



CPUC Public Agenda 3292

Thursday, April 19, 2012, 9:00 a.m.
505 Van Ness Ave, San Francisco



Commissioners:
Michael R. Peevey
Timothy Alan Simon
Michel Peter Florio
Catherine J.K. Sandoval
Mark J. Ferron

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Railroad Preemption of Traffic Signals Preemption Review Project



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California Public Utilities Commission

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Presentation Overview

- Explanation of preemption – approaching trains alter (*preempt*) the normal operation of motor vehicle traffic signals to allow traffic to clear a crossing.
- Fox River Grove, IL, 1995 bus/train collision, and the FRA Safety Advisory.
- California Vehicle Code, (CVC) Section 22526(d):
 - A driver of a vehicle shall not enter a railroad or rail transit crossing, notwithstanding any official traffic control device or signal indication to proceed, unless there is sufficient space on the other side of the railroad or rail transit crossing to accommodate the vehicle driven and any railway vehicle, including, but not limited to, a train, trolley, or city transit vehicle.
- Hazards addressed: Situations where cars violate CVC and are unable to move off of railroad tracks.
- Hazard mitigations – preemption, others.
- CPSD rail crossing safety staff activities: Working with railroads, municipalities and consultants:
 - To ensure preemption circuitry is designed, installed, and maintained to function as intended.
 - To identify where preemption circuitry changes or equipment adjustments are needed.





Addressing Queuing

- Traffic signals with preemption
- Pre-signals / Queue Cutter
- DO NOT STOP ON TRACKS sign
- Hatch / KEEP CLEAR markings
- Traffic laws and enforcement
- Relocate the sources of queuing (driveway, bus stop, etc.)





Signalization of Intersections Near Crossings

- Roadway intersections near crossings present special condition where traffic signals should be considered.
- Particular concern is vehicles queuing or stopping on the tracks and the possibility that traffic may prevent them from moving off the crossing when a train approaches.
- Installation of traffic signal equipped with railroad preemption is usually the best solution to clear motorists from the rail crossing.





What is Railroad Preemption?

- A special control mode in a traffic signal controller designed to start up and clear any vehicular traffic on the roadway approach crossing the tracks on approach of a train
- Allows only traffic movements that do not conflict with the railroad movement for the duration of the train movement through the crossing.



