Line-of-Road Hotbox Detectors in Service by Dec. 31, 1960

Rail-road	Scanner Location	Mfr.	Recorder Location and reader Note 1	Miles from Scanner	Carrier Mfr.	Automatic Features Note 2	How is Train Stopped? Note 3
ACL	N. Yemassee, S. C.	SERVO	STA	5	none	none	CS, RADIO
	S. Yemassee, S. C.	SERVO	STA	5	none	—	—
B&O	Hancock, W. Va.	SERVO	INT	0.1	none	—	CS
	Heath, Ohio	SERVO	INT	4.2	none	ALM, EE, WC	CS
B&M	Ayer, Mass. (WB)	SERVO	INT	5	none	—	CS
	Ayer, Mass. (EB)	SERVO	INT	5	none	—	CS
	Lawrence, Mass. (NB)	SERVO	INT	5	none	—	CS
	Gardner, Mass. (WB)	SERVO	DS	5	none	—	CS
	Zoar, Mass. (WB)	SERVO	DS	32	SERVO	—	CS, IND
	Zoar, Mass. (EB)	SERVO	DS	32	SERVO	—	CS, IND
	Hoosick, N. Y. (EB)	SERVO	DS	57	SERVO	—	CS, IND
	Danbury, N. H. (SB)	SERVO	DS	112	SERVO	—	CS
	Danbury, N. H. (NB)	SERVO	DS	112	SERVO	—	CS
	Exeter, N. H. (SB)	SERVO	DS	51	SERVO	—	CS, IND
	Wells, Me. (SB)	SERVO	DS	87	SERVO	—	CS
	Wells, Me. (NB)	SERVO	DS	87	SERVO	—	CS
C&O	Ewell, Va.	SERVO	INT	5.6	USG&S	none	CS
	Toano, Va.	SERVO	INT	2.5	none	none	IND
	Scottsville, Va.	SERVO	OP	11.6	USG&S	none	CS
	Buchanan, Va.	SERVO	OP	21	USG&S	none	CS
	Ranger, W. Va.	SERVO	ctc OP	14	USG&S	none	CS
	Stockdale, Ohio	SERVO	ctc OP	17	USG&S	none	CS
	KN Cabin, Ohio	SERVO	INT	10.7	USG&S	none	CS
C&EI	Glover, Ill.	SERVO	INT	3.5	none	—	RADIO
	Cayuga, Ind.	SERVO	INT	3.5	none	—	RADIO
	Momence, Ill.	SERVO	INT	3.5	none	—	RADIO
CMStP&P	Duplainville, Wis.	SERVO	INT	6.2	none	—	RADIO
	Watertown, Wis.	SERVO	STA	6	none	—	RADIO
	Portage, Wis.	SERVO	STA	5	none	—	RADIO
	New Lisbon, Wis.	SERVO	STA	6.8	none	—	RADIO
	Winona, Minn.	SERVO	STA	7.2	none	—	RADIO
	Red Wing, Minn.	SERVO	STA	5.6	none	—	RADIO
Clinchfield	Ft. Blackmore, Va.	SERVO	YO, OP	71.5	HARMON	none	CS, RADIO
	Spruce Pine, N. C.	GE	YO, OP	47.3	GE	none	CS, RADIO
	Forest City, N. C.	GE	YO, OP	6	GE	none	CS, RADIO
D&H	Bainbridge, N. Y.	SERVO	DS	25	SERVO	ALM	CS, RADIO

Note 1: CDS—chief dispatcher, DS—dispatcher reads tape, INT—interlocking operator, OP—operator, STA—station agent, TC—train crew, YO—yard office. **Note 2:** ALM—alarm, EE—engine eliminator, RM—reverse move protection, SIG—sets stop signal

Survey Tells How Railroads Us

Thirty-one railroads were contacted for this special Railway Signaling and Communications survey on railroad usage of hotbox detectors. Twenty-three roads responded with detailed information as a result of having had detectors in service by Dec. 31, 1960. Information concerning line-of road hotbox detectors is shown above, and a table showing yard inspection installations is on page 32. A hotbox detector performance record is on page 30, and a selected summary using comparable figures of performance over four seasons is on page 54. In addition to the data in the tables, here is a report on other findings in the survey.

