

# Train Control Progress in 1925

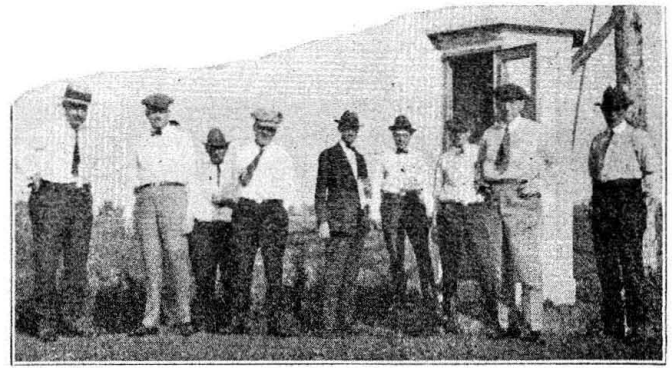
## Twenty-four Divisions Completed Under First Order and Two Under Second, Commission Has Made Five Final Reports

**T**WENTY-FOUR of the 45 roads on which the first train control order is now effective have reported a full engine division equipped as of January 1, 1926, and two carriers also report a division complete under the second order. Although final inspection was made of nine complete division installations during the year only five final reports were issued. At the time the first order was issued on June 13, 1922, the completion date was set as January 1, 1925; but many developments in the meantime have influenced the commission in granting requests for extensions of time.

The suit of the Delaware & Hudson Company vs. the United States in the United States Court of Southern New York resulted in decisions on several important points which affected the final completion dates. This court in its decision of May 26, 1925, denied the Delaware & Hudson an injunction forbidding the Interstate Commerce Commission from enforcing the order requiring the installation of train control, but the court enjoined the government from collecting penalties. The decision held, also, that the order of the commission was constitutional and pointed out that "to call the modification of the order issued on July 18, 1924, allowing the permissive feature for the train stop, a mere amendment was unfair if not absurd." The D. & H. was, therefore, granted an injunction against prosecution for two years from July 18, 1924. In other respects the petition of the railroad was denied.

Following the decisions of this court, many of the roads petitioned the commission for extensions of time, some asking until January 1, 1926, and others until July 1, 1926, and in the majority of cases the petitions were granted, especially to those carriers which had shown diligence in complying with the orders. The impracticability of meeting the original completion date was demonstrated by the fact that, aside from the three roads on which installations were made prior to the order, only one road, i. e., the Atchison, Topeka & Santa Fe, reported a division fully equipped on January 1, 1925, the completion date mentioned in the original order.

The second order, issued on January 14, 1924, and now effective on 41 of the 45 roads included in the first order, requires that a second division be equipped with train control by February 1, 1926. The majority of the roads have not yet given much consideration to the second order, because they believe that some definite de-



*Among Those Present During the Preliminary Inspection of Train Control on the C. & N. W. Were*

cision on their first division installation should be rendered by the commission before proceeding further. However, a few of the roads proceeded at once to their second district, notably the Southern which reported its second installation complete on November 22, 1925. The Norfolk & Western, the Santa Fe, the Union Pacific and the Chicago & North Western also have their second districts practically complete.

### Twenty-Four Installations Now Complete

Information regarding the detailed characteristics of each installation is given in the table. The group of roads using the ramp type, including the Chicago & Eastern Illinois, the Chicago, Rock Island & Pacific and the Chesapeake & Ohio, made installations prior to the issuance of the train control order. The C. R. I. & P. complete divisional installation of the intermittent ramp type of train control with speed control furnished by the Regan Safety Device Co., Inc., was inspected in 1923, the C. & E. I. installation of the Miller Train Control Company's intermittent ramp type, which has been in service between Chicago and Danville, Ill., since November 17, 1914, was given a final inspection starting on January 6, 1925. The Chesapeake & Ohio installation of the American Train Control Corporation's ramp system installed between Gordonsville, Va., and Staunton was given the final inspection starting on August 24, 1925.

