

there is enough experience with longer gate arms to include them as an SSM at this time. FRA will continue to monitor their development for future acceptance as an SSM. FRA is also aware of a manufacturer that has developed a gate arm that telescopically extends beyond the centerline and is equipped with a sensing mechanism which will stop the extension if it encounters an obstacle. This technology has potential to be considered as an SSM but has yet to be field tested. FRA will also monitor this technology.

California PUC's Rail Safety and Carrier Division advised that each crossing in a quiet zone should be equipped with "Remote Health Monitoring." Missouri's Division of Motor Carrier and Railroad Safety stated that each SSM should have constant warning time with redundancy. We note that the rule requires that all active grade crossing warning devices in New Quiet Zones be equipped with power-out indicators (defined to include remote health monitoring that includes reporting exceptions to primary power status) and (with limited exceptions) constant warning time devices. *See* § 222.35(b).

FRA received a large number of comments addressing specific SSMs. A brief summary of comments received follows.

Temporary Closure of a Public Highway-Rail Grade Crossing

Some communities expressed concern with the temporary closure. The communities of Orlando Park and Wilmette, both in Illinois, viewed closures as impractical or not feasible. Community representatives argued that most crossings are major thoroughfares, and thus closing a crossing would have a serious impact on traffic patterns. Jeffrey Smelty, chairman of the Executive Committee of the Chicago Area Transportation Studies Council of Mayors, stated that closures are a "viable option only in a few instances of low volume roads." The President of the Village of Northbrook claims that closing low volume crossings would have little effect on collisions since the low volume itself decreases the statistical risk of an accident. Two States, the Kansas DOT and Missouri Division of Motor Carrier and Railroad Safety commented that if a crossing can be temporarily closed part of the day, then it should be able to be closed permanently. They were also concerned with the potential for human error in closing and opening the roadway. In contrast, the North Carolina DOT stated that overnight closures should be given a preference in the rule because it

would entirely eliminate the need for horns to sound.

The AAR expressed concern regarding the potential confusion that would occur if States and localities adopt different closure periods. Different closure times would mean that engineers would have to know each crossing's closing period, thus placing an extra burden on the engineer. Therefore, the AAR recommended that the FRA establish uniform closure periods for every day of the week. Additionally, the AAR recommended that the FRA require barriers that cannot be moved by the public and cannot be crossed by automobile or pedestrian traffic. A comment by Wichita, Kansas took into account the possible side effects of temporary closures. They noted that temporary closures may result in drivers speeding to beat the closure time. They were also concerned about the possibility of disrupting emergency vehicle service routes.

FRA does not view the temporary closure as a solution for every crossing in every situation. Commenters are indeed correct that in some situations temporary closures are impractical. However, temporary closures can in some circumstances provide a legitimate alternative to other SSMs. This alternative is but one among a number of choices available to public authorities in developing quiet zones. FRA believes that the MUTCD provides appropriate standards for barriers and that train crews can become familiar with quiet zone time periods.

Four-Quadrant Gate System

Comments on the four-quadrant gate system ("4Q system") centered on its cost, potential for failure, and dangerousness. The FRA did receive praise on this proposed SSM from some, including the Washington Department of Transportation, which stated that the proposal "indicated extensive thought and effort." Others had problems with the 4Q system. The State of Illinois was particularly concerned with the 4Q system because the ICC did not allow for their use at highway-rail grade crossings. The ICC had concerns about safety regarding trapped vehicles in the crossing. Also, the ICC believes that it will take more time than the FRA estimates for vendors and railroads to design, manufacture, and install the gates to meet all of the new demand.

Many comments provided suggestions for improving the design of the 4Q system to make its overall functioning safer. The Florida Department of Transportation recommended that median barriers of at least 100 feet be required at crossings in addition to the

gates. This overall sentiment was echoed by the Missouri Division of Motor Carrier and Railroad Safety, which objected to the term "blocked crossing" being used to describe the 4Q system because the gates only "greatly deter" a driver and do not totally impede a vehicle or pedestrian from crossing the gated tracks. The New Jersey Department of Transportation suggested that all traffic signals within 200 feet be equipped with preemption circuitry.

Most States and communities, like Moorhead, Minnesota, were particularly concerned with the danger of a car getting trapped within the gates on the tracks. Robert Guttman, a top official on the MBTA Advisory Board believes that quadrant gates should be outfitted with a safety mechanism to prevent vehicles from being trapped. Another safety measure that communities would like to see is constant warning time circuitry. The AAR points out, however, that this system may be impractical at crossings with three or more tracks.

One of the most controversial issues centered on whether to have the four-quadrant gates programmed to stay up or down during a failure of the system. Concerned with safety, the North Carolina DOT clearly stated that gates should always fail in the down position. This position was supported by a study conducted in conjunction with Norfolk Southern titled "Exit Gate-Arm Fail-Safe Down Test." The data provided evidence that fewer vehicles traveled through a failed crossing when all the gates were in the down position than when one or more of the gates were in the upright position. Communities and their representatives disagree; for example, Illinois State Representative Eileen Myins stated, "What will they do when double gates malfunction, and there is no way around them?" Gate failure appears to be a "particularly bothersome" problem, as noted by Massachusetts State Representative Michael Cahill: "gates frequently malfunction in the down position, resulting in motorists who leave their car, get on the track, and wave motorists across the tracks because there is no train approaching." Mayor William Scanlon of the city of Beverly in Massachusetts also reports frequent incidents of failure where police have had to direct traffic around the gates. Therefore, these communities recommended that the gates fail in the upright position.

Another area of great concern with the four quadrant gate system was the cost, which Orlando Park, Illinois describes as "inordinately expensive." A representative of Chicago referred to a