NEW ZEALANMD RAILWAYS

UPPER HUTT-FEATHERSTON C.T.C.

Local Instructions for C.T.C. Operator.

1. INTRODUCTION.
The Centralised Traffic Control system of signalling consists of two parts:

(a) The communicating or coding equipment.
(b) The signalling und interlocking or safety equipment.

(a)Coding Equipment.
In the OFFICE is a control panel.

At the various stations FIELD equipment is installed.

A LINE comprising two wires throughout the territory controlled connects the OFFICE and FIELD equipment together.

CONTROL CODES are sent along the line to the FIELD and these are requests which are decoded by the field equipment and passed to the Signalling and Interlocking asking that a change be made. If unsafe the decoded request will be ignored by the Signalling and Interlocking equipment. INDICATION codesare sent along the line to the OFFICE from the FIELD and these are reports of a change in the field. They start automatically in the field and are decoded and stored by the OFFICE equipment. These stored reports control the indication lamps of the office panel.

The LINE can handle only one CODE at a time and CONTROL CODES take precedence over INDICATION CODES. However, if the LINE is engaged with the transmission of one code, all other codes are stored at the point of origin and transmitted along the line in turn. The coding system contains no interlocking; it merely passes messages from one place to another.

On the OFFICE CNTROL PANEL the levers set up a code and this CONTROL code is transmitted or started when the start button below the levers is pressed and released. A signal change and points change can be transmitted together as one code, and the Signalling and Interlocking equipment at the field station will ensure that these changes are made in the proper sequence. When a control code is transmitted, the indications of the points and signals controlled by this code are extinguished and will not be displayed until an indication code is received from the field station showing that a change has taken place in the field. If the CONTROL code is not obeyed, then no indication code will be received from the field, and the panel lights above the start button used will remain out. These panel indications can, however, be "recalled" by a second operation of the start button and the report that comes in shows the actual positions of the points and signals concerned.

Indication codes reporting track occupancy are transmitted automatically and are in no way related to the control codes but their transmission can be delayed by control codes which take precedence. Track circuit failures will be shown as "track occupied" indications.

(b)Signalling and Interlocking or Safety Equipment
This comprises the, Signalling relays, points motors, switchlocks, signals and their inter-connecting wiring. All the safety requirements are taken care of by

this equipment at each station. It will obey the requests of the controller (CONTROL CODES) only if it is safe to do so. It will report all changes to the controller cy means of indication codes.

The C.T.C. OFFICE control panel comprises the five right hand units of the Upper Hutt control panel. These units, in order from left to right, control and indicate the following field equipment:

1. Upper Hutt.
2. Mangaroa.
3. Centre of tunnel forced ventilation (not in operation).
4. Rimutaka loop.
5. Featherston.

2. CONTROL MACHINE. The control panel consists of an illuminated track diagram below which are mounted the levers and relevant indications.

(a) Track Diagram.
This is normally dark and the occupancy of a track circuit is indicated by the illumination of a small red indication light on the track-diagram.

The two track circuits shown between stations outside the intermediate signals are half-block section occupancy indications and they operate as follows:

A train entering a block section will illuminate the half-block section indication light at that end of the section. On passing a point approximately half way through the block section the other half block section occupancy indication will also light and both of these indications will remain illuminated until the train has vacated the section and a delay of 30 seconds has elapsed. A departure signal cannot be cleared until all the track indication lamps for the block section concerned are out.

(b) Control Panel. Controls provided are:

(i) Points Levers The horizontal row of levers immediately below the illuminated diagram are for the control of the points and have two operating positions - to the left for points normal and to the right for points reverse. White lamps stencilled N & R placed just above each points lever indicate that the points are normal or reverse and that the points are safe for traffic. Id neither an N or R indication is displayerd the points are not safe for traffic andaction as outlined in Section 4 of these instructions must be taken. (See also Traffic Code Instructions No. 49 (5) & (6).)

(ii) Signal Levers
The signal control levers are mounted below the points control levers and operate in two or three positions, the normal (signal "stop") position in either case being vertical. Signal indication lamps are provided above each signal control lever; wlhen the red indication lamp is illuminated it is an indication that signals controlled by the lever are at "stop". If the L or R green indication lamp is lighted, it is an indication that the L or R signal is at "clear".

(iii) Local Control Changeover Levers
These levers are si-tuated in the same horizontal row as the points control switches.

When a request has been received by the C.T.C. ,operator to give local control, the following procedure should be adopted after ensuring that all points and signals concerned are normal:

Turn the yellow lever to the "L" position and press the start button below it. The "C" light will immediately go out, and the "L" light on ther field apparatus will be illuminated.

The field operator now turns the contlol changeover lever on his local control panel to reverse. An indication code to illuininate the "L" lamp on the control machine will now be received.

The field operator is now free to operate his equipment. The C.T.C. operator cannot resume control without the co-operation of the field operator.

When the latter has completed his operation under local control and has restored all equipment to normal the "L" lamp on the control panel will be extinguished and a single stroke gong will sound.