The Atchison, Topeka & Santa Fe installed a complete system of the Union Switch & Signal Company's three-speed continuous train control without wayside automatic signals, using cab signals in the locomotives. This installation was made between Chillicothe, Ill., and Shopton, Iowa, and an extension of this installation eastward, from Chillicothe to Corwith, Ill., constituting the second district, is now reported as nearly complete.

Among the other roads using the same three-speed continuous system is the Norfolk & Western which installed it, together with a complete new installation of a.c. position-light signals on 105 miles of single track between Hagerstown, Md., and Shenandoah, Va., as the first district, and has now extended this same type of installation to Roanoke, Va., as the second district. The Reading installation of the same train control system was placed in service on January 1, 1925, and that on the Central Railroad of New Jersey on October 25, 1925.

Of the 45 roads on which the first train control order is now effective, 24 installations are now completed, and on 3 others the wayside equipment is complete; but not all locomotives are equipped. Two installations under the second order are in service and wayside apparatus is 90 per cent complete on 3 other roads, such that the installations will be in service by February 1, the date set in the order. During the year the commission made 17 interim inspections and 9 final inspections, rendering 14 interim reports and 5 finals. Foul-weather protection, recurrent acknowledgement and split reduction are the important features yet to be decided definitely.

# Status of Train Stop and Train Control as of January 1, 1926

ROAD	Order	FROM	TO	Miles of Road	Manu- facturer	Con- tinuous or Inter- mittent	Train Stop or Train Control	Number of Brake Applica- tion Points	Auto- matic Signals	Miles Pole Line Built	Voltage Power Line	Per Cent Wayside Complete	Locomotives		Pre- liminary Inspection Date	Complete Installation Date	Final Inspection Date
													To Equip	Equip- ed			
A. T. & S. P.	1	Chillicothe, Ill.	Shopton, Ia.	104.5 d	Union	Cont.	Cntr.	256	73	101	6,600	100	84	84		1-1-25	
	2		Corwith	124 d													
A. C. L.	1	Rocky Mt., N. C.	James River Bd., Va.	119 d	G. R. S.	Intr.	Stop	256	232 S			100	61	23		3-24-25	
	2	No decision															
B. & O.	1	Baltimore, Md.	Washington, D. C.	36.3 d	G. R. S.	"	"	70	70 S				129				
	2		Philadelphia, Pa.	97 d									76				
B. & M.	1	Boston, Mass.	Greenfield	103 d	Union	Cont.	Cntr.					14	137	4			
	2	Relieved															
C. R. R. N. J.	1	Red Bank, N. J.	Winslow Jet.	65.6 s					74 S	65	6,600	100	30	30		10-25-25	
	2								122 C								
		No decision															
C. & O.	1	Gordonsville, Va.	Staunton	61 s	Amer.	Intr.	"	182	145 C	44	6,600	100	46	46		1- 1-24	8-24-25
	2	Clifton Forge, Va.	Staunton	55 s													
C. & A.	1	Chicago, Ill.	Bloomington	24 s	N. S. A.	"	Stop					35	46	10		12- 1-24	
	2	St. Louis, Mo.		103 d													
				18 s									63				
				135 d													
C. & E. I.	1	Yard Center, Ill.	Danville	105.4 d	Miller	"	"	174	178 S			100	134	134		11-21-14	1- 6-25
	2	Terre Haute, Ind.	Danville, Ill.	15 s									21				
				39 d													
C. & N. W.	1	Boone, Ia.	Council Bluffs	149 d	G. R. S.	Cont.	Cntr.		304 D	149		100	101	85		6- 4-25	1- 1-26
