2017 Grade Crossing Research Needs Conference

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Topics

- Wireless Crossing
- Next Generation Technology
- Highway / Rail Interconnection
Wireless Crossing
Conventional Highway Grade Train detection

- Based 1970’s track circuit technology
- Custom to each specific road/track configuration
- Expensive to install and maintain
- “Loss of Shunt “ conditions
- Bad ballast conditions
Wireless Crossing System

System Components:
• PTC Operational Territory

Wayside:
• Flashers, Crossing gates, and Relays/SSCC
• Crossing WIU
• Island detection (Infrared, Radar,…)

Onboard components:
• PTC enabled locomotive
Wireless Crossings

- Coordinated with Locomotive
- Fewer exposures (20,000 annually)
- Improved reliability
- Continuous remote health monitoring
- Lower cost to install and maintain
Next Generation Technology
Next Generation Technology

- Internet of Things
- Eliminating the Human factor
IoT

- Use train position data to influence drivers to seek alternate routes via GPS based mapping applications
IoT

- Train presence information for Emergency Services
- Very low cost

- Requires common standards and support by
  - Railroads
  - Traffic agencies
  - Application builders

- Unquantifiable impact
Eliminating Human Error

• 62% of highway rail crossing accidents are at crossings equipped with active warning devices

• A significant number of these were due to human error of the vehicle operator

• Automotive Industry is developing “autonomous” vehicle technology
  • Must prevent vehicles from colliding with trains
Eliminating Human Error

• 62% of highway rail crossing accidents are at crossings equipped with active warning devices
• 90+% of these were due to human error of the vehicle operator
Eliminating Human Error

- Active and/or Passive Warning devices alone will not achieve the goal of eliminating highway rail grade crossings accidents.
Eliminating Human Error

• Autonomous vehicles
  • Must prevent highway rail grade crossings accidents to be successful
    Technological Approach:
    Automotive based sensing
    Rail based sensing
    GPS based positioning of both rail and auto
    All would most likely require some universal communications network
  • Since it is a “must do” where is the priority?
  • Can this come ahead of autonomous operation?

Lead or Follow?
Eliminating Human Error

• From a safety perspective this must be a universal active system
  • Must include the participation of all railroads, all auto manufacturers and all road authorities
  • Will likely involve FCC, FHWA and FRA
Highway / Rail Interconnection
Highway / Rail Interconnection

- Current FHWA- MUTCD recommendations are not universally applied
Highway / Rail Interconnection

- To achieve “Zero”, Safety is not optional
  - Safety at Highway grade crossings must be of significant importance and Not be an afterthought
  - Safety requirements must applied universally by traffic agencies
Highway / Rail Interconnection

• A unified vision for highway grade crossing safety including all involved is critical to achieve zero accidents