

# Remote Control Locomotive Technology

ASSOCIATION OF AMERICAN RAILROADS

MAY 2010

## Summary

The use of remote control locomotive (RCL) technology in rail yard operations is safer and more efficient than conventional operations. In a March 2006 report, the Federal Railroad Administration (FRA) found that “[e]mployee injury rates were approximately 20 percent lower for RCL operations than for conventional switching operations...” Governments should refrain from imposing regulatory or legislative barriers to the use of remote control locomotive technology on U.S. freight railroads.

## Overview of Remote Control Locomotive Technology

- Remote control locomotive technology allows rail personnel on the ground to operate locomotives through the use of a small control device that transmits signals to a microprocessor on board a locomotive. A major purpose of RCL is to **reduce accidents in rail yards**, which account for more than half of all train accidents.
- Remote control locomotives **have been used extensively for many years** on major Canadian railroads, several U.S. short line railroads, and many U.S. industrial railroads. U.S. Class I railroads began using remote control in some yards in 2002, after first reaching agreement with the United Transportation Union (UTU) on implementing the technology.
- RCL systems have two major components that communicate via digital radio: a **hand-held operator control unit (OCU)** and a **locomotive control unit (LCU)**. When beginning work an operator initiates a process to ensure that the OCU’s commands are implemented **only** by the intended locomotive and that the intended locomotive accepts commands only from the appropriate OCU. During operation, digital packets of information are transmitted several times per second from the OCU to the LCU. To help ensure that the locomotive does not move accidentally, **two separate actions** are required by the OCU operator before the locomotive will move.
- As with other aspects of railroad operations, the **FRA has authority over the safe operation of RCL systems**. In February 2001, the FRA released guidelines addressing RCL design, operation, training, and inspection and testing. The rail industry has developed a **comprehensive training program** for OCU operators, who are certified pursuant to FRA-approved certification programs. In addition to their other training, all RCL operators must complete at least 80 hours of RCL classroom and on-the-job training. RCL equipment is inspected daily and is not used on passenger trains.
- In a March 2006 report, the FRA confirmed that “[e]mployee injury rates were approximately 20 percent lower for RCL operations than for conventional switching operations.”

## Safety Features of Remote Control Locomotive Technology

- Far from diminishing safety, RCL systems enhance safety by reducing the risk from human and other error in rail operations:
  - ✓ Avoiding miscommunication. Conventional rail yard operations rely on ground personnel using hand signals or radios to instruct locomotive engineers on train movements. This system of communication is open to misunderstanding and delayed reactions. RCL technology is a clear improvement because it allows an operator with a closer and unobstructed view of the leading edge of the movement to control it. An OCU can immediately control a train if a problem arises.
  - ✓ Fail-safe design. If communication is interrupted between an OCU and an MCU, the train automatically stops.
  - ✓ Dynamic speed control. Once the speed is established by the operator, the RCL system automatically adjusts the throttle and brakes as needed; the OCU operator does not have to look down continually at the OCU and make adjustments. Instead, the OCU operator can concentrate on train movement and the surrounding environment.
  - ✓ Tilt detection. If an OCU tilts more than 45 degrees from the vertical position for more than one second (for example, because the operator falls), an alarm sounds. If the OCU is not returned to an upright position quickly, the locomotive automatically stops.
  - ✓ Operator alertness. If an OCU operator takes no action within a certain period of time, an alarm sounds. If the alarm is not reset promptly, the locomotive automatically stops.
  - ✓ Pitch and catch. This feature allows two OCUs to communicate with a train, so that a train that will move in two directions can be controlled by operators at both ends. Only one operator has control of the locomotive at any one time, but at all times either operator can stop the train. If pitch and catch is being used, continuous communication with both OCUs must be maintained or the RCL system will stop the train.
  - ✓ System monitoring. RCL systems monitor important parameters such as the air pressure in brake systems and locomotive system voltages. If a problem is detected, the RCL system will either warn the operator or automatically stop the locomotive.
  - ✓ Recording and time stamping. Since significant events are recorded and time stamped, RCL systems act as a “black box” to help identify the cause of problems if they occur.