	2		Clinton	207 d					409 D	207		35	69			7- 1-26	
C. B. & Q.	1	Creston, Ia.	Pacific Jet.	24.4 s	Sprague	Intr.	Stop	122	110 S			100	55	55		2- 3-25	9-22-25
	2			57.7 d													
			Burlington	187 d													
C. I. & L.	1	Hammond, Ind.	Monon	64.7 s				53	101 S			30	40	6		5- 4-25	
	2	No decision															
C. M. & St. P.	1	Bridge, Switch, Minn.	Hastings	108 d	Union	Cont.	"		129 S		4,400	100	67	67		9- 3-25	12-15-25
	2	LaCrosse, Wis.	Portage	101 d													
C. R. I. & P.	1	Blue Island, Ill.	Rock Island	165 d	Regan	Intr.	Cntr.	241	216 S			100	96	96		11- 1-23	11-10-23
	2	Davenport, Ia.	Des Moines	110 s				271	230				50				
				62 d													
D. & H.	1	Whitehall, N. Y.	Rouses Point	108 s	G. R. S.	"	Stop	41	41			20	17	5			
	2			5 d													
			Albany	77 d													
D. L. & W.	1	Elmira, N. Y.	East Buffalo	141 d	Union	Cont.	Cntr.	646	646		500	100	69	69		5-18-25	7- 1-25
	2	No decision															
Erie	1	Sparrowbush, N. Y.	Lanesboro, Pa.	102 d	G. R. S.	Intr.	Stop					20	97	8			
	2	No decision															
G. N.	1	Minot, N. D.	Williston	98 s	Sprague	"	"	132	254			100	35	35		11-21-24	9-15-25
	2			22 d													
			Wolf Point, Mont.	107 s									22				
I. C.	1	Champaign, Ill.	Branch Jet.	122 d	Union	Cont.	"	189	3 S		550	100	54	54		3- 2-25	12-31-25
	2	Cedar Falls, Ia.	Ft. Dodge	96 s				194	44 C		550	100	38	38		12-31-25	
K. C. S.	1	Oskaloosa, Mo.	Pittsburg, Kan.	104 s	G. R. S.	Intr.	"	26	24 S			13	16	5			
	2	Exempted															
L. V.	1	Easton, Pa.	Newmark, N. J.	34.6 d				213	161 P			100	150	14		4- 2-25	4- 1-26
	2			25 t													
			Sayre, Pa.	6.2 f													
				162 d									175				
				17 t													
				24 f													
L. I.	1	Harold Ave., L. I.	Pt. Washington	9 s	Union	Cont.	Cntr.							3			
	2			12 d													
			Babylon	27.6 d													
L. & N.	1	Jamaica, L. I.	Etowah, Tenn.	162 s					347 S		550	100	31	31		5-19-25	1- 1-26
	2	Corbin, Ky.															
		No decision															
Mo. P.	1	Leeds, Mo.	Osawatomie, Kan.	50 s	N. S. A.	Intr.	Stop			50	4,400	100	38	38		9- 2-24	7- 1-25
	2	No decision															
N. Y. C.	1	Monroe, Ohio	Toledo	22	Miller	"	"	35	35 C				10				
N. Y. C.	1	Albany, N. Y.	Syracuse	18.2 d	G. R. S.	"	"	628	618				857			6-15-25	
	2			118 fr													
				8.9 fr													
		Cleveland, Ohio	Buffalo, N. Y.	182 f				677	677 S				333				
B. & A.	1	Springfield, Mass.	Rensselaer, N. Y.	65 s				290	283 S				115				
	2			34 t													
			Boston	98				321	321 S				130				
			Jackson	74.5 d													
M. C.	1	Detroit, Mich.														6-15-25	
	2	Niles, Mich.		117 d													
C. C. C. & St. L.	1	Indianapolis, Ind.	Mattoon, Ill.	129					76 S 28 C								
	2	Mattoon, Ill.	Brigden, Bridge Juct.	38 s					121 S								
				71.5 d													
P. & L. E.	1	Pittsburgh, Pa.	Youngstown, Ohio	13.4 d	Union	"	"	314	314 S				94			7-13-25	
	2			2.3 t													
				53 f													
		Exempted															
N. Y. C. & St. L.	1	Chicago	Ft. Wayne, Ind.	125 s				44	44 S				41	6		10-22-25	
	2			16 d													
		No decision															
N. Y. N. H. & H.	1	Cedar Hill, Conn.	Springfield, Mass.	59.8 d		Cont.	"	120	120		2,200	100	60	60		4-16-25	7- 1-25
	2	New Haven, Conn.	Providence, R. I.	113									178				

