

Detectors Aid Car Inspection

WHILE MOST railroads are installing hot box detectors in areas of high hot box incidences, the Norfolk & Western has concentrated on installing detectors at approaches to yards. Only cars that have above normal journal temperatures are inspected by yard forces. This reduces delays to cars in yards, and operating expenses.

One detector installation is on the eastbound track near the entrance to Roanoke, Va., yard and checks coal trains as they enter the yard. The recorder is in the car inspector's office in the receiving yard, about three miles from the detector location. Cars are shopped out for complete servicing if the detectors indicate journal temperatures appreciably above normal.

Detector at Crewe, Va.

A second hot box detector checks eastbound trains just before they enter the Crewe, Va., yard. Those cars with journals above normal temperature are examined and moved to shop tracks for further attention.

The N&W's third hot box detector is located on a belt line at Poc, Va. (Petersburg). The detector is about four miles from the recorder, which is in the yardmaster's office, where the chart is checked by a car department supervisor. These hot box detectors were furnished by Servo Corp. of America.

N&W plans to install three more hot box detectors at entrances to

yards to check inbound trains. One detector will check trains as they enter the west yard at Bluefield, W. Va., a second detector will check trains entering the east yard at Portsmouth, Ohio, and the third detector will check trains entering the east yard at Williamson, W. Va. At these installations the recorders will be in car inspectors' offices, about three miles away at Bluefield and Portsmouth, and at Williamson, about six miles from the detector locations. The N&W expects to transmit these detector signals over existing line wires, using FM carrier operating above a "C" and below a "45", probably in the 37-38 kc range.

The detector heads (heat scanners) are mounted on two long ties. N&W thinking is that this type of mounting preserves the same relative position of the detector and the journals, regardless of the vertical motion of the track due to train motion.

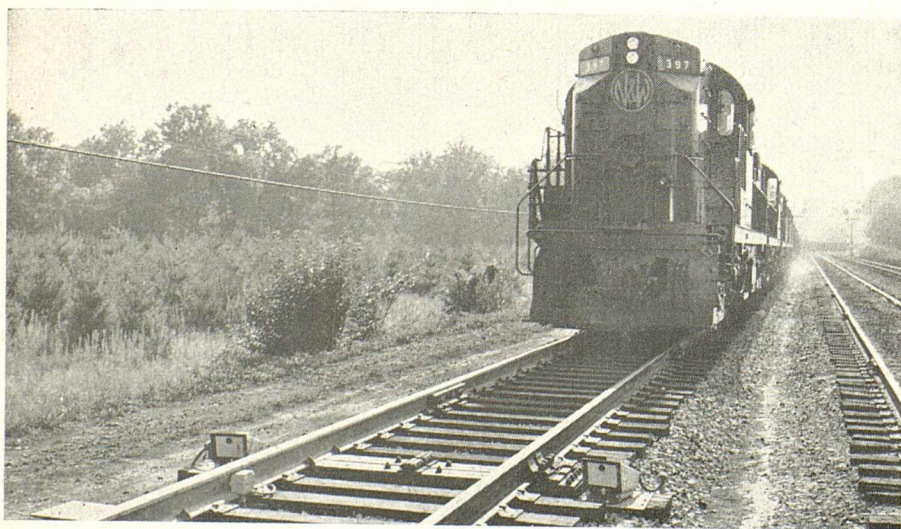
Norfolk & Western has a General Electric Co. hot box detector on test at the entrance to Roanoke yard. The detector checks eastbound trains entering the yard. The pen graph is in the car inspector's office about three miles distant. The detector signals are sent via FM carrier over existing line wires. A single transducer is used as a wheel pickup unit, and it is mounted 50 in. ahead of the detector heads in the direction of train movement. The pickup unit consists of a permanent magnet to establish a magnetic field and a coil to

detect changes in the field. When a wheel passes this unit, the wheel flange changes the reluctance of the magnetic path. The resulting change in the magnetic flux induces a voltage in the coil.

The detector system operates on 115 volts, 60-cycle ac. Power requirements using the FM carrier are 250 va at the detector location and about 300 va at the receiver location. In this test installation, the N&W is using the GE type 50 FM carrier, which is an all-transistor, frequency shift carrier. The frequencies used for this installation are 37 and 37.5 kc. The detector signals are square wave pulses with a maximum peak which may be as high as 100 volts. The carrier and detector equipment is completely transistorized, except for two subminiature tubes used in the detector preamplifiers.

Equipment in the Field

At the field location, the detector preamplifier is mounted in the rear of the detector head. A power supply unit, buried in the ballast, feeds the detector preamplifiers. The other field equipment, such as amplifiers and carrier transmitter, are rack mounted in a steel relay case. Pushbuttons for testing the system are part of the equipment in the field relay case. A gate test pushbutton is used to simulate a wheel pickup signal. A chart drive test button simulates a gating pulse to start chart, which runs for five seconds and is cut off by an automatic timing circuit. A hot pip pushbutton simulates a hot box and an ungate switch allows all signals to pass through the system. Another pushbutton is pressed to test the operation of the pen amplifier and pen movement. A shutter switch can be used to open the shutters on the detectors. The shutters are normally closed, and open when a wheel passes the transducer. The five-second chart timer circuit also allows the shutters to close after the last wheel of the train has passed. (More complete information was in RS&C, Oct. 1959, p 26.) In the car inspector's office the carrier, receiver and associated equipment are rack mounted in a metal case. The recorder is on top of this case.



Eastbound train will pass detectors in approach to Roanoke yard.