Freight Railroads & Positive Train Control (PTC)

What is PTC?

PTC is a safety system that tracks the speed and movement of trains and can automatically stop a train to prevent specific human-error accidents. In 2008, Congress passed legislation requiring that PTC be installed on track that carry passengers and certain hazardous materials. The law requires that the technology prevent four specific types of accidents:

- Train-to-train collisions.
- Derailments caused by excessive speed.
- Accidents that can occur if trains are routed down the incorrect track.
- Unauthorized train movements on tracks undergoing maintenance.

Key Takeaway

PTC — technology that will reduce the number of human error-caused accidents by automatically stopping or slowing a train — is in operation across 100% of the required Class I route miles nationwide and will be fully interoperable by the end of 2020.

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When will PTC be in full operation?

The seven U.S. Class I freight railroads are committed to safely implementing PTC as quickly as feasible. They all met statutory requirements by having 100% of their required PTC-related hardware installed, 100% of PTC-related spectrum in place, and 100% of the required employee training completed by the end of 2018. In aggregate, Class I railroads have 100% of required PTC route-miles operational as of August 2020.

As all freight railroads met the 2018 statutory requirements, they now have up to an additional 24 months to test and ensure their systems function properly, are fully interoperable and can meet the rigorous demands of long-term, day-to-day operation. By the final December 2020 deadline, Class I freight railroads will have PTC fully implemented on all required route miles. In the meantime, railroads are continuing to test and validate their systems thoroughly to ensure they work as they should.

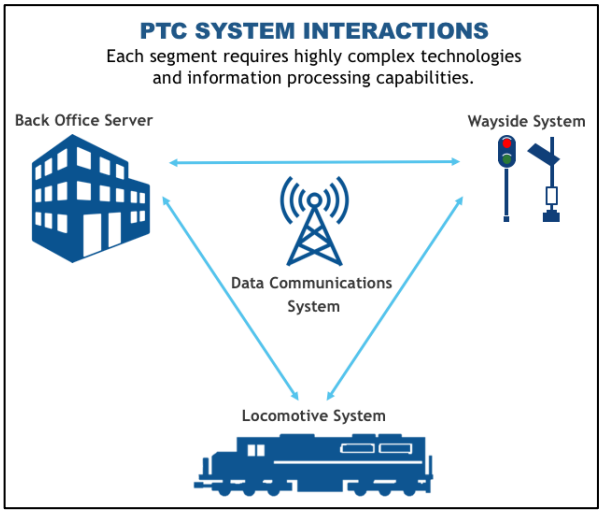
What is interoperability?

America's rail network is a combination of privately owned freight and publicly owned commuter and passenger systems. It is very common for the trains pulled by the locomotives of one railroad to operate on track that is owned and controlled by another railroad.

Interoperability ensures that individual railroads' PTC systems work together seamlessly no matter which railroad owns the locomotives and track. Put another way, a passenger locomotive operating on a freight railroad's track must behave the same way as that freight railroad's locomotive would on that same track.

How does PTC technology work?

PTC systems must be able to determine the precise location, direction and speed of trains, compare this information with similar details of other trains or other types of restrictions on track use, warn operators of potential changes in operating conditions or conflicts and bring a train to a stop should the engineer fail to act appropriately.



A PTC system consists of three main elements integrated by a wireless data communications system that must move massive amounts of information back and forth between the back-office servers, the trackside equipment, and computers on board locomotives. These three elements include:

- **An onboard or locomotive system** monitors a train's position and speed and activates brakes as necessary to enforce speed restrictions and prevent unauthorized train movements.
- **A trackside (or "wayside") system** monitors railroad track signals, switches, and track to communicate data needed to permit the onboard system to authorize train movement.
- **A back-office server** stores all information related to the rail network and trains operating across it (e.g., speed restrictions, train movement authorizations, train compositions, etc.) and transmits this information to individual locomotive onboard enforcement systems.

Can a PTC-enabled train still have an accident?

PTC will prevent four specific types of accidents related to human error that were outlined by Congress, but it does not address every potential cause of a rail accident. Railroads approach safety strategically and deploy a variety of methods to address the leading causes of incidents — track, equipment and human error — to help reach the goal of zero accidents. These plans rely heavily on the continuing development of technology to address the increasingly complex issues that result in track or equipment component failures. There is no substitute for aggressively maintaining and modernizing physical infrastructure and equipment. The rail industry has invested an average of approximately $26 billion a year over the past five years on maintaining and modernizing the rail network, helping make recent years the safest in rail history.

What kind of testing and validation is needed?

To ensure it works as it should, PTC must be tested and validated under real-world conditions. It is not realistic to think the huge number of potential failure points in complex PTC systems will perform flawlessly day in and day out, especially upon initial implementation.

Railroads are fully engaged in this effort. This task is made particularly difficult by the need to ensure that PTC systems are fully interoperable across railroads. It's not unusual for one railroad's locomotives to operate on another railroad's tracks. When that happens, the "tenant" locomotives must be able to communicate with, and respond to conditions on, the "host" PTC system. Ensuring this interoperability has been a significant challenge. Every day, as railroads expand PTC operations, they are reducing risk on the rail network and getting closer to a zero-accident future.