N. & W.	1	Shenandoah, Va.	Hagerstown, Md.	106 s	Union	Intr.	Cont.	Stop	206 P	106	4,400	100	42	42	2-15-25	9-8-25
N. P.	2	Manassas, N. D.	Roseton, Va.	102 s	Sprague	Intr.	Cont.	Stop	183	183	100	100	35	35	9-30-25	
Penn.	2	Dickinson, N. D.	Glendive, Mont.	106 s	Union	Cont.	Stop	Auto	83	83	6,600	60	162	162	4-14-25	9-16-24
Penn.	1	Lewisport, Pa.	Baltimore, Md.	43 s	Union	Intr.	Cont.	Stop	Auto	Auto	Auto	Auto	231	231		
Penn.	2	Harrisburg, Pa.	Altoona, Pa.	17.9 d	Union	Intr.	Cont.	Stop	Auto	Auto	Auto	Auto	139	139		
P. C. C. & St. L.	1	Columbus, Ohio	Indianapolis, Ind.	105 f	Union	Intr.	Cont.	Stop	Auto	Auto	Auto	Auto	395	395		
W. J. & S. S.	2	Pittsburgh, Pa.	Newark, Ohio	110 d	Union	Intr.	Cont.	Stop	Auto	Auto	Auto	Auto	146	146		
W. J. & S. S.	1	Camden, N. J.	Atlantic City	156.9 d	Union	Intr.	Cont.	Stop	Auto	Auto	Auto	Auto	65	65	2-1-26	
P. M.	2	Seymour, Mich.	Lansing	60.9 s	G. R. S.	Intr.	Cont.	Stop	91 S	91 S	100	100	52	52	1-1-25	
P. M.	2	Lansing, Mich.	Detroit	63 s	Union	Intr.	Cont.	Stop	66 D	66 D	100	100	52	52	1-1-25	
Reading	1	Camden, N. J.	Atlantic City	52.5 d	Union	Intr.	Cont.	Stop	11 S	11 S	25	25	65	65	6-15-25	
R. F. & P.	2	No decision	Richmond	101.6 d	Union	Intr.	Cont.	Stop	69 S	69 S	100	100	36	36	10-15-24	8-3-25
R. F. & P.	1	Alexandria, Va.	Monett	2.7 t	N. S. A.	Intr.	Cont.	Stop	69 S	69 S	100	100	36	36	7-1-25	
St. L.-S. F.	1	Nichols, Mo.	Tracy	4 d	Union	Intr.	Cont.	Stop	127	127	100	100	73	73	1-1-25	7-30-25
S. P.	2	No decision	Fresno	49.6 s	Union	Intr.	Cont.	Stop	177	177	230	230	75	75	1-1-25	7-13-25
S. P.	1	Oakland, Calif.	Glendive	24.4 d	Union	Intr.	Cont.	Stop	69	69	100	100	40	40	1-1-25	
G. H. & S. A.	2	Tracy, Calif.	Fresno	125 s	Union	Intr.	Cont.	Stop	202 S	202 S	100	100	63	63	11-22-25	
G. H. & S. A.	2	Roseburg, Tex.	Greenville, S. C.	123 s	G. R. S.	Intr.	Cont.	Stop	189	189	100	100	38	38	11-22-25	
Southern	2	San Antonio, Tex.	Atlanta, Ga.	151 d	Union	Intr.	Cont.	Stop	310 S	310 S	50	50	96	96	1-1-26	
Southern	1	Spencer, N. C.	Somerset	78 s	Union	Intr.	Cont.	Stop	360	360	100	100	50	50	3-2-25	
C. N. O. & T. P.	1	Greenville, S. C.	Chattanooga, Tenn.	88 s	Union	Intr.	Cont.	Stop	141 S	141 S	2,300	2,300	95	95	2-1-26	10-7-25
C. N. O. & T. P.	2	Ludlow, Ky.	Cheyenne, Wyo.	90 d	Union	Intr.	Cont.	Stop	161 S	161 S	2,300	2,300	33	33	3-31-25	8-24-25
U. P.	1	Sidney, Neb.	North Platte	102 d	Union	Intr.	Cont.	Stop	192 S	192 S	2,300	2,300	33	33		
O. W. R. & N.	1	Portland, Ore.	The Dalles	81.5 s	Union	Intr.	Cont.	Stop	192 S	192 S	2,300	2,300	33	33		
O. W. R. & N.	2	Exempted		2.5 d	Union	Intr.	Cont.	Stop	192 S	192 S	2,300	2,300	33	33		