Eight railroads reported that indicated hotboxes are checked by train crews, while five roads said that checks are made by car inspectors, and ten roads reported that checks are made by both train crews and car inspectors. Roads having yard inspection systems only (where hotbox detectors inspect trains as they enter or approach yards, and where normal procedure is for the train to pull into the yard without stopping if a hotbox is indicated by the detector) reported that indicated hotboxes were checked by car inspectors.

As regards instructions to train crews, the majority of railroads reported that crews are to inspect the indicated hot journal, decide if they can treat it and continue or if the car has to be set out. Several roads reported that crews are instructed to inspect all journals on the car having the one indicated hot, and journals of one or two cars either side of the one

Rail-road	Scanner Location	Mfr.	Recorder Location and reader Note 1	Miles from Scanner	Carrier Mfr.	Automatic Features Note 2	How is Train Stopped? Note 3
E-L	River Jct., N. Y.	GE	DS	60	GE	ALM, SIG, WC	CS, IND, RADIO
	B&O Jct., N. Y.	SERVO	STA	0	none	none	IND, RADIO
GM&O	Mt. Glen, Ill.	GE	CDS	20	GE	none	CS, RADIO
L&N	Austerlitz, Ky.	SERVO	OP	8.5	none	none	IND
	Anes, Tenn.	SERVO	OP	57	SERVO	none	CTC, IND
	Wesoda, Ala.	SERVO	TC	5.5	none	ALM, EE, SIG, WC	IND
	Longview, Ala.	SERVO	YO	32	SERVO	none	IND
	Deatsville, Ala.	SERVO	YO	20	SERVO	none	IND
PRR	Nest, Pa.	SERVO	INT	3.8	none	ALM, RM, SIG	*
	Paoli, Pa.	SERVO	INT	3.7	none	RM	*
	Parks, Pa.	SERVO	INT	3.8	none	RM	*
	Edgewood, Md.	SERVO	INT	7.6	SERVO	ALM, EE, RM, SIG, WC	*
	Perryville, Md.	SERVO	INT	9.2	SERVO	ALM, EE, RM, WC	*
	Port, Pa.	SERVO	INT	3.1	none	RM	*
	Hunt, Pa.	SERVO	INT	3.9	none	RM	*
	SO Southfork, Pa.	SERVO	INT	4.6	none	RM	*
	Derry, Pa.	SERVO	INT	2.6	none	RM	*
	Jacks Run, Ohio	SERVO	INT	3.9	none	ALM, EE, RM, WC	*
	Mohican, Ohio	SERVO	INT	4.4	none	RM	*
	Lucas, Ohio	SERVO	INT	3.8	none	ALM, EE, RM, SIG, WC	*
	Orrville, Ohio	SERVO	INT	3.2	none	ALM, EE, RM, WC	*
	Big Run, Ohio	SERVO	INT	3.9	none	ALM, EE, RM, WC	*
	Custer, Ohio	SERVO	INT	3.7	none	RM	*
	Wanatah, Ind.	SERVO	INT	3.6	none	RM	*
P&LE	Beaver Falls, Pa.	SERVO	INT	12.5	US&S ctc code	EE, WC	CTC, IND
RDG	West Trenton, N. J.	SERVO	INT	0	none	none	CS
	Weston-Manville, N. J.	SERVO	INT	0	none	none	CS
RF&P	Rutherglen, Va. (NB)	SERVO	DS	32	SERVO	ALM, EE, WC	IND, RADIO
	Woodbridge, Va. (SB)	SERVO	DS	78	SERVO	ALM, EE, WC	IND, RADIO
SAL	Riceboro, Ga.	SERVO	unattended	0	none	ALM, EE, WC	RADIO
T&P	Tye, Texas	SERVO	OP	9.4	SERVO	none	IND, RADIO
	Bivins, Texas	SERVO	OP	37.2	HARMON, SERVO	none	CTC, IND, RADIO

* Will have device to set signals automatically.

WC—wheel count. **Note 3:** CS—stopped by regular controlled signal, CTC IND—special indicator on ctc signal, IND—special indicator separate from signal system, RADIO—the location of the hotbox is radioed to the train crew.

lotbox Detectors

having the suspected hot journal. C&EI reports that crews are instructed to stop and inspect immediately if the pengraph deflection is over 9 mm for freight trains and over 20 mm for passenger trains. An interlocking operator reads the tapes and informs crews via radio. If the reading is between 4 and 9 mm on freight trains, the crews are advised to watch the suspected car or cars. Passenger train crews are similarly advised if the deflection for the passenger trains falls between 14 and 20 mm. CMStP&P, which also uses radio to inform crews of hotboxes, reports that operators who read the detector tapes are to stop all trains when a chart deflection of 18 mm or more exists, for any journal, except engines and roller bearing equipped cars. When the chart deflection is between 9 and 18 mm, the operator is to telephone the operator at the next open station and the operator at the next hot bearing detector location and give him the car position in the train, and axle number (counted from the head end) and the side of the train of the journal giving this 9–18 mm deflection. B&O reports that if the journal is hot, the car is set out. If warm, the journal is treated, and then examined at the next terminal.

