

Remote Control Locomotives

Key Takeaway: In recent decades, RCL technology — which FRA-certified employees operate — has helped make yard operations safer and more efficient. The FRA has said it does not have specific concerns with the use of remote-control operators.

For more than 20 years, freight railroads have successfully used Remote Control Locomotive (RCL) technology — also known as Remote Control Operations — to enhance the safety and efficiency of locomotive operations within rail yards. Widely accepted throughout the industry, RCL has proven to be as safe or safer than conventional methods in facilitating yard operations. RCL has been longstanding and extensively considered by the FRA, with the regulatory body as recently as April 2023 [noting](#) that “there are no specific concerns with the use of remote-control operators.”

Railroads primarily use RCL technology in yards for essential tasks like building trains.

For example, when the Remote Control Operator (RCO), who can be positioned anywhere along the length of cars, wants a train backed up 40 feet, they can reverse the locomotive and stop it at a given point, instead of having to communicate directions multiple times with another employee over a radio. By controlling the locomotive from a safe distance, RCL significantly reduces the risk of accidents and injuries while improving efficiency through optimized train movements.

Class I RCL operations generally work through a trifecta of remote operations, safety features and monitoring.

Remote Operation: One or two RCOs stationed near the train or on the locomotive itself use transmitters called Operator Control Units (OCUs) to communicate with and operate the RCL. The operator can remotely control locomotive movements within the rail yard or industrial facility, including acceleration, deceleration, direction, and other functions necessary for shunting, coupling and uncoupling cars.

Safety Features: Remote control systems often incorporate several safety features to prevent mistakes and accidents. These include:

- **Man Down:** OCUs include a “man down” feature that will stop the locomotive and broadcast an emergency radio message if the operator trips or falls down. This feature is tested at the beginning of each shift.
- **Vigilance Test:** OCUs also have a vigilance feature that detects lack of activity on the part of the operator and will bring the locomotive to a stop (after an audible warning) if the operator does not operate a button to indicate they are actively engaged in the operation.
- **Registration:** Before being used, the OCUs are digitally registered to the assigned locomotive to ensure the operators are only controlling their intended locomotive.

Monitoring: The control system typically provides real-time feedback to the operator, allowing them to monitor the status of their locomotive, track their movements and respond to any issues or alarms that may arise during operations.

Trained employees operate RCL.

All RCO employees are FRA-certified and receive specialized training in remote operations. Operators must comply with safety standards and operating rules equivalent to conventional locomotive engineers. FRA regulations require that ground employees maintain a line of sight where they can observe the track ahead or create specified zones where only one RCL can operate at a time. Additionally, RCOs continually undergo testing and training. These include a tri-annual recertification and an annual "check ride" by a supervisor.

RCL Timeline

In the early era of train transportation, manual control by skilled engineers was standard, requiring careful coordination and communication to ensure safety. Since the 1970s, industrial customers and railroads have been evolving and advancing RCL operations which allows operators to precisely control movements and reduce the risk of human error caused by miscommunication.

- **1970s:** Customer industrial sites begin using RCL in the U.S. and Canada.
- **1980s:** Canadian National begins extensively using RCL to support safe, efficient yard operations. During this time, CN pioneered the "speed control," whereby the operator selects a speed, and the onboard computer decides on brake and throttle settings.
- **1992:** FRA attends a demonstration of RCL technology on the Wheeling and Lake Erie Railway.
- **1994:** FRA begins reviewing RCL safety with its first hearing in 1995. At this time, no regulatory action is taken. During this year, FRA also grants a waiver to experiment with the technology.
- **1995-1996:** FRA holds hearings in DC and Appleton, WI.
- **July 2000:** FRA holds a technical conference with all parties to discuss how the technology is being used, the safety of its use and lessons learned from operations to date. The goal of that meeting is to inform the development of best practices for RCL usage.
- **February 2001:** FRA issues a safety advisory outlining recommendations and guidance for RCL operations based upon the July 2000 conference.
- **September 2003:** Senate Commerce asks the FRA to assess the impact and safety of RCL operations.
- **May 2004:** FRA provides an interim report to Congress noting that RCL accident rates were 13.5% lower than train accident rates caused by conventional switching operations and employee injury rates were 57.1% lower for RCL operations than for conventional switching operations.

- **March 2006:** FRA releases their most comprehensive analysis on RCL technology, which found in part that RCL operations were as safe as conventional operations. "The FRA encourages the advancement of modern technology into the rail industry, for both efficiency and safety. The future of the country's rail transportation system depends on it. As stated above, FRA's assessment of RCL operations shows that these operations currently appear as safe as conventional operations." ([P. 11](#))
- **2008:** FRA provides guidelines for training, including on-the-job training for RCL operations.
- **2014-2016:** Through the RSAC process, FRA again considers RCL operations. No regulatory action is taken based off those meetings. FRA has oversight for RCL training (see Part 240 Locomotive Engineer Certification) and has holds periodic conversations with the industry about training practices for RCOs.