LEGEND: S=single track; d=double; t=three and f=four. Intr.=Intermittent; Cont.=Continuous; Stop=Train Stop. 100 Cycle.  
The first entry opposite the name of a road applies to installation required under the first I. C. C. order and second entry for second order.

The two-speed continuous system has been adopted by several roads, of which the Oregon-Washington Railroad & Navigation was the first to receive a final inspection. This installation of the Union Company's two-speed continuous system was completed on March 1, 1925. The Union Pacific completed a similar installation on double track on April 1, 1925, while the Delaware, Lackawanna & Western installation of this same system was completed on July 1, 1925. The Louisville & Nashville, also in this group, has finished its installation, while the Richmond, Fredericksburg & Potomac and the Boston & Maine have only about 21 miles equipped.

The Chicago & North Western has in service the two-speed continuous system of train control manufactured by the General Railway Signal Company on 149 miles of double track, with 122 locomotives, between Boone, Iowa, and Council Bluffs. This installation is being extended eastward, from Boone, Iowa, to Clinton, as the second district.

The installations discussed so far include either the three-speed or the two-speed apparatus. The primary function of the two-speed system is to limit the speed to a minimum practical operating speed in the occupied block which may be entered without stopping the train, providing the engineman acknowledges. The control may also be arranged to stop the train if a fixed maximum speed is exceeded. In addition to the functions of the two-speed system the three-speed system limits the speed to a medium rate in the caution block. According to the specifications of the I. C. C. order, either of these systems is classed under *train control*.

The *train stop* system includes no apparatus to control the speed, and until the commission modified its order on July 18, 1924, to allow the use of the permissive feature for this system, many roads had considered the *train stop* as impractical for railroad service on busy lines; however, after this change a number of roads adopted *train stop*.

Five carriers are using the intermittent magnetic inductive train stop system of the National Safety Appliance Company. The Southern Pacific has 50 miles of single track and 24 miles of double track equipped between Oakland, Cal., and Tracy, and is extending this installation from Tracy to Fresno, Cal., for the second division. The Galveston, Harrisburg & San Antonio, also a Southern Pacific line, has a 50-mile installation and the St. Louis-San Francisco, 40 miles. Final inspections have been made of these three installations, the reports being in this issue. These installations are all in automatic signal territory and employ the permissive feature. The Missouri Pacific has used the same train stop system as an adjunct to its controlled-manual block signal system on 56 miles of single track between Kansas City, Mo., and Osawatomie, Kan., where trains are being operated by signal indication without written train orders. The system is so arranged that the train must come to a stop to release the brakes to pass a stop signal. The Chicago & Alton is also using the National system and has about 90 per cent of its territory of 102 miles from Chicago to Bloomington, Ill., equipped. This road has decided to extend this installation to St. Louis, 153 miles, as its second division.

