

UNION PACIFIC'S AUGUST 2018 Positive Train Control Update



Union Pacific continues to make significant progress implementing positive train control (PTC). The company anticipates it will meet all required deadlines for installing PTC on its network. As allowed by federal law, Union Pacific will continue to implement, test and refine the complex suite of technologies comprising the system in 2019-20.

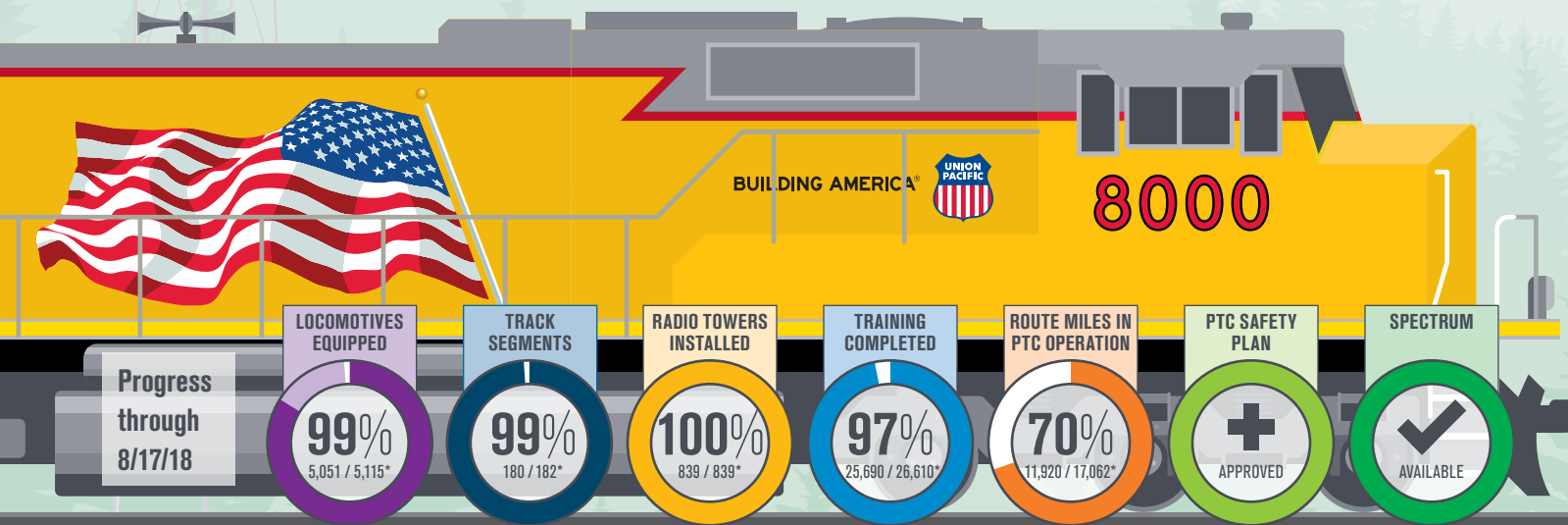
Union Pacific's PTC footprint is the largest of all North American railroads, encompassing more than 17,000 route miles, roughly one-third of all PTC miles and 45 percent more required miles than the next largest railroad. Union Pacific is in regular contact with the Federal Railroad Administration officials regarding its PTC progress.

Installing and implementing PTC across the U.S. rail network, including passenger and freight, is costly and complex. One of the most challenging parts of PTC implementation is ensuring system interoperability among all U.S. rail lines and locomotives. Given the various readiness levels of North American freight and passenger railroads, including publicly funded commuter lines and short lines, it is important that all railroads continue working together to maintain the health, safety, resiliency and fluidity of the rail network during PTC implementation.

Between April 1, 2018, and August 17, 2018, Union Pacific's accomplishments included:

- **Preparing additional track segments for PTC operations**, bringing the total number of track segments to 180, or 99 percent complete. These track segments are equipped with wayside devices such as signals, switches and radios and have defined GPS coordinates, which identify thousands of precise locations for systemwide PTC coordination.
- **Educating more than 25,690 employees on PTC operations**, or over 97 percent. Training materials are tailored to a variety of employee roles, including engineer, conductor, dispatcher, maintenance of way/engineering, mechanical, signal, telecom and information technologies.
- **Increasing by approximately 1,020 the number of installed PTC route miles**, bringing the total number of route miles in PTC operations to 11,920 or 70 percent.

Union Pacific is testing the PTC system as we install the technology across our network and begin utilizing it in 200- to 300-mile sections. Trains are experiencing unintended stops, which are the result of a built-from-scratch technology in the hands of employees still becoming familiar with it. These unintended stops have an adverse impact on our system. On occasion, the communities we serve experience impacts to vehicular traffic. Customers also may be affected, on occasion, from the resulting system wide velocity impact. We are diligently working to reduce unintended stop situations to eventually eliminate these occurrences.



*Union Pacific submitted to the FRA a request for amendment to its PTC Implementation Plan. This request modifies the total requirement counts for each of these metrics. The numbers shown here reflect these updates and may vary from the FRA's quarterly industry status reports.

With the FRA's conditional approval of our PTC safety plan, Union Pacific is running PTC operations on nearly 12,000 miles in Arizona, Arkansas, California, Colorado, Idaho, Illinois, Iowa, Louisiana, Minnesota, Missouri, Nebraska, Nevada, New Mexico, Oregon, Texas, Utah, Washington, Wisconsin and Wyoming.

WHAT PTC DOES PREVENT:

- ✓ Train-to-train collisions
- ✓ Derailments caused by excessive train speed
- ✓ Train movements through misaligned track switches
- ✓ Unauthorized train entry into work zones

WHAT PTC DOES NOT PREVENT:

- ✗ Vehicle-train accidents at railroad crossings
- ✗ Train accidents involving pedestrians on the track
- ✗ Incidents due to railroad track malfunction
- ✗ Incidents due to equipment malfunction

