High-speed Rail Development & Crossing Safety

Frank A. Frey, Gen. Engineer
Office of Safety
Highway-Rail Crossing Div.
Washington, D.C. 20590

U.S. Department of Transportation
Federal Railroad Administration
ADVANCING H.S.R. IN THE U.S.A.

- why high-speed rail
- FRA’s Sealed Corridor
- design criteria
Why HSR in the US?

population growth

Today – 315 million people
+ 100 million people by 2050
Why HSR in the US?

congestion & mobility
Why HSR in the US?

energy & environment
Where are the key US markets?
## Appendix: Potential Tier Structure for Passenger Systems

### Highway-Rail Grade Crossings

<table>
<thead>
<tr>
<th>Tier</th>
<th>0</th>
<th>IA</th>
<th>IB</th>
<th>IC</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Regional Rail Conventional Emerging HSR HSR Regional HSR Mixed Operations HSR Mixed Passenger HSR Dedicated HSR Express</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Speed (mph)</td>
<td>0-65</td>
<td>0-79</td>
<td>80-110</td>
<td>111-125</td>
<td>126-150</td>
<td>0-150</td>
<td>0-150</td>
<td>0-200/220</td>
</tr>
<tr>
<td>Other traffic on same track</td>
<td>None (or temporarily separated)</td>
<td>Mixed passenger and freight</td>
<td>Mixed passenger and freight</td>
<td>Mixed passenger and freight</td>
<td>Mixed passenger and freight</td>
<td>Conventional passenger only</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Closures</td>
<td>Consolidation encouraged in regional and conventional service; funding condition if part of HSR corridor</td>
<td>Demonstrated effort and results required as part of funding process. No crossings above 125 mph</td>
<td>Grade separated – entire corridor</td>
<td>Grade separated – entire corridor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public highway-rail grade crossings, generally</td>
<td>Automated warning; supplementary measures where warranted</td>
<td>Automated warning; supplementary measures where warranted</td>
<td>Sealed corridor; evaluate need for presence detection and PTC feedback</td>
<td>Barriers above 110, see §213.247</td>
<td>Presence detection tied to PTC above 110 mph</td>
<td>See IC</td>
<td>See IC</td>
<td>None at any speed</td>
</tr>
<tr>
<td>Private highway-rail grade crossings, generally</td>
<td>Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit</td>
<td>Automated warning or locked gate preferred; cross-buck and stop or yield sign where conditions permit</td>
<td>Automated warning with gates; or locked gate (interlocked with signal system at higher speeds)</td>
<td>None or as above</td>
<td>None above 125 mph</td>
<td>None above 125 mph</td>
<td>None at any speed</td>
<td>None at any speed</td>
</tr>
<tr>
<td>System Safety Programs</td>
<td>Crossing safety and trespass prevention issues included in SSP process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plus FRA reviews management decisions and may disapprove.</td>
</tr>
</tbody>
</table>
Close As Many Grade Crossings As Possible
What does the FRA look for in crossing design??

- Non-traversable Medians

- 3 or 4 Quadrant Gates

- Gate orientation

- Cantilevers

- Preemption (Advanced or Simultaneous)

- Technologies (VPD, RHM)
Gates with 100’ non-traversable medians
4-Quad gates

NOTES:
1. REPLACE GATE FOUNDATION
3-Quad gates
Pedestrian Treatments
Railroad Preemption

Pre-Signal Queue-cutter
Exit Gate Management System

Remote Health Monitoring
Cantilevers
Skewed Crossings

Acute Angled

Less 90°

Obtuse Angled

Greater 90°
Acute Angled

Bad

Good

AREMA Part 3.1.36B
Obtuse Angled

Good

Good
The best grade crossings are...
Thank-you!

frank.frey@dot.gov
(202) 738-2195