The following standards are used by the Clinchfield which uses radio to inform crews of hotboxes, or sets controlled signals to stop in CTC territory. For conventional bearings: for readings of 8–15 mm above normal, the train is to be stopped for inspection, and the car set out if necessary. For readings of 15 mm or more above normal the road requires that the car be set out for inspection by mechanical forces. The road reports that the normal will be established for each train by the conditions prevailing in the train at a particular time and lo-

(*Continued from page 29*)

cation. The road has found that conventional journal bearings operating at normal temperatures will give an indication ranging from 2 to 5 mm.

The normal for roller and other type bearings, such as sleeve, has been found to be from 7 to 10 mm. Instructions concerning these roller and special type bearings are that for readings of 8 to 12 mm above normal, the train is to be stopped for inspection, and the car set out if necessary. When readings are 12 or more mm above normal, the car should be set out for inspection by mechanical forces.

Sixteen railroads reported that signal department employees maintain the hotbox detectors, and three roads said that the communications department employees handle detector maintenance. Three roads, which have a single communication and signal department, report that men in this department maintain the detectors. ACL reports that the signal maintainer checks the detector twice monthly. However, the telephone maintainer makes recorder adjustments and repairs.

Practically all railroads reported that supervisors or inspectors attended manufacturers' schools. These men then trained the maintainers or technicians who do the maintenance work. One road said it started out with a maintenance contract with the manufacturer, but it has now trained its own men for this work.

A few railroads indicated that the detectors were checked only upon failure or repaired when damaged. The majority of roads said that a periodic inspection of the detector is made —weekly, twice a month, monthly, etc. B&M reports that the signal maintainer makes a weekly inspection. In addition, a biannual alignment and complete unit check is made by an assistant signal supervisor under the jurisdiction of the signal engineer's office. C&O says a daily check of dedector operation is made. Clinchfield reports that the leading signal, communications and electrical maintainer (who performs ICC signal inspections and maintains radio equipment) inspects detectors every two weeks for mechanical defects. He also runs a test tape with cold pip buttons to check gain settings and carrier operation.

GM&O which makes a weekly visual inspection of the detector, reports that a monthly check is made using a heat chopper to measure over-all performance of the system. Also, a voltage measurement is made on the power supplies. P&LE checks all voltages once a week; and once a month makes an oscilloscope check and detector head output and alignment check. RF&P inspects tapes daily; gain, levels and balance check is made monthly; and field alignment check is made every six months. T&P has the signal maintainer check the battery regularly. The signal inspector checks voltages and makes adjustments once each month. A thorough check of the entire

(*Please turn to page 32*)

Hotbox Detector Performance Record

Railroad		Spring	Summer	Fall	Winter
B&O	Indicated hotboxes	69	120	64	60
	Hot boxes found	45	86	49	28
	Trains stopped	69	120	64	60
B&M	Hotboxes found	605	689	337	576
	Detectors in service	9	10	13	9
C&O	Indicated hotboxes	62	123	24	35
	Hotboxes found	29	82	20	28
	Trains stopped	57	122	24	35
C&EI	Line-of-Road Installations				
	Indicated hotboxes	—	—	—	17
	Hotboxes found	—	—	—	9
	Trains stopped	—	—	—	15
CMStP&P	Line-of-Road Installations				
	Indicated hotboxes	81	140	226	97
	Hotboxes found	66	92	188	71
	Trains stopped	14	41	12	19
D&H	Line-of-Road Installations				
	Indicated hotboxes	90	179	41	33
	Hotboxes found	47	71	23	21
	Trains stopped	64	115	35	28
	Yard Inspection Installations				
	Indicated hotboxes	116	214	210	59
	Hotboxes found	105	170	192	53
DM&IR	Yard Inspection Installations				
	Indicated hotboxes	70	351	161	26
	Hotboxes found	18	60	50	3
E-L	Line-of-Road Installations				
	Indicated hotboxes	—	60		
	Hotboxes found	—	40	Aug.–Feb.	
	Trains stopped	—	60		
L&N	Indicated hotboxes	100	93	65	44
	Hotboxes found	67	69	54	36
	Trains stopped	80	75	63	42
PRR	Indicated hotboxes	1,685	1,629	1,329	2,306
	Hotboxes found and those requiring attention	1,238	1,215	876	1,432
P&LE	Line-of-Road Installations				
	Indicated hotboxes	20	18	16	15
	Hotboxes found	14	11	9	10
	Trains stopped	19	18	15	13
RDG	Line-of-Road Installations				
	Indicated hotboxes	13	14	23*	10
	Hotboxes found	11	9	5	6
	Trains stopped	13	14	23	10
StL-SF	Yard Inspection Installations				
	Indicated hotboxes	266	166	130	40
	Hotboxes found	266	166	130	40
	Hotboxes that could not have been detected by ordinary inspection	174	85	52	20
T&P	Line-of-Road Installations				
	Indicated hotboxes	52	65	31	28
	Hotboxes found	23	33	25	12
	Trains stopped	40	48	28	24