The intermittent magnetic inductive train stop system of the Sprague Safety Control & Signal Corporation is being used by four roads. The Chicago, Burlington & Quincy installation was completed on July 1, 1925, and inspected in September, while that on the Great Northern has been completed and was inspected, starting on November 9. The Northern Pacific installation was completed on September 30, 1925, and the Monon has its



installation about 50 per cent finished on 68 miles of single track from Hammond, Ind., to Monon.

Thirteen roads have adopted the intermittent magnetic auto-manual train stop system of the General Railway Signal Company. The Cincinnati, New Orleans & Texas Pacific, and the Southern have installations in service, while the Lehigh Valley, Atlantic Coast Line and the Pere Marquette have been actively engaged in installing this system and have the wayside equipment completed. A unique feature of the A. C. L. installation is the use of acknowledging levers on both the engineman's and fireman's side of the cab, the purpose of which is to prevent the habitual or sub-conscious use of the release to pass stop or caution signals.

In August the New York Central Lines decided to adopt the intermittent inductive auto-manual train stop system and contracts were let covering the divisions under both orders to the General Railway Signal Company, including the New York Central, the Boston & Albany, the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis. The contract for the division under the first order on the Pittsburgh & Lake Erie was awarded to the Union Switch & Signal Company, this road having been relieved from the second order. The New York Central Lines made test installations of the Sprague intermittent train control on the New York Central, of the General continuous system on the M. C., the B. & A. and the C. C. C. & St. L., and of the Union continuous on the P. & L. E. An interim inspection was made of the test installation of the G. R. S. continuous system on the M. C., but no report was made by the commission.

On all of the five roads of the New York Central Lines, revisions of wayside circuits, the placing of ties for the inductors for the intermittent system and line work are being carried on and engines are being equipped. If materials are delivered according to schedule it is expected that these installations will be completed about the middle of 1926.

The Baltimore & Ohio, after making tests of the General tapered speed control and closing contracts for the continuous train control system on 36 miles between Baltimore, Md., and Washington, D. C., later decided to install the General intermittent inductive train stop system. On this road, therefore, little progress has been made so far, with the exception of work on the wayside equipment.

The New York, Chicago & St. Louis adopted the intermittent inductive auto-manual system of the Union Switch & Signal Company and expect to complete its first division from Chicago to Ft. Wayne, Ind., about July 1, 1926.

The Union Switch & Signal Company is supplying its continuous train stop system to six roads. The Illinois Central is using cab signals without wayside permissive automatic signals on both installations which are reported completed as of December 31, 1925. The one installation is between Champaign, Ill., and Branch Jct., and the second between Waterloo, Iowa, and Ft. Dodge. The Chicago, Milwaukee & St. Paul installation between Bridge Switch, Minn., and Hastings is nearly complete. The Pennsylvania Railroad is installing the Union continuous automatic stop with the forestaller on two divisions of the Pennsylvania, two divisions of the Pittsburgh, Cincinnati, Chicago & St. Louis and one division of the West Jersey & Seashore. The first division on the Pennsylvania between Harrisburg, Pa., and Baltimore, Md., is 60 per cent complete. The New York, New Haven & Hartford installation, using General equipment on 30 engines and Union on 30 engines, on

59.8 miles of road, was placed in service on July 1, 1925.

A total of 7,769.4 miles of tracks will be equipped with train control when the first order is completed, including 1,618 miles of single track, 2,557 miles of double track, 85.5 miles of three track, 183.9 miles of four track and 8.8 miles of five track lines with approximately 3,860 locomotives, of which about 1,706 are now ready for service.

