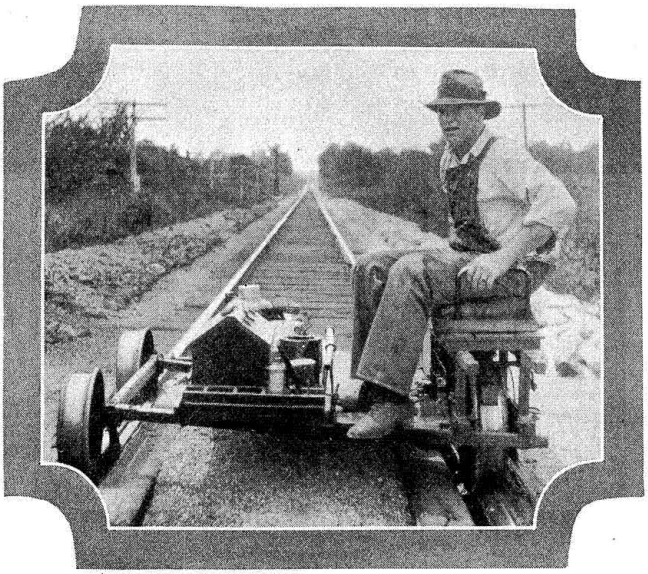

What's the Answer?

An open forum for the discussion of maintenance and construction problems encountered in the signaling field. *Railway Signaling* solicits the co-operation of its readers both in submitting and answering any questions of interest.

TO BE ANSWERED IN A SUBSEQUENT ISSUE

(1) *Should traveling signal maintainers on branch lines, and who look after interlocking and crossing signals only, use motor cars?*

(2) *Why does the neutral armature of a polarized relay always drop when the polarity of the relay is reversed?*

(3) *Do you provide an emergency release on approach or stick locking of signal levers? If so, what means do you use to introduce a time element?*

(4) *Where color-light home signals are used at interlockers, what scheme is employed when it is desired to hold a signal clear, during operation of an emergency release?*

Are Call-On Signals Safe?

"Do you believe that a call-on signal at an interlocker expedites traffic without sacrificing too much in safety?"

A Call-On Signal Expedites Traffic Without Sacrificing Safety

By D. W. RICHARDS
Signal Engineer, Norfolk & Western, Roanoke, Va.

WE USE calling-on signals on this road to direct train movements without flagging at interlocking plants where it is impossible to clear a home signal. There are certain conditions which make it absolutely necessary to use a signal of this character, particularly where cars have to be shifted off the rear end of trains in automatic block territory adjacent to interlocking plants.

It is my opinion that a calling-on signal no doubt creates a hazard. However, if the operating rules governing its use are strictly observed, it unquestionably expedites traffic without sacrificing safety. There is always a hazard present owing to the human element being present and there are cases on record where the calling-on signal has been used for purposes for which it is not intended, with accidents occurring as results. My experience however has been that without its use traffic is very seriously delayed under certain conditions, and therefore the use of the signal is warranted, but strict observance of the rules must be enforced.

Used Only for Controlling Slow-Speed Movements Through Crossovers

By A. H. MCKEEN
System Signal Engineer, Union Pacific System, Omaha, Nebr.

ON the Union Pacific System the call-on signal arm is used only for controlling slow-speed movements through crossovers or onto side tracks at interlocking plants. We do not use the call-on signal for advancing trains on main tracks for the reason that in our opinion nothing is gained by so doing because in most cases the automatic block ahead is occupied and by advancing a train through the interlocking limits with a call-on signal the train in most cases would be required to stop at the automatic signal and this would tie up the interlocking plant. We see no advantage in moving trains on the main line by means of call-on signals, except possibly to make switching movements.

Other Comments

IT IS the practice on the Chicago & North Western to use call-on signals and has been for a number of years. This practice was adopted because of the large number of derailments, occurring on account of misunderstandings of hand signals. J. A. Peabody, signal engineer, Chicago & North Western, states that they have believed it to be a safe practice and have have had no reason to change their opinion.

C. J. Kelloway, superintendent of signals, Atlantic Coast Line, replies that his road employs call-on

signals, their indication being "proceed at slow speed prepared to stop." In his opinion, "such a signal expedites traffic and it is a far safer practice to move a train under a slow-speed signal than under a hand signal through an interlocking plant. If conditions are such that a signal cannot be given, Rule 663, of the Standard Code, is then followed."

Cost of a Train Stop

"What is the estimated average cost of a train stop on your road, (a) passenger, (b) freight? How do you arrive at this figure?"