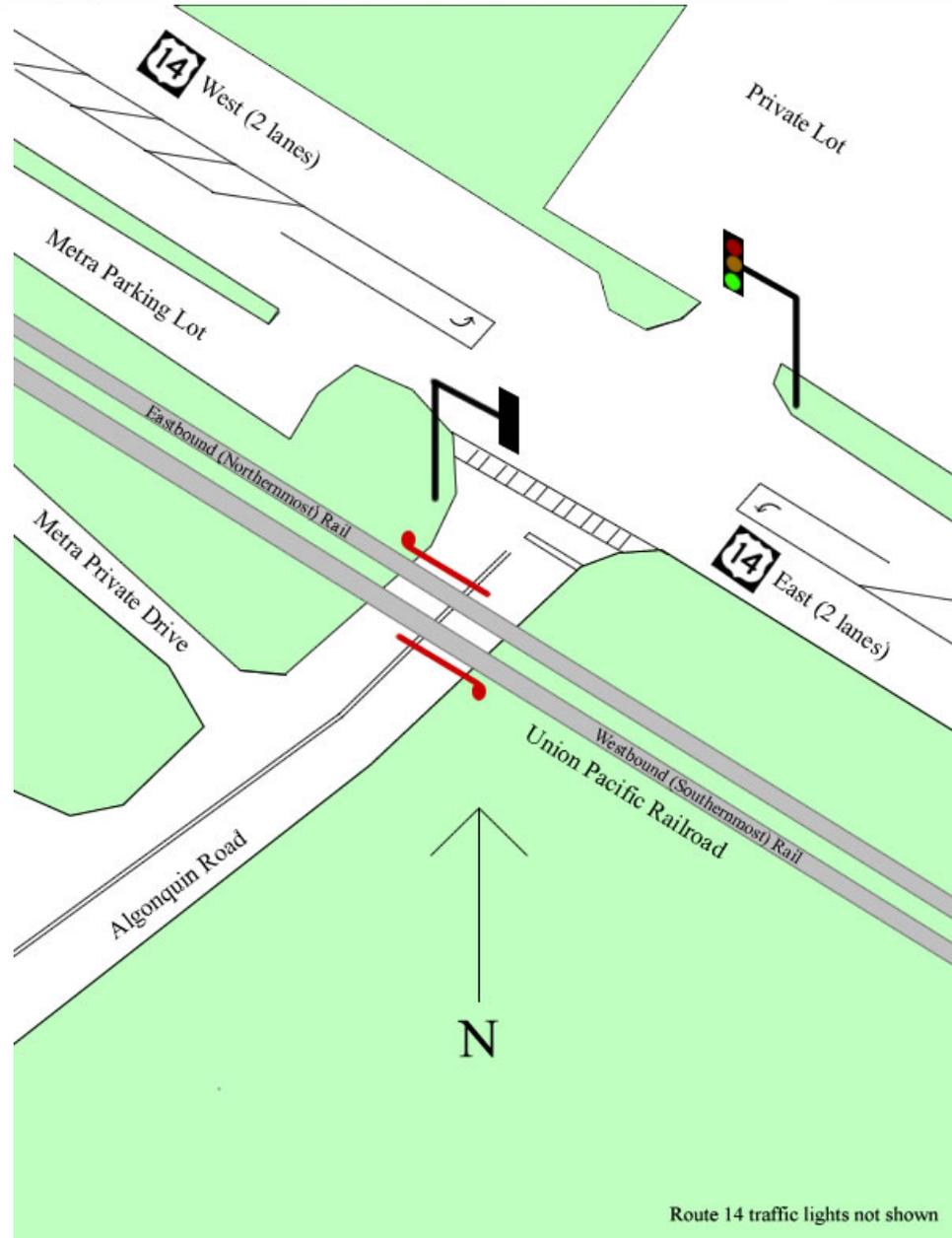


Fox River Grove, IL -10/25/1995





Crossing graphic for Fox River Grove accident





Fox River Grove Accident Diagram

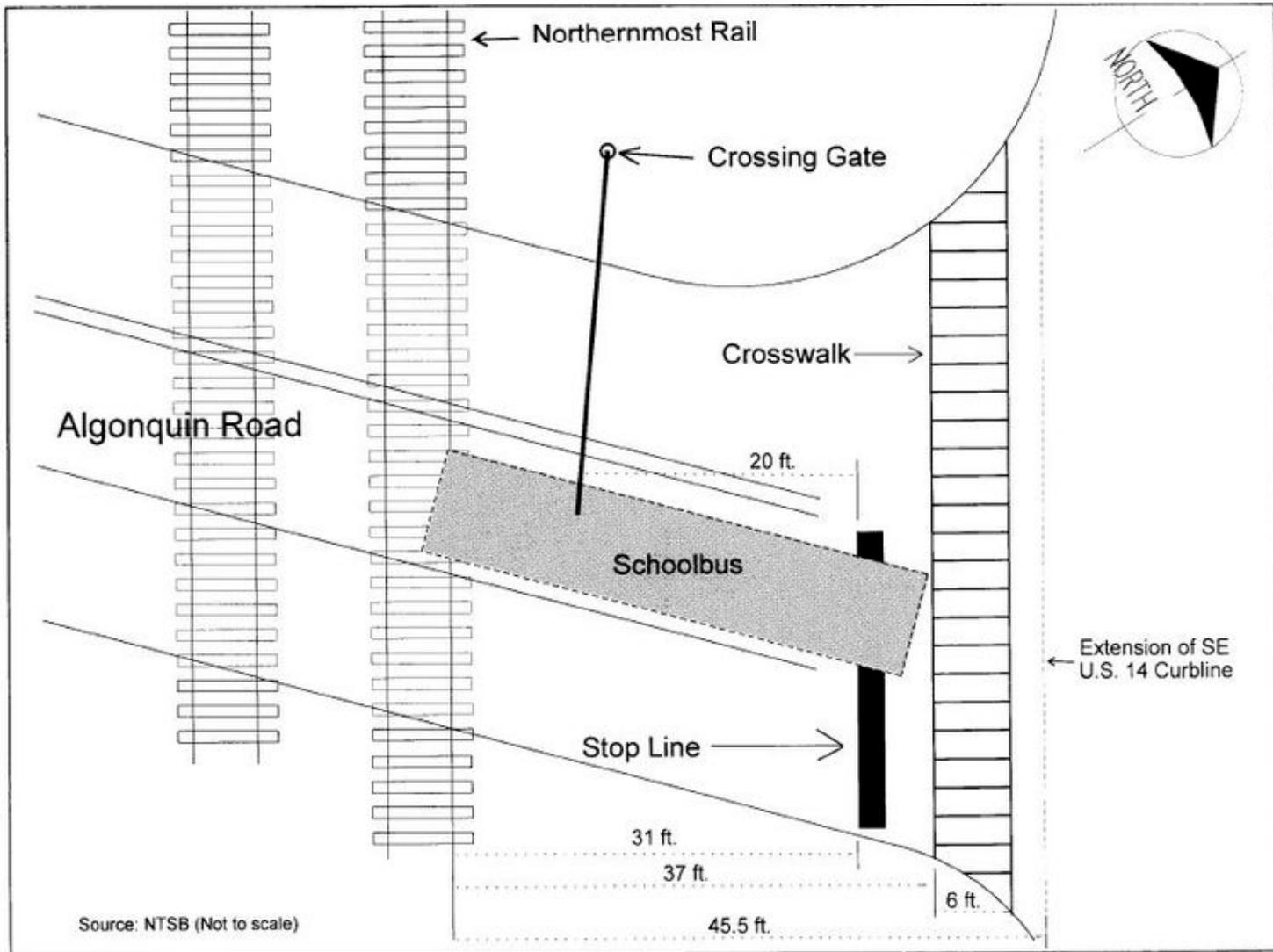


Figure 5 — Diagram of queuing area





FOX River Grove, IL collision

NTSB Probable Cause:

- 1 – School bus driver positioned the bus so that it obstructed the track area.
- 2 – Illinois DOT failed to recognize the short queuing area on Algonquin Road and address it.
- **3 – Illinois DOT did not recognize the short green signal indication for northbound vehicles to clear the track area before arrival of the train at the crossing.**
- 4 – The School District did not identify route hazards (at a railroad-highway crossing) and did not provide its drivers with alternative instructions for such situations.