The Union Switch & Signal Company has contracts for installations on 19 roads, the General Railway Signal Company on 14, the National Safety Appliance Company on 5, the Sprague Safety Control & Signal Corporation on 4, and the Miller Train Control Company 1, the American Train Control Corporation 1, and the Regan Safety Devices Company 1. The continuous system is being used on 18 roads, the intermittent inductive on 25, and the intermittent contact ramp on 3. Three-indication light type cab signals giving continuous indication of the condition of the block are used on the continuous train control of the A. T. & S. F., the C. R. of N. J., the N. & W. and the Reading, while the D. L. & W., the U. P., the O. W. R. & N., the L. & N., the I. C., the N. Y., N. H. & H., and several other roads using the continuous system employ the two-indication light type cab signal. The C. & N. W. uses audible type cab signals. Cab indicators of the visual and audible types are used with several of the intermittent train stop systems. Train control including speed control is used on 14 roads and the train stop on the remaining 31.

Therefore, taken as a whole, the year 1925 has been characterized by the completion of many train control divisions, by the granting of extensions of time on others and by diligent activity on the part of all except a half dozen roads.

#### Train Control Activities of the Commission During 1925

During 1925 the Interstate Commerce Commission made no changes in the status of its train control orders with the exception of showing a spirit of tolerance in granting extensions of time for the completion of installations. The Western Maryland, the Buffalo, Rochester & Pittsburgh, the Chicago, St. Paul, Minneapolis & Omaha and the Chicago & Erie were relieved from compliance with the first order. The first three roads named, together with the Kansas City Southern, the Oregon-Washington Railroad & Navigation, the Pittsburgh & Lake Erie and the Boston & Maine have been excused from the second order.

One of the important hearings on train control before the commission during the year was that on the Great Northern's petition requesting relief from the second order. Although considerable difference of opinion existed among the members of the commission the majority ruled that the petition of the carrier be denied. In view of the fact that the Great Northern territory is typical of western roads handling a light traffic and operating at fairly moderate speeds in open country, this decision apparently establishes a precedent which will discourage further petitions of a similar nature with possibly a few exceptions.

#### Results of Preliminary Inspections Important Guides in Development

The activities of the commission have been confined mostly to building up a force of inspectors which, under the jurisdiction of the Bureau of Signals and Train Control, have made inspections of preliminary test sections on 17 roads and final inspections of complete divisional installations on 9 roads.

Reports have been rendered by the commission on 14 of the 17 inspections of preliminary test sections made during 1925; reports on similar inspections made in the latter part of 1924 were also made public late in that year, or early in 1925. The installation of so many test sections followed as a result of the commission's announcement in April, 1924, that if a road equipped a 20 mile section of its division and a proportionate number of its locomotives with train control the commission would co-operate in an inspection for the purpose of giving an opinion and advice as to the desirability or objections to the principle or construction of the system.

Aside from the C. & E. I., which installation was made prior to the order, only one final report on a complete installation, i. e., the O. W. R. & N., was made public up to December 31, 1925, when reports on the S. P., the G. H. & S. A. and the St. L.-S. F., were issued and which are published elsewhere in this issue.

The railroads, therefore, have depended a great deal on the opinions contained in the commission's reports of the preliminary inspections for guidance. The criticisms and suggestions in these reports may be classed in three groups: (1) suggestions to the manufacturer, covering changes in the detailed construction of valves and connections; (2) suggestions to the railroad on control features at specific points, and (3) criticism of a general nature applicable to similar systems on all roads. It is with criticisms of this third class that considerable controversy has arisen.

A criticism made of the intermittent magnetic systems was that "the track magnet may be displaced or removed without affecting the operation of the signal system, and, under these conditions, a stop signal and an automatic brake application would not result at the signal and the magnet in the rear." This criticism has been met by some roads arranging that the core of the neutralizing track magnets form a part of one of the control circuits. Other roads have considered this additional complication as undesirable and unnecessary. Final opinions of the commission on this question are, therefore needed.

The question of fouling protection on turnouts and crossovers was raised in the reports on test installations on the M. P., the St. L.-S. F., the C. & A., the C. B. & Q., the C. N. O. & T. P., the G. N., the A. C. L., the L. V., the N. P., and the C. I. & L. In the majority of the cases this suggestion of the commission was as follows: "It is suggested that the type of fouling protection employed at sidings and crossovers be considered with a view to possibly securing increased protection."

