsin and the Chicago Region). Data for Wisconsin generally indicated an increase in accident risk for each type of warning device with bans in place, whether the Wisconsin whistle ban crossings were compared with other similar Wisconsin crossings or with

³ The NTSB's Passive Crossing Study has been construed by some as an attack on the safety value of the train horn because it cited examples of situations at passively signed crossings in which the horn's signal-to-noise ratio likely did not meet a pre-established criterion. Neither the NTSB's report nor its comments in this docket question whether the horn is effective in preventing some accidents. Rather, the NTSB has ventured the conclusion that certain accidents have occurred at passively signed crossings where the horn did not provide a sufficient warning given the background noise and other factors. FRA's position in this rulemaking is consistent with this conclusion.