The C.T.C. operator must then restore the yellow control changeover switch to the "C" position and press the start button. This operation will restore all field equipment to normal and the resulting indication code will illuminate the "C" indication to show that control has been restored to the C.T.C. operator.

(iv) Start Buttons. The row of spring return push buttons are start buttons and the operation of one of these causes a control code to be transmitted to the field station. A control code thus started contains only "controls" selected by the levers vertically above it. The two lamps, designated "Indication Code" (yellow) and "Control Code" (white) at the lower left hand end of the control panel indicate to the operator whether an indication or control code is being transmitted.

3.
(a) Operation of Controls.
All controls except the start buttons can be moved at any time without altering the apparatus in the field and it is not until the start button is depressed and then released that any control takes place. The C.T.C. apparatus is arranged in unit form and each vertical row of switches and push buttons is referred to as a panel; thus each start button controls only the transmission of codes for the thumb switches located above it.

When a control is being transmitted from any panel all the indication lights on that panel will be extinguished until the corresponding incication code is received.

A control code to clear a signal is automatically cancelled when a train passes the signal and in this case it is only necessary to restore the signal lever to normal, no control code being sent.

(b) Cancelling

If for any reason it is desirable to cancel control codes which have been stored at the office, operation of the "Storage Cancel" push button, at the lower left hand end of the contlrol machine, will cancel all stored codes which have not already been transmitted.

A fault on the ststem may become apparant by reason of continued code action, and the code indication lamps will indicate in these circumstances whether the trouble originates on a control code or an indication code.

If the control coding is at fault, code action can be stopped by pressing the "Storage Cancel" push button. After the repeat code action has been stopped, the individual panels should be tried one at a time in order to locate the fault which should then be stopped by a second operation of the storage cancel button.

If the trouble is confined to any one panel then all other panels can be used as needed, independent of the defective panel.

If the indication code is at fault, code action can be stopped by pulling the "Pull to Disconnect Line" button which must be left in this position for 30 seconds. This will neutralise the system and the button can then be restored to normal.

To bring the system back into use control codes must be sent from pannels with whic a red start button is associated. The red start buttons should be operated one at a time, working from left to right, until the fault reaprears. The "Pull to Disconnect Line" button should again be operated and the red start buttons pushed in turn with the exception of the one associated with the faulty panel.

The Signal Maintainer must be advised immediately of such failures and no attempt to send a control code to the defective station should be made until the fault is rectified.

(c) Storage.
Should the start button be operated to transmit a control code to the field while an indication code is being received, the control code is stored and v{ill be sent out, as soon as the line is clear, without another operation of the start button. Additional storages may be made up to the number of start buttons provided on the machine. Furthermore, each start button may be operated in quick succession at any time and control codes will follow one another until all storages have been transmitted.

In the same way indication codes will be stored in the field and will be transmitted in turn as soon as the line is clear.

(d) Indication Recall.
The operator can check any or all of the indications showing on the control panel by utilising the recall feasture, which consists of simply pressing the start button of any selected panel. Since no change in the lever positions has been made the panel will remain dark, a second operation of the same start button will recall (and recheck) asll indications relating to that start button.

In the same way if a control code is transmitted and no change in the field apparatus results either due to the interlocking not permitting or to faulty operation of the equipment a "dark" panel will result. In this case also a second operation of the start button will recall all indications which when obtained will report the position of all signals, points etc.

(e) Bell Incicaton.
Single stroke bells are provided and operate as follows:

(i) When the field operator has completed local control working and restores all controls to normal, as described under the heading "Local Control Changeover Keys".

(ii) When the approach track circuit to the home signal at each station is occupied (i.e. AJT, E3T, BJT, CBT, CJT or DBT).

(f) Gong Cut-out
A push-pull button designated "Gong Cut-out" is provided on the lower left hand end of the control panel which, when pushed in, will prevent the gong from sounding. This button should normally be pulled out.

(g) Home Signal Indication

Indications of the position of the home signals at Upper Hutt and Featherston have been provided on the C.T.C. control machine.

When the signal concerned is at "clear" a green indication will be displayed and when at "stop" a red indication will be illuminated.

(h) Train Waiting Indication
A "Train Waiting" indication has been provided for Featherston and will be illuminated, by the operation of a switch at Featherston, when a train is ready to depart from Featherston and shall be interpreted as a recquest for the Down departure signal No. D2L.

This signal must not be "cleared" unless the "Train Waiting" indication s illuminated, otherwise excessive ringing of the crossing alarms at Featherston will result.

(j) Approach Lock Releases
Electrically operated time delays operate automatically in conjunction with all signals for approach locking purposes.. Afterany route has been set up, the signal concerned may be restored to normal, if necessary, but if a train is indicated on the approach track circuit to the signal no alteration can be madev to the route until the automatic time release has operated.

Time releases are set as follows:

Signal No. A8R Upper Hutt	- 60 Seconds
All signals at Mangaroa	- 90 seconds
All signals at Rimutaka Loop	- 90 seconds
Signal No. D2L Featherston	- 60 seconds

The "Time Delay Operating" indication, showm on the track digram below the station name, is a flashing white light and will operate whenever the approach lock release mechanism is in operation at the station concerned.

(k) A.C. Power Off Indication
Should the A.C. power supply to the C.T.C. control machine fail the system will automatically switch over to a D.C. supply.

Under these conditions the "A.C. Power Off" indication on the lower left hand end of the control panel will be illuminated.

If this indication remains lighted for 30 seconds the Signal Maintainer must be advised.

4. FAILURE OF CONTROLS.
(a) Points Fail to Move. This will be shown by the panel indications remaining extinguished after a control has been sent, and a further operation of the start button will show the points in their last position. Before assuming that the points motors have failed:

(i) Check that all signals leading over the points are at "Stop".
(ii) Check that the points track circuit is clear.
(iii) Check that the Time Delay Operating indication is out.

(b) Points operate but fail to complete movement.
Panel lights will be illuminated after the control has been sent but the appropriate "N" or "R" indication will not light

Try signals; if these clear, it shows that points have moved correctly and that the pane indication light circuit only is fauty, e. g. the lamp may have burnt out.

In both cases if the points can still not be operated, it will be necessary to instruct the guard to isolate and hand-wind the points in accordance with instructions (Traffic Code Instruction No.49).

In case (b) the guard should also check for any obstruction.

(c) Signals fail to clear. (See also Traffic Code Instruction No.49(6).))

(i) Check that all points are correctly set.
(ii) Check that no opposing signals are "cleared".
(iii) Check tLat the: track circuits ahead of the signal are clear.
(iv) Check "Time Delay Operating" indication is out.

In the event of the signal still not operating the points indications should be rechecked by means of the recall feature provided and if points are correct the train may be verbally authorised to pass the signal at stop except in the case of a departure signal. {See Auto. Sig. Reg. No.19.)

If no points indication can be obtained the procedure as set out for failure of' points must be followed.

(d) Local Control changeover.
In the case of a failure to hand over to Local Control:

(i) Check that all points are normal and all signals are at stop from the indications.
(ii) Check that the "Time Delay Operating" indication is out.

In the case of a failure to restore control to C.T.C.

(i) Instruct the field operator to check that all levers are in the normal position and the appropriate indications are showing.
(ii) Check that all switchlocks are normal and properly locked up in accordance with instructions.

In all cases of failure the Signal Maintainer must be advised immediately.

5. EMERGENCY CONDITIONS
In the event of a failure of the C.T.C. , or in any emergency condition when the control of the signalling cannot be carried out satisfactorily from the C.T.C. machine, the Train Control Operator must be advised immediately so that he may appoint emergency Signalmen at Mangaroa and/or Rimutaka Loop to operate the emergency control panels provided for this purpose at each station.

At Featherston an emergency lever (No.24) is provided for clearing the Dowm departure signal in an emergency as directed. By train control.

When a station emergency control panel is controlling the signalling at any station no attempt shall be made to operate any function at the station concerned from C.T.C. machine.

WHEN THE EMEGENCY CONTROL PANEL AT MANGAROA IS IN USE THE UPPER HUTT UP DEPARTURE SIGNAL MUST NOT BE CLEARED WITHOUT THE AUTHORITY OF THE TRAIN CONTROLLER. IN THE EVENT OF FAILURE OF COMMUNICATION HOWEVER THIS SIGNAL MAY BE CLEARED WITH THE PERMISSION OF THE EMERGENCY SIGNALMAN AT MANGAROA.

For control of the Upper Hutt Up departure signal No. 8R, lever A8 and its start button on the C.T. C. panel will normally be used. In an emergency (C.T.C. coding not being available) this signal can be controlled by lever 8R on the Upperr Hutt station section of the panel, and when used this lever must be put back to N after the passage of each train.

In the event of the C.T.C. line failing coding will not be possible. Under these circumstances any signal that has been cleared by C.T.C. before the line failure will revert to "Stop" after 30 seconds.

6. TELEPHONES.

(a) Telephones at Mangaroa, Rimutaka Loop and Featherston Dowm departure signal and all intermediate track telephones (listed in the Working Timetable) have direct acess to the Upper Hutt C.T.C. Controller, who can switch the "C.T.C. Controller's Circuit" to the Wellington Train Controller by operation of the key marked "Switch Train Control to Featherston".

(b) To call train crews to the telephone at Mangaroa or Rimutaka Loop operate the key marked accordingly and a hooter will sound at the station concerned.

(c) If the panel loadspeaker fails the C.T.C. Controller's circuit should be switched immediately to train control.

(d) When Upper station is unattended the C.T.C. Controller's circuit should be switched to train control.

7. VELOCIPEDES.

ALL INFORATION REGARDING MOVEMENTS OF VELOCIPEDES BETWEEN UPPER HUTT AND FEATHERSTON WILL BE GIVEN BY THE C.T.C. OPERATOR, UPPER HUTT. He should insist that he be informed by telephone promtly when each velocipede is placed on the line and is taken off clear of the line.

K. D. CROFT
DISTRICT TRAFFIC MANAGER.

District Traffic Manager's Office,
Wellington
31st October, 1955.

NEW ZEALAND RAILWAYS.
MANGAROA AND RIMUTAKA LOