



Operator holds deadman control in his left hand and with his right hand he presses buttons to control locomotive.

## AUTOMATION

# Radio Controls Switcher

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● Radio control of an industrial switching locomotive, demonstrated for members of the American Short Line Railroad Association in Green Bay, Wis., several weeks ago, now makes it possible for one man to make up or switch trains.

A portable 15-lb radio transmitter, carried by the locomotive operator, makes it possible for him to start, stop, reverse, and speed or slow the locomotive from distances up to ¼ mile away. Along with controlling these operating functions remotely, the operator can also sound the horn and bell.

The system had been under development by the Locomotive and Car Equipment Department of General Electric at its Erie, Pa., plant for about a year.

Only 10 different signals are required from the radio transmitter to control the locomotive in normal switching service. These are: forward motion, reverse motion, increased speed, decreased speed, brakes on, brakes off, bell ringing, horn blowing, sanding, and uncoupling.

The locomotive can also be controlled by the operator in the conventional way from the cab when that is preferable. Cab equipment duplicates that which is standard on normal diesel-electric locomotives. In addition to this, the locomotive carries the radio receiver and control equipment which function to duplicate cab operation when remote control is used. It could be possible, according to GE, for a stationary transmitter at a central location to control several locomotives.

### Ten Pushbuttons for Control

The 15-lb radio transmitter for individual locomotive control can be carried on the shoulder of the operator. It is powered by a rechargeable battery. On its top are the 10 pushbuttons for locomotive control. When the "deadman" switch is compressed in the palm of the operator, the portable transmitter emits a continuous carrier signal which holds a "fail safe" pilot relay in the locomotive receiver in the closed position. When this deadman is released at any time, removing the carrier signal, there is an emergency brake application and the removal of power from the traction equipment. As the operator de-

presses the safety, or deadman, switch, the locomotive brakes release. Next, he presses the proper pushbutton to determine the direction of operation and proceeds to control the unit with the other pushbuttons.

To place a locomotive in operation, the operator initially places the "remote-manual" switch in the locomotive cab in the "manual" position to start the diesel engine and allow it to warm up in the usual manner. The radio power switch is also put in the "on" position to warm the receiving equipment. When transferring to remote control, the throttle is placed in idle, the reverser is placed in neutral, and the "remote-manual" switch is moved to the "remote" position. The locomotive brake handle is then moved to the "release" position, although the locomotive brakes remain applied through the emergency safety control and cannot be released until the operator has placed the remote transmitter in operation.

All of the radio and control equipment conforms to existing federal regulations governing operation and construction of this type of apparatus. Demonstrations have been made with a 25-ton industrial diesel electric, but the system is applicable to other types of locomotives.