

study done by the General Accounting Office, which stated that a single system equipped with sensors to detect trapped cars could cost \$1 million. The BRS disagrees, estimating that vehicle detection systems can be installed for around \$175,000.

Vehicle detection systems are used for a variety of purposes in traffic control systems. They generally consist of inductive loops buried just beneath the surface of the roadway to detect a metal mass over the location. Their cost will vary depending upon the complexity of the application. In pilot studies and high-speed rail applications, costs of four-quadrant gate installations with complex vehicle presence detection systems have approached \$1 million; however, it appears that much of this cost has resulted from attempts to make the circuitry fully fail-safe in nature. Neither the MUTCD nor FRA regulations require that vehicle presence detection function on a fail-safe or closed circuit principle. Rather, in the context of a four-quadrant gate system it appears that a reasonable design objective would be a high degree of reliability in detecting a motor vehicle. FRA believes that a typical installation should be feasible for costs in the range of \$175,000 to \$250,000.

FRA wishes to emphasize that use of vehicle presence detection makes sense only where there is reason to be concerned about storage on the crossing due to cued traffic (normally as a result of nearby intersections). For instance, the State of Florida has installed several four-quadrant gate systems without vehicle presence detection along the Tri-Rail commuter line in south Florida. Those installations have functioned well. By contrast, FRA agrees that, at many Chicago Region crossings with nearby traffic signals and heavy traffic volumes, use of vehicle presence detection to keep the exit gate arms up until all vehicles clear the track will be fully warranted. The question of whether the exit gates should fail up or down has been resolved by amendments to the MUTCD subsequent to the publication of the NPRM. These amendments permit failure down only in the presence of remote health monitoring.

The AAR objected to FRA's proposed requirement that gates must be activated by use of constant warning time devices. The AAR stated that "constant warning time devices are not always practical. For example, constant warning time devices may be impractical where three or more tracks are located close to each other. Thus, FRA should at most require constant warning time devices where practical." FRA acknowledges concerns

about the use of constant warning time devices in electrified territory and AAR's concerns about three track crossings. Accordingly, FRA is requiring constant warning time devices where reasonably practical.

Gates With Medians or Channelization Devices

In the NPRM, FRA proposed to require that gates with medians or channelization devices be considered SSM if: opposing traffic lanes on both highway approaches to the crossing are separated either by medians bounded by barrier curbs or medians bounded by mountable curbs if equipped with channelization devices. FRA proposed that such medians must extend at least 100 feet from the gate, unless there is an intersection within that distance. If so, the median must extend at least 60 feet from the gate, with intersections with that 60 feet closed or moved.

The median barrier option was given positive comments by some, and constructive criticism by others. Communities commented that they can be impracticable, expensive, unsafe, and that the required median length is too long. Planning Coordinator of the West Central Municipal Conference, Megan Swanson and Mayor Jeffrey Smelty pointed out that median barriers are simply "aesthetically displeasing" or have "aesthetic problems." Orlando Park, Illinois submitted that the medians were "inordinately expensive."

Several commentaries focused on the possible safety hazards that may arise when median barriers are installed. Mayor William Scanlon of the City of Beverly noted that fire apparatus would be inhibited when trying to pass vehicles near the grade crossing medians. The New Jersey Department of Transportation offered a possible solution by suggesting that mountable medians be installed to allow for emergency vehicle access. The problem with mountable devices, as the Florida and North Carolina DOTs point out, is that they can be "high maintenance" items, and may encourage drivers to drive over the median. Others, such as LCI Energy of Ipswich, Massachusetts, were concerned about disabled vehicles and the driver's ability to escape from the vehicle. Jefferson Parish, Louisiana noted that medians may invite motorists to make additional U-turns that they would not have otherwise made but for their driveway being blocked. Another safety concern brought up by David Bier of LaGrange, Illinois, is that installing barriers may create a secondary problem of vehicles crashing into the medians.

The main body of commentary complained that median barriers are

simply impracticable. Many submissions, such as those from the Kansas Department of Transportation; Chicago Department of Transportation; Ipswich, Massachusetts; Edward Sirovy of the Dupage Railroad Safety Council; Gene Shannon of the Metropolitan Council of Governments; Wilmette, Illinois; Mayor Jeffrey Smelty; Peter Wells, City Attorney of Pendleton, Oregon; and Joan Johnson of BLAST, noted that most of their crossings are adjacent to a parallel highway intersection, making barriers unusable, especially if the required distance remains 100 feet. These comments also noted that narrow roads would make installation of median barriers impossible. Gene Shannon was particularly concerned that motorists would be unable to access businesses if a median was installed. Communities located in the north said that medians were not an option because they would either prevent snow from being plowed off the road, or be inadvertently destroyed by the plow.

Another body of commentary focused on the required length of the proposed medians. Most communities requested that the FRA shorten the requirement so that the barriers could be installed at more locations. But the Florida Department of Transportation requested that the medians be mandated to be a fixed height of nine inches and a length of 200 feet, so that motorists would not drive around them. Of the commenters that believed medians should be shorter, there was disagreement as to whether the length should be set or decided on a crossing by crossing basis. The Kansas Department of Transportation stated, "We encourage that the determination of the length of median be made as a crossing specific engineering decision and that the 100-foot distance is only a recommended practice." The Missouri Division of Motor Carriers submitted that a shorter median may be just as effective as a longer one, and that a State level diagnostic team should assess the particular length of each median. In contrast, Illinois ICC recommended that FRA avoid arbitrary criteria for the length and material of medians.

FRA understands the point made by many commenters that median length may be substantially constrained by roadway geometry. However, safety at highway-rail crossings has already benefitted substantially from use of median arrangements at many crossings, and there is no reason not to fully exploit this technique in support of community quiet. Accordingly, FRA continues its approval of shorter channelization arrangements and, in the revised Appendix B, invites local