Technology Section Feature

Technological Developments at the Federal Railroad Administration

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As the primary governmental safety regulator of railroads, the Federal Railroad Administration (FRA) has long been the authority on regulatory enforcement with a mission of encouraging the "safe, reliable and efficient movement of people and goods for a strong America, now and in the future." The railroad industry tends to view the FRA as an institution whose purpose is to place rules and requirements on railroads. However, the FRA is also an important information resource. This article examines three major efforts made by the FRA over the last few years to aid their mission while providing technological resources for the railroads they govern, specifically in the areas of Geographic Information Systems (GIS), Global Positioning Systems (GPS), and hazmat route optimization.

One of the ways in which the FRA has been able to become a resource for railroads is through the development of three public-facing website GIS tools. One of these is a general "public viewer" that depicts the national rail network, allowing users to access data related to grade crossings, track ownership, and trackage rights, and is one of the few ways to view the entire national rail network on one map. Users can also incorporate their own data into the viewer for additional analytic capabilities.

FRA GIS Public Viewer web address: http://fragis.fra.dot.gov/GISFRASafety/

Another website tool the FRA has developed over the last few years is their "grade crossing pop-up viewer" application within the GIS system that connects to the data they collect from each state's department of transportation (DOT). Again, the major benefit here is the ability to see crossings from most railroads in one centralized location. The data is updated weekly. This tool can be accessed in two ways:

- Either from the map (you have to click the globe icon on the top right and turn on "Grade Crossings"),
- Or at this web address:
  http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx

This data will become even more accurate after railroads begin to comply with the National Highway – Rail Crossing Inventory Reporting Requirements published on January 6, 2015. Submission of new data is required by March 7, 2016.

The FRA also recently unveiled their "Trespasser Map." This is more of a statistical tool, and can help railroad professionals better understand the safety weaknesses in their systems. In viewing the entire country, the FRA uses a heat map to show gradations of trespassing frequency. When zooming in, more

detail is shown, with injuries shown in blue and fatalities shown in red. The map shows all data collected by the FRA from June 2011 through today and is intended to help determine where additional safety precautions may help prevent future incidents.[i]

FRA Trespasser Map: http://fragis.fra.dot.gov/Trespassers/

The FRA has also made efforts outside of GIS to increase railroad safety through technology. Today, almost everyone uses GPS to assist in navigation while driving. The FRA recently began working to better educate navigation system providers, such as Google Maps, Apple Maps, Garmin, TomTom, etc on track status and crossing locations. Today, you might see a faint gray line on Google Maps to indicate a track location, but that is the extent of information provided. The FRA is providing these companies with detailed information on whether tracks are either active, out of service, or abandoned, so the actual danger of crossing the track can be clear to users. The FRA is also encouraging GPS companies to add crossing warnings to voice navigation systems, so drivers can hear they are approaching an active rail track, regardless of visual signaling. These improvements would increase safety at crossings and could hopefully help prevent drivers from attempting to "beat the signal" when a train is approaching.

Finally, the FRA is continuing to work on a long term mapping project to attempt to find the safest routes for the transportation of hazardous materials. Through collaborations with the Association of American of Railroads (AAR) and American Short Line and Regional Railroad Association (ASLRRA), the FRA developed maps that conduct route analyses on cars containing security-sensitive materials. With data provided by the AAR since 2009, the FRA worked with a company called VRisk[ii] to create the Rail Corridor Risk Management System (RCRMS), a system that provides routing assistance to Class I railroads. Using 27 "risk factors" to help determine the best route for various commodities, the RCRMS has become a major source of guidance to railroads with an increasing focus on the transport of crude oil.

Because the RCRMS only assists the Class 1s, the FRA has another system to aid short lines. The program, called the Hazmat Transportation Analytical Risk Model (H-Tram), similarly attempts to analyze hazmat routing. Though short lines rarely have alternative route options, H-Tram helps increase awareness of existing routing risks and offers potential solutions to "route risk analysis requirements."

A more technological FRA is beneficial to the railroads. With new tools and mapping, the FRA can assist the entire railroad industry in becoming safer and better able to meet many of the requirements it prescribes. Though many railroads have their own enterprise GIS systems, the FRA views itself as the primary connecting entity, allowing industry participants to understand each other's rail networks through their GIS system and view the national rail system as one large interconnected network. The FRA is the entity best positioned to act in this role because it understands the need to protect proprietary information while allowing for a specific degree of transparency.

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[i] Statistics shown in the Trespasser Map exclude suicides.
[ii] VRisk (AKA Visual Risk) recently changed their company name to Factor.