Three detectors installed at one location on WM

Western Maryland installed its first hotbox detector last January. Since that time the unit, 22 miles west of Hagerstown, Md., on the mainline to Cumberland, has spotted 18 actual or developing hotboxes.

"Any one of these detections may have saved us one-quarter of a million dollars," said K. L. Muse, signal and communications engineer. He recalled that a derailment of hopper cars on the line, prior to installation of the detector, and reported to have been caused by a hotbox, cost about $250,000.

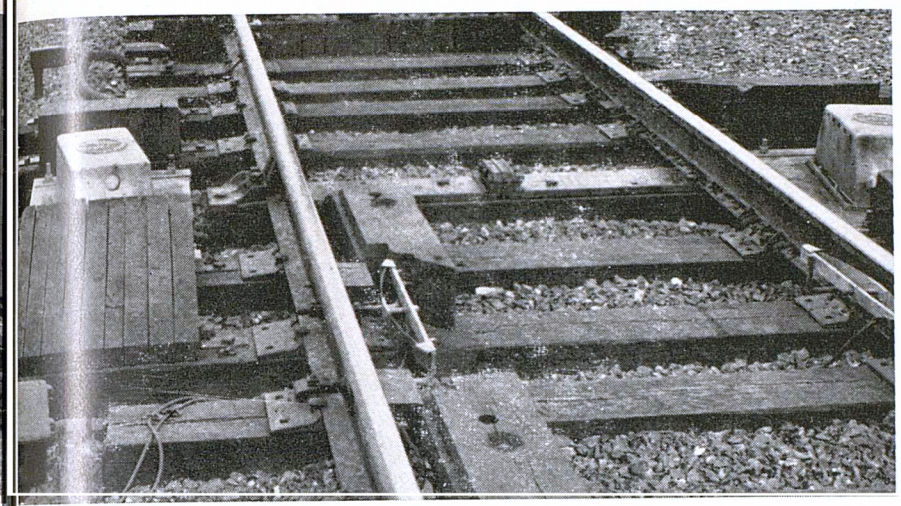
To get maximum safety for its fast freight trains, WM's signal and communications department has installed a loose-wheel detector and a dragging-equipment detector at the same location. After seven months' operation of the three detectors, the results are 18 hotboxes, 2 loose wheels and 4 dragging-equipment detections.

The successful operation of its first Servo hotbox detector has led WM officers to press for installation of two more such detection systems. Says WM Vice President, Operations George M. Leilich, "As far as we were concerned, the hotbox detective system had proved itself then and there" [referring to a detection within 8 hours after the system had been installed]. "Plans to install a second Servo-Safe system further up the line were put into the works." It will be installed later this year along with a third system on one of the road's other subdivisions.

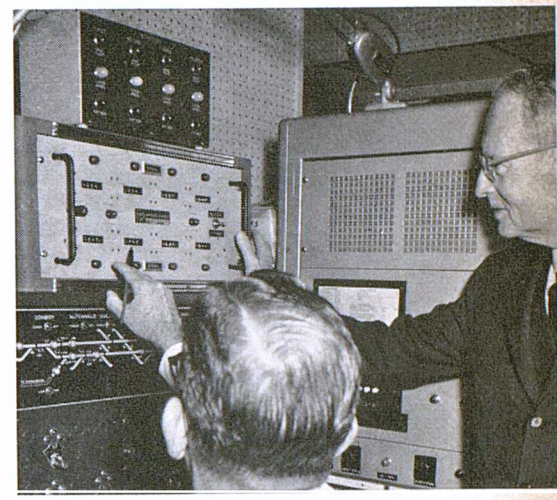
The hotbox detector and its associated equipment is at Parkhead, Md., on single track and its operation is bidirectional. Equipment at this location includes the Model 7707C basic system made by Servo Corp. of America.

The trackside equipment consists of a north side and a south side journal scanner, each containing an optical system, a thermistor bolometer and a pre-amplifier. Each scanner has an automatic shutter assembly, controlled heaters and associated junction boxes which contain filtering networks.The scanner outputs are routed to a data-processing unit in the nearby relay house and are fed to the 2-channel galvanometric graphic recorder.

Hotbox detector is main item of detection at Western Maryland's inspection-on-the-fly point, only 22 miles west of Cumberland, Md. Station has spotted 18 hotboxes, 2 loose wheels and 4 dragging equipments in seven months' operation.



Hotbox detector location, west of Hagerstown, Md., is on single-track mainline of Western Maryland. In addition to hotbox detector (scanners either side of rails), a loose wheel detector is mounted on the gage side of the rails (just below scanners in photo), and dragging equipment detector is beyond the other detectors (extreme top of photo). All units are operational when trains are running in either direction. WM plans to install other such detection stations.



