



Union Pacific Railroad: Using GPS in the field to streamline track inspection and maintenance

Challenge

The Union Pacific Railroad is the largest railroad in the United States with over 33,000 miles of track, serving 23 states, representing over two-thirds of the country. A strong focus on quality and a strategically advantageous route structure enable the company to serve customers in critical and fast growing markets.

Historically, ties were inspected by workers called "System Tie Spotters" who would walk the tracks to identify ties needing replacement and keep a running total of bad ties per mile on paper. At the end of a week in the field, Spotters would return to the office and enter the results of their inspections for use in the maintenance planning system. The Spotters often expended as much time entering data as they spent conducting inspections in the field.

The second phase of the tie maintenance process involved the delivery of the new ties to the replacement location as part of the maintenance cycle. This process involved sending personnel out into the field to walk the tracks a second time to mark the unloading locations for each 15-tie replacement bundle. These workers had to estimate and mark the best spots for the supply train to drop the bundles based on the Spotters' previous reports. The lack of coordinated location information for the bad ties made this an imprecise and time-consuming process.

In order to automate and improve the process of tie inspection and replacement, a mobile computing system was deployed using handheld computers with Global Positioning System (GPS) receivers.

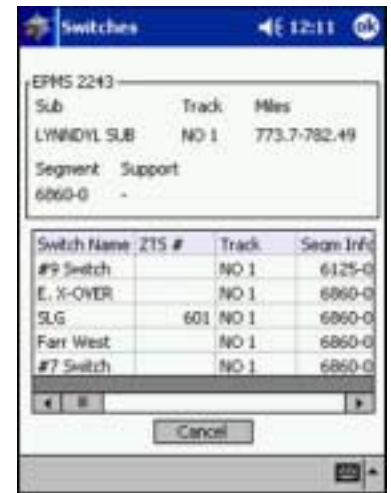


Solution

The Union Pacific Engineering Systems Group deployed a system for railroad tie inspection to be used by the "System Tie Spotters." The solution included Symbol 8100 handheld computers with snap-on modems and LinksPoint Bluetooth GPS. With the solution, the spotter walks the tracks and uses a specially-designed "clicker" to count bad ties. Each "click" generates a record on the handheld computer that is associated with a precise location captured from the LinksPoint Bluetooth GPS receiver and transmitted to the handheld computer using Bluetooth short-range wireless technology.

The tie inspection software used on the handheld was designed in-house with the help of LinksPoint's GPS application programming interface (API) and engineering support to access GPS position data. Specific components for synchronizing data with Union Pacific's ERP system were also developed by the Engineering System Group. The project was initially deployed as a pilot and based on its success was rolled out to the full team of Spotters.

When deployed in the field with the team of 20 Spotters, some results were immediately apparent. Spotters could now walk the tracks and use the clicker to record GPS location data for each bad tie. At the end of each assignment, the Spotter uses the handheld's modem to dial into the railroad's planning system to automatically upload bad tie location data collected in the field. The planning system uses this in the maintenance cycle to plot specific locations for the unloading of replacement tie bundles. GPS on the replacement tie train used the plotted locations to automatically drop the bundles for use by the repair crews.



Benefits



The Union Pacific mobile solution is very successful in that it provides benefits far beyond simply automating a process. It eliminates the use of paper recordkeeping and additional data entry. It transforms the way tie inspections were conducted in the field to greatly increase worker productivity and, thanks to GPS, greatly increase the value to the enterprise of the data collected. It uses data collected in the field to eliminate the costly and inefficient process of sending out additional spotters prior to unloading replacement ties. At the same time it increases the quality and availability of tie condition and location data to improve the entire track maintenance planning process.