* Intermittent trouble at one location caused false indications.

HB DETECTOR SURVEY

(*Continued from page 30*)

equipment is made every three months.

Concerning the question on special locations, uses or features, the B&M reports that all of its detectors on single track are operated bi-directional with standard signal equipment used to reverse direction of traffic. Also, the dispatcher's telephone circuit is used to control automatic signals for stopping trains showing high heat indications. ACL has five detector systems located five miles in approach to yards. Journals that indicate trouble are examined promptly after the train stops in the yard. Two other hotbox detector systems are located in high-speed territory.

C&O has detectors in one location approaching a viaduct in Richmond, Va., which is used for a dual purpose: (1) stopping trains before running on the viaduct with hotboxes; and (2) recorder tape is used in connection with train yard inspection. Erie-Lackawanna reports that information on "warm" (not enough deflection difference to be dangerous) journals is telephoned ahead to the next yard for use by the car inspectors.

L&N has an automatic detector installation with the wheel-count and journal locator panel at the signal

(*Please turn to page 54*)

Yard Inspection Hotbox Detectors Installed by Dec. 31, 1960

Railroad	Location	Mfr.	Miles from Yard Note 1	Inspection Note 2	Recorder Location Note 3	Recorder reader Note 4	Carrier Mfr.	
ACL	S. Florence, S C.	SERVO	3.5	INC	MDO	CF	none	
	S. Rocky Mount, N. C. EB	SERVO	5	INC	MDO	CF	none	
	S. Rocky Mount, N. C. WB	SERVO	5	INC	MDO	CF	none	
	N. Rocky Mount, N. C.	SERVO	5	INC	MDO	CF	none	
B&O	Patterson Creek, W. Va.	GE	3	INC	INT	OP	none	—
B&M	E. Deerfield, Mass. (WB)	SERVO	5	INC	INT	INTOP	none	—
C&O	Bosher, Va.	SERVO	9.5	INC	CTC	OP, CF	US&S	none
	Greenway, Va.	SERVO	5	INC	MDO	CF	none	none
	Low Moor, Va.	SERVO	3	INC	MDO	CF	none	none
	Ashland, Ky.	SERVO	3	INC	MDO	CF	none	none
	Ashland, Ky.	SERVO	3	INC	MDO	CF	none	none
	Raceland, Ky.	SERVO	3.4	INC	MDO	CF	none	none
	Bridgeport, Mich.	SERVO	7	INC	MDO	CF	US&S	none
	Lawndale, Mich.	SERVO	5	INC	MDO	CF	US&S	none
	Jenison, Mich.	SERVO	4	INC	MDO	CF	US&S	none
	Seymour, Mich.	SERVO	9	INC	MDO	CF	US&S	none
D&H	Colliers, N. Y.	SERVO	5	INC	MDO	CI, CF	SERVO	A
D&RGW	Fruitvale, Colo.	SERVO	2	INC	YO	CF	none	
	Grand Jct., Colo.	SERVO	YE	INC	YO	CF	none	
DM&IR	McKinley, Minn.	SERVO	3	INC	YO	OP	none	
IC	Lake View, Miss.	SERVO	8	INC	YO	CF	HARMON	
	Woodstock, Tenn.	SERVO	14	INC	YO	CF	SERVO, LENKURT	
L&N	New Castle, Ala.	SERVO	8	INC	YO	OP	SERVO	
	Spaulding, Ala.	SERVO	8	INC	YO	OP	SERVO	
MP	Osawatomie, Kan.	GE	10.6	INC	YO	CI, CF	GE	
	Little Rock, Ark.	GE	12.1	INC	YO	CI, CF	GE	
	McGehee, Ark.	GE	12.6	INC	YO	CI, CF	GE	
NYC	53 detectors	50 SERVO, 2 GE, 1 GRS		—	—	—	39 GRS, 1 GE	
PRR	Enola, Pa.	GE	4	INC	MDO	CI	none	
	Conway, Pa. (EB)	SERVO	1	INC	INT (MDO)	CLK	none	
	Conway, Pa. (WB)	SERVO	2.1	INC	MDO	CLK	none	
StL-SF	Nonco, Tenn.	SERVO	6	INC	MDO	CI	US&S	
	Olive Branch, Miss.	SERVO	6	INC	MDO	CI	US&S	
SAL	Neuse, N. C.	SERVO	8.6	INC, OUT	DSO	DS	GE	
	Cary, N. C.	SERVO	9.4	INC, OUT	DSO	DS	GE	
	Oceda, S. C.	SERVO	9.4	INC	YO	OP	GE	
	Warsaw, S. C.	SERVO	5.8	INC	YO	OP	GE	
	Bryceville, Fla.	SERVO	7.7	INC	YO	OP	GE	
	Lawtey, Fla.	SERVO	15.3	INC	YO	OP	GE	
	Bushnell, Fla.	SERVO	12.3	INC, OUT	TO	OP	GE	
	Miami Plantation, Fla.	SERVO	9.1	INC	YO	OP	GE	