Top unit shows type of detection—loose wheel (top lights), drag load (middle row) and hotbox (bottom row). Digital readout unit (hands pointing) above CTC panel gives axle count to defect. Dispatcher is at Hagerstown, Md.

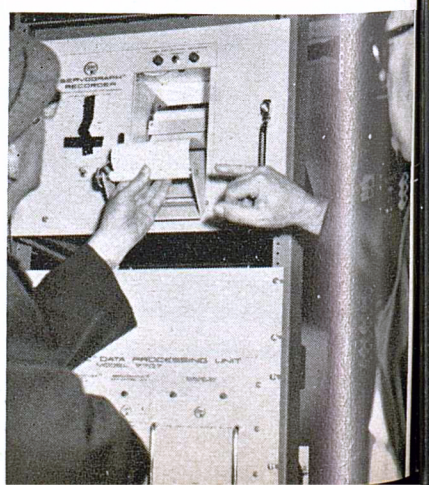
The trackside equipment also includes rail-mounted transducers, a variable reluctance device, which initiates the hotbox-detection system determining start and stop functions. The transducers also provide axle count for the loose-wheel and dragging-equipment detectors. Special circuits are provided to retain proper direction if a train stops and restarts after partially moving over the detector.

Also at this trackside location is a loose-wheel detector and a dragging-equipment detector. They work in conjunction with the hotbox detector, but are not part of the Servo-Safe hot box detective system.

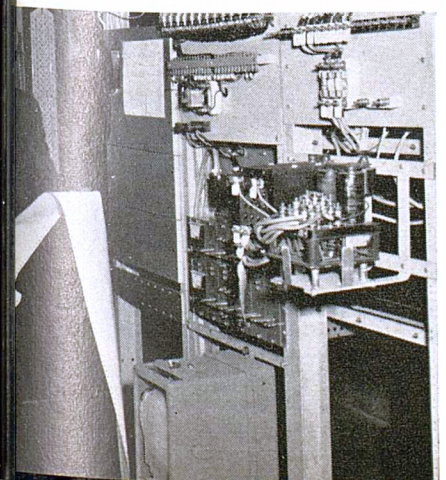
Detection alarm equipment and axle counters are in the dispatcher's office in Hagerstown, Md. Wheel counts are registered for locating loose wheels and dragging equipment in addition to hotboxes. The equipment is capable of registering up to 8 detections, 4 on either side of a train. A panel of lights over the Servo-alarm locator indicates to the dispatcher whether the defects being registered are loose wheels, hotboxes or dragging equipment. An audible alarm is provided which the dispatcher acknowledges by operation of a toggle switch when a defect is received and when the train clears the block after detection is received.

When a defect (hotbox, loose wheel or dragging equipment) is detected, a special eastward or westward wayside signal 9,000 ft from the detector site displays a lunar white aspect over a "D" sign indicating to the train crew to stop the train. They are to communicate with the dispatcher by radio or telephone to determine the location and nature of the defect.

Graphic recorder at wayside location provides readout for maintenance.



Graphic readout is also provided at Hagerstown yard office.



OVERLAY CONTROL

Control relays for the "D" signal are fed by a 400 Hz, AC line overlay transmitter which is located at the hotbox detector site and normally energized over a detection repeater relay. A receiver is located at each signal having a "D" sign. This overlay is superimposed on the signal HD control wires.

When an overheated journal is detected, the amplitude of the journal heat is registered on the recorder at the detector location, showing also the axle count and the side of axle the defect is on. This information, plus loosewheel and dragging-equipment detections, is transmitted by carrier equipment superimposed on existing telephone lines to Hagerstown. A graphic pen recorder in the Hagerstown yard office equipment room records the time of all train movements through the detector area, all defects showing time of defect, type of defect and the side of the train involved.

Carrier channel assignments are as follows: Loose wheel, north rail, channel No. 1 downshift; loose wheel on south rail, channel No. 2 downshift. Dragging equipment is simultaneous downshifting of channels No. 1 and No. 2. Hotbox on the north rail is handled by channel No. 1 upshift, while a hotbox on the south rail is indicated by channel No. 2 upshift. Wheel counting is handled by channel No. 3 upshift. Channel No. 3 downshift automatically resets the Servolarm locator and "type of detection" light panel when the train moves out of the block east or west of the detector.

Center position of carrier receiver relay contacts is utilized to monitor power and operating conditions of carriers. In the event of carrier outage, the wheel count light on the Servolarm locator is extinguished.

RS&C