Figures Showing Average "Out-of-Pocket" Cost to Stop and Start Trains Have Been Computed by Superintendent of Transportation, Illinois Central—Cost Varies from $0.50 to $2.30 Per Stop

By H. G. Morgan
Signal Engineer, Illinois Central, Chicago

OUR superintendent of transportation has prepared a statement covering the estimated average cost to start and stop trains on the Illinois Central. The figures given in this statement are the ones which are in use on our road. This statement follows:

"A study to show a conservative figure of costs to stop and start trains is of useful information, as it enables constructive suggestions where train stoppages may be avoided by various improvements in operating facilities, curtailing of flag stops, and making flag stops out of as many regular time-table stops as possible. Arriving at the cost to stop and start trains by taking all of the usual items in the unit of train costs, per mile or per minute, and applied to the actual time lost by reason of making the stop, would not be representative, as there is no additional expense created for wages of crew unless they be on overtime; neither would there be any additional cost for roundhouse supplies, roundhouse men or train supplies. There may be a small additional cost for locomotive and car repairs over and above brake shoe wear, but under ordinary conditions this expense would be small and difficult to estimate. A cost calculated on such a basis would be inflated and would be a poor figure on which to make an estimate of savings in a contemplated investment for improved facilities.

"The cost to stop and start trains will vary according to whether the start is made on a heavy grade, a curve, level track and with weather conditions, size of locomotive, number of cars in train, price of fuel delivered on tender, etc., which would require a large number of tests to cover each condition. It is not infrequent for a freight train to meet with an unexpected stop, incurring a loss of 9 min. which may be the direct cause of 1 to 2 hr. delay further down the line, by reason of their not being able to make the meeting and passing points lined up for them, in which case these costs would be much more than indicated. A cost, therefore, which covers a train movement under favorable conditions would seem to be more representative for general requirements.

"For this purpose, a series of tests and checks were made on the Illinois Central dynamometer car in connection with other tests being made at the time. Tests were made on approximately level straight track and under favorable weather conditions. Additional coal was arrived at by scoop count, and its cost includes both transportation and coal chute expense. Additional water costs were apportioned on ratio of additional fuel costs per rate of evaporation of the engine. Locomotive and car brake shoe wear were based on tests made to ascertain the life of a brake shoe. Experiments have shown that brake shoe wear on the wheel itself, under action of most all types of shoes, is exceedingly small and would not materially affect these costs. 'Superheat oil' is based on cost per minute, per average cost and consumption over a train district, it being understood that 'superheat oil' feeds during a short time the locomotive is standing. Cost for per diem on foreign cars is based on $1.00 per day, or the *same amount* if an ownership car as the *net earnings* of a 'home' car approximate this figure.

Passenger Train Stop

"To stop and start an 11-car passenger train with a Pacific type locomotive on level straight track, summer conditions, from a speed of 50 miles an hour and to regain the same speed:

	Distance	Time
After locomotive shut off steam to stopping point	0.44 mi. 2,344.0 ft.	60 sec.
Standing		60 sec.
Regain speed 50 m.p.h.	2 mi.	240 sec.
Total		360 sec.
Less time required to run entire distance of 2.44 mi. at 50 m.p.h. had stop not been made		175 sec.
Actual time lost		185 sec.
Equivalent to		3 min.

Cost of Passenger Train Stop

Additional coal, 296 lb. at $0.0015 per lb.	$0.444
Water, 7 cents per 1,000 gal. (3.4 per cent of coal costs above)	.015
Brake shoe wear on 8 ownership cars (24 shoes per car), tender 8 shoes, total 200 shoes at $0.0002 per one brake shoe stop	.04
Brake shoe wear on locomotive ($0.00055 one brake shoe per stop), 6 shoes	.0033
Superheat oil, $0.00078 per min. (3 min.)	.0023
Total cost	$0.5046

Freight Train Stop

"Estimated cost to stop and start an average 50-car freight train having a 2-8-2 class superheat locomotive when running on level straight track (summer conditions) from speed of 25 m.p.h. and to regain the same speed:

	Distance	Time
After locomotive shuts off steam to stopping point	0.375 mi. 1,980.0 ft.	114 sec.
Standing		69 sec.
Regain speed of 25 m.p.h.	2.6 mi.	780 sec.
Total		963 sec.
Less time required to run entire distance of 2.9 mi. at 25 m.p.h. had stop not been made		417 sec.
Actual time lost		546 sec.
Equivalent to		9 min.

Cost of Freight Train Stop

Additional coal, 343 lb. at $0.0015 per lb.	$0.514
Water, 7 cents per 100 gal. (3.4 per cent of coal cost above)	.0174
Brake shoe wear locomotive ($0.00055 one shoe per stop), 8 shoes	.0044
Brake shoe wear 50 cars and tender (8 shoes each), 408 shoes at cost of $0.00013 per shoe, per stop	.053
Superheat oil, $0.00033 per min.	.0029
Per diem on foreign cars or net earning capacity of 50 ownership cars at $1.00 per day or $0.000694 per car-min.	.312
Cost non-overtime train	$0.9037