Note 1: YE—yard entrance. **Note 2:** INC—incoming, OUT—outgoing. **Note 3:** CTC—ctc control point, DSO—dispatcher's office, INT—interlocking, MDO—mechanical dep't. office, TO—telegraph office, YO—yard office. **Note 4:** CF—car foreman, car inspector, CLK—clerk, DS—dispatcher, INTOP—interlocking operator, OP—message operator. **Note 5:** ALM—alarm.

(*Continued from page 32*)

where the train stops. Actuation of the detector sets the signal, and the train crew looks at the locator panel to find out where the hotbox is located. Local circuits are used to keep the recorder and locator off the line at all times except when a train is passing the detectors.

Pennsylvania reports that its line-of-road detector installations are now being equipped with automatic wheel counters, automatic alarm, engine eliminator and reverse move protection. In addition, they are being interconnected with the signal system to automatically set signals when hotboxes are detected (RS&C Apr. 1959, p. 22; Sept. 1959, p. 25).

P&LE's detector is 12.5 miles from the recorder location, and the information about an actual hotbox, its location, etc., is sent via the CTC code system to the recorder site. The degree of heat is also indicated, such as hot or warm (RS&C Dec. 1959, p. 19).

SAL's line-of-road hotbox detector at Riceboro, Ga., reports via radio to the train crew, and via telephone to the dispatcher when it is in operation and when a hotbox is detected. A computer and tape reproducer team up with the detector to provide the location of a hot-box, or up to four hotboxes in the train, to the crew and the dispatcher (RS&C July 1961, p. 22).

The overall performance figures shown above reflect experience of seven railroads with line-of-road and yard hotbox installations. The yard inspection installation figures are from data furnished by only two railroads. The roads selected were those furnishing comparable information.

Several railroads were not able to provide complete information on the questionnaire or report any information concerning experience because they were in the process of or planning to install their first hotbox detector. Among those in this category are AT&SF—two installations; CNR—two installations; CB&Q—one installation; EJ&E—one installation; and FEC—six installations. Three other railroads, for policy reasons, were unable to provide information at this time.

Overall response to the RS&C survey indicates that hoxbox detectors, while admittedly posing problems, are doing an effective job.

Hotbox Detector Performance Over Four Seasons

Condition	Spring	Summer	Fall	Winter	Totals
Line-of-Road and Yard Installations					
Indicated hotboxes	474	738	467	312	1,991
Hotboxes found	291	444	368	206	1,309
Trains stopped	343	539	241	221	1,344
Yard Inspection Installations Only					
Indicated hotboxes	186	565	371	85	1,207
Hotboxes found	123	230	242	56	651