FRA Safety Advisory

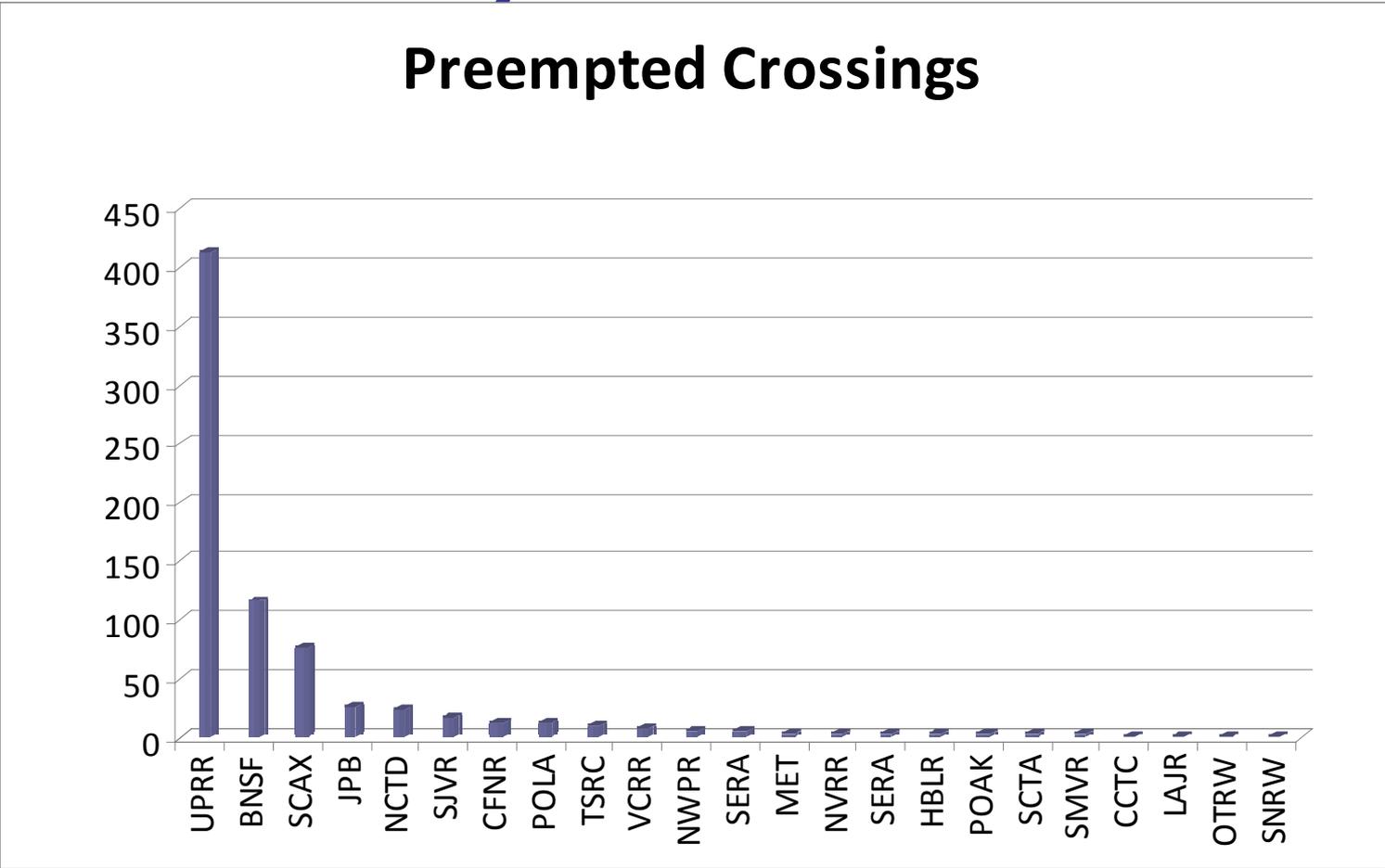
- As a result of the Fox River Grove Incident and looking into the future, the FRA in responding to the NTSB issued Safety Advisory 2010-02. It recommends:
 - That States, local highway authorities and railroads conduct comprehensive periodic joint inspections of highway traffic signal pre-emption interconnections.
 - That States, local highway authorities, and railroads install, maintain, and upgrade railroad and highway traffic signal recording devices at crossings with active warning devices that are interconnected with highway traffic signal systems.





Preempted California Crossings by Railroad

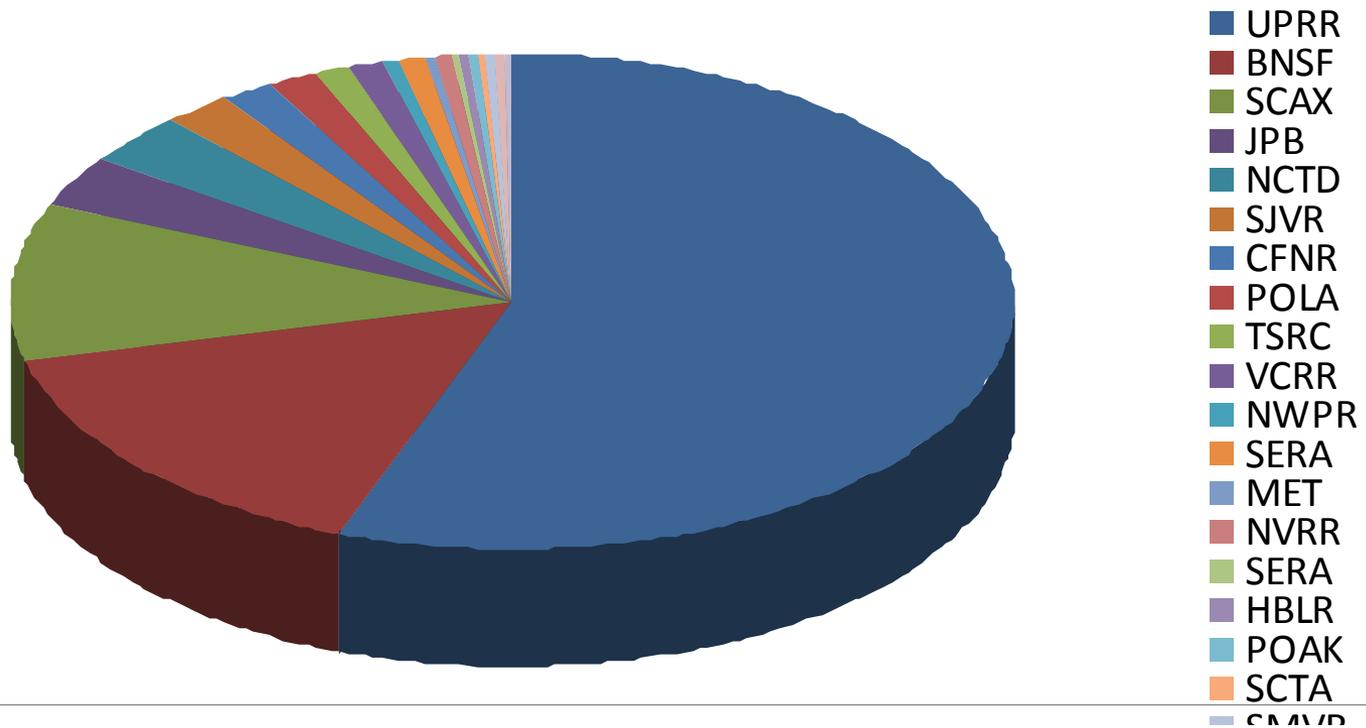
Preempted Crossings





Preempted California Crossings by Railroad

Preempted Crossings





BNSF - UPRR

- In compliance with the FRA Safety Advisory, the two largest railroads in California hired Campbell Technology Corporation, experts in Preemption design and evaluation, to conduct safety reviews at all of the BNSF and UPRR preempted crossings in California.
- BNSF – 109 preempted crossings
- UPRR – 412 preempted crossings





CPUC –CTC-Railroad Partnership

- At the request of RCES and local roadway authorities, the Commission's RCES partnered with CTC and the Railroads to participate in the crossing preemption evaluations in California
- RCES Engineers are now actively participating at each crossing preemption evaluation





Preemption Time

- To estimate the preemption time calculate:
- * Right of way Transfer Time
- * Queue Clearance
- * Maximum Preemption Time
- * Railroad Minimum Warning Time
- * Advance Preemption Time
- * Check Gate interaction and Track Clearance
Green Time





Preemption Time

- Right of Way Transfer Time is the maximum amount of time needed for the worst case condition, prior to display of track clearance green interval to drivers waiting on/near the crossing approach. Including:
 - Reaction time for equipment to acknowledge a request for preemption
 - Time to allow traffic control signal green to terminate,
 - Pedestrian walk and clearance,
 - Yellow change interval, and,
 - Red clearance.





Preemption Reviews

- Verify existing equipment and configuration
- The railroad signal to local agency traffic signal controller and railroad train detection circuit reviewed.
- Preemption timing sheets verified and reviewed.
- Check Operation – Field site review completed by a Diagnostic Team consisting of the railroad, its consultant, local agency traffic engineering staff and CPUC RCES engineering representative to test the proper operation of the signalized intersection and clearing of traffic.
- Final report on each crossing.





Preempted Crossings

- Approximately 743 Preempted crossings in California
- Union Pacific Railroad and Burlington Northern Santa Fe initiated a preemption study in April of 2011 to review all of their preempted crossings.
- 100 crossings have been completed thus far and various others are being scheduled for completion in 2012
- These BNSF and UPRR projects will result in ALL of their preempted crossings in CA undergoing a thorough review of preemption as recommended by the FRA Safety Advisory.





Preempted Crossings

- RCES is exploring ways to partner with the other CA railroads such as Metrolink and Caltrain to implement preemption reviews on those lines.
- Develop a process to assure railroads and local roadway authorities continue ongoing reviews in accordance with the FRA Safety Advisory.

