

What's the Answer?

CTC into Service

When putting CTC into service, do you cut in short sections, i.e., from siding to siding, or do you cut in the whole project at once? What rules or procedures do you set up for the operation of trains when part of the CTC is in service, before the entire project is completed? Please explain fully.

Siding-to-Siding

By H. B. GARRETT
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San Francisco, Calif.

We usually place CTC in service starting at the end nearest the control machine. This is due to the fact that the first cut ins are made before pole line work is completed and before the code line circuit has been installed throughout the job. Sections of CTC are placed in service as soon as the control machine is on hand and field work completed, usually a siding at a time. These sections consist of intervening signals from the preceding sidings or beginning of CTC and to and including the next siding.

Prior to placing each section in service, a timetable bulletin is issued giving the limits and explaining that automatic signals are being removed and CTC is being placed in service, making reference to special rule changes in the timetable. Operation of the remaining section of railroad continues as in the past by timetable and train order. An open telegraph office is maintained within the CTC limits or at least on the end adjoining the section remaining under train order operation. The purpose of this is to issue train orders to trains leaving the CTC. As the CTC is extended to include another open telegraph office, the preceding office is closed.

Many Factors Involved

By W. R. SMITH
Signal Supervisor
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Several things should be considered before you can determine how a CTC installation will be put in service. They are: (1) Is there a signal system presently in effect? (2) No signals in service, and (3) The amount of manpower available for both signal and section men.

The most desirable way, providing

there is no signal system presently in effect, is to complete the entire installation, and have it working for a couple of weeks before actually putting it in service. In this method, test bars are installed on the switch machines so they may be operated the same as if they were connected to the switch. These test bars couple the throw bar to the lock and detector rods providing for the operation of the switch from the control office, and receiving the correspondence indication. Signals may be cleared and switch machines operated for train movements the same as if the installation were in service. This gives the dispatcher a chance to learn the operation, and also shows up any defects there may be in the signal system circuitry, or improper adjustments, without affecting the train schedules. With this method all the testing may be done before the dispatcher takes the machine over, and avoids a lot of confusion. It also eliminates issuing a considerable amount of bulletin orders.

When there is a signal system already in operation, an advantage is to put each location in service as it is completed. The discontinuance of the present system for any length of time is not desirable on account of the enginemen and trainmen being familiar with that system. Confusion and possibly an accident, as well as unnecessary delays to trains, could result. Thus the benefit and safety of the present system should be continued until the day each location is put in service, which usually is about a two hour period to convert from the old to the new.

Converting from double track to single is a little more complicated. One end of the two sidings has to go in service at the same time as well as the intermediate signals. This usually takes about eight hours on account of the track changes and signal change at all locations. The intermediate signals should be left in their present position; circuits changed and moved after the second track has been removed; a temporary dwarf signal may be set between the tracks to control the facing point movements where the home signal normally would be at that location. Another reason for putting each location in as it is completed is that there is usually a considerable amount of temporary work in the signals and tracks, which if left too long may cause failures and consequent delay to trains.

For train operations, the CTC loca-

tions are bulletined as they are put in service, but the train order system is left until such time as CTC is complete beyond two train order offices. Then the one that is no longer required is taken out of service. This relieves the dispatcher of some of the load, as he is usually operating both systems, and also the economics of CTC can be gained at the earliest possible time.

Cut in Three to Five Sidings

By J. S. ANDERSON
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When putting a traffic control system in service, our practice is to cut in from three to five sidings at a time, rather than wait until the entire project is completed.

"Begin Traffic Control System" and "End Traffic Control System" signs are set at effective absolute signals at each end of the installation with automatic approach signals from 6,000 to 10,000 ft. in advance of the absolute signals and having an approach of approximately one mile. "Block Signal Limit" signs are set opposite the approach signals and "Block Signal One Mile" signs are set in advance of the approach signals.

Cut ins are made so that there is an open telegraph office at each end of portion cut in service. Portions to be cut in service are bulletined five days in advance of cut in date and time. When cut in date is effective, trains are operated by traffic control system rules in traffic control system territory and by time table and train orders in non-traffic control system territory.

We are currently engaged in converting absolute automatic block system to full traffic control system between Stockton and Oakland, Cal. Four sidings are being removed, two new sidings installed, existing sidings extended, signals in siding to siding block respaced, T-21 switch machine with SL-25 electric locks installed on main track spur switches and Ramapo Ajax low switch stands with SL-25 electric lock installed at derails at fouling point.

This installation is cut in from siding to siding and is bulletined five days in advance of cut in date, showing sidings permanently removed from service, new sidings placed in service, new location of siding account of extension, location of absolute and automatic signals placed in service, location of absolute and automatic signals removed from service and location of electric locks on switches and derails.