As the majority of the roads use the standard shunt fouling circuits which have been considered as adequate protection in automatic signal systems, many have been undecided as to what action should be taken on this rather indefinite suggestion. One road has devised a special circuit for crossover protection, another road is using separate track circuits and others are providing derails on sidings, pipe-connected to the switch stand. The method of protection for sidings and crossovers that will be required or deemed adequate by the commission remains to be seen from future final reports.

Recurrent acknowledgment at succeeding stop signals has been suggested as a requisite in the reports of preliminary inspections of continuous train control installations on the I. C., the D. L. & W., and the L. & N., the suggestion reading as follows: "No provision has been made in this installation for having enginemen acknowledge succeeding stop signals."

This criticism was based on the fact that on July 22, 1924, the commission made public in a press notice its interpretation of paragraph *b* of paragraph 2 of the

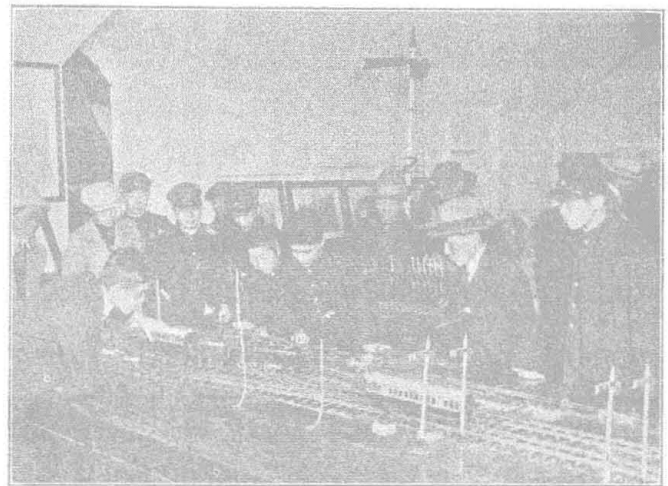
specifications to the effect that "consistent practice required definite acknowledgment by enginemen at each succeeding signal indicating stop." In other words, the term "danger zone," in the specification is interpreted as being limited to mean each and every block separately.

The report of the preliminary inspection of the two-speed continuous system installed on the C. & N. W., included a description of the recurrent acknowledgment feature effective at succeeding points which are separated by a fixed distance by the operation of a distance cam, which starts operation when a danger indication is received. The report did not express specific approval or disapproval of this feature. The I. C., the C. M. & St. P., the N. Y., N. H. & H., and the three roads of the Pennsylvania system are taking measures to provide recurrent acknowledgment.

The commission came out definitely on this question in the final report on the O. W. R. & N., offering as one of the exceptions the provision that "provision must be made requiring enginemen to acknowledge succeeding stop signals." The carrier later petitioned the commission for a modification of its report, contending that recurrent acknowledgment is neither necessary nor desirable, and requesting that this requirement be eliminated. Results of this hearing held on December 14, have not yet been made public.

Another important feature of the final report of the O. W. R. & N. was the rather indefinite suggestion that the railroad consider whether the split reduction feature was desirable, which question was raised on account of the fact that the split reduction apparatus failed to function as a benefit in certain cases during the inspection. Further developments have been made looking towards the elimination of the defective operating features used in the earlier designs of this apparatus, and opinions of those interested seem to be divided about equally as to whether the advantages to be gained by the use of split reduction are worth while.

The final report on the installation of the Miller Train Control Company system of the intermittent ramp type of train-stop, as installed on the Chicago & Eastern Illinois between Chicago and Danville, was issued on March 27, and this report formally approved the installation as meeting the requirements of the commission's order with the exception that ramp detectors were not required and might be removed, and that changes were to be made in six of the engine equipments to bring them up to a standard with the other engines.



Employees of the Japanese Government Railways Receive Instructions On the Operations of Signaling