Bulletins Keep All Informed

By H. A. APPLEBY
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CTC systems are put into service, one siding at a time, where the change involves a transition from an existing automatic block system. Longer sections of CTC are put into service at one time in zones where a transition of signal systems is not required.

An operating department bulletin is issued some time before the first section of a CTC project is to be placed into service. The provisions of the bulletin become "Effective at time and date to be established by train order." The bulletin covers discontinuance of the existing signals (if any): lists rules, bulletins, etc., that will be discontinued or modified; and establishes operation under Rule 261 with any special provisions that may be necessary. This bulletin is used by the operating department for instruction of classes of train and engine service employees as needed.

When the time and date is established for putting a section of CTC into service the aspects of the old signals (lamps and blades) are removed and aspects of the new signals (lamps) are added at the time shown in the train order for the change. Most important is that the change of systems be made at the exact time designated for the change. The time for each change-over should be selected jointly by the operating, track and signal departments. If the time of changeover is during a period of light traffic, the train delays will be reduced and the time for track changes and testing of signals will be reduced.

The hazard of accident is eliminated when all concerned understand that train orders and rules of the old block system apply up to the time of change-over and that the operation is under Rule 261 and the new signal system exactly at the time specified in the train order. The new signals are in Stop position at the time of placing in service, and are not cleared for train movements until tests are completed to determine that all parts of the system are functioning safely and as intended. This is a very important phase of the cut-over process, especially where much of the old system is re-used in the new system, such as pole line, cables, track circuits, etc.

The cutover operation is handled under the direction of a responsible supervisory official who maintains direct communication with one or

more signal employees at each signal location in the section. The cutover work at each location is rehearsed beforehand with the employee who is in charge of the cutover work and test at that location. The supervisor in charge of the cutover must very carefully coordinate his work with that of the track department and with the train dispatcher. The dispatcher is often able to hold certain trains back out of the cutover zone until testing is completed and thus actually cause less delay to traffic by then being able to give Proceed signals for the movements instead of allowing these trains to move by Stop signals under the CTC rules for such signals. The section to be cut in should always be limited to what the track and signal crews can handle during the daylight hours, and should allow time for clearing or correcting unexpected emergencies.

The extended zone of operation under Rule 261 should include both ends of the siding. The meeting or passing of trains at a siding must be either by train order or by signal indication and not by a combination of the two systems. A portable communication office is used at the end of the siding where traffic enters train order territory and trains are required by train order to secure clearance card when entering train order territory—this practice avoids the problem of providing a train order signal at the temporary office of communication.

This program has been used on Western Lines of the Santa Fe for placing about 700 miles of CTC into service during the past 10 years.

Siding-to-Siding

By M. F. ANDERSON
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CTC is put in service under two different conditions, namely:

- (1) Sections of railroad where no automatic block signal system exists and,
- (2) Sections of railroad where an automatic block signal system does exist.

We cut CTC in service in sections in either case, but the procedure and length of sections cut in are somewhat different under the two conditions mentioned. Under either condition, the requirements of the operating department, the density of traffic or any specific or peculiar conditions relative to traffic, time of year, and availability of man-power and equipment are controlling factors. Also we always begin at one

end of an entire project and cut sections in service consecutively from that end to the other. This permits change in operating rules and conditions from the starting point to the end of each section cut in without break.

Where no automatic block system exists, construction is pointed towards completing the predetermined section to be cut in service. This includes any track changes or track improvements to be made in the section. As soon as possible after construction is completed, the section is cut in service.

Cutting in service is done by general order stating that CTC and automatic block signal rules are to become effective at time and date specified for the limits of the section. General order provides—that CTC and automatic block signal rules supersede any rules no longer applicable. Sections cut in frequently include two to four sidings.

Where automatic block signal system exists, frequently changes in the existing system are required due to track changes, respacing of signals, replacement of semaphore signals with color light signals, etc. All such changes are completed before cutting CTC sections in service. CTC control equipment is also installed sometime in advance of cutting sections in service.

Cutting in service is done by general order stating that CTC rules are to become effective on section of track at intervals of time; the limits of which and time and date to be covered by train orders. Sections cut in service are seldom longer than siding to siding but always including an entire siding.

Siding to Siding

By C. M. BISHOP
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On the Rock Island, CTC is placed in service from siding to siding as soon as ready, instead of waiting until the entire project can be cut in.

When replacing automatic block signals with CTC, the CTC can be cut in from siding to siding with a minimum of delay to trains, and in territory where there are no signals we take advantage of the added safety as well as efficiency of operation. When a section of CTC is ready for service a general order is issued to cover, showing date and time CTC will be placed in service, as well as location and operating rules which will be in effect. No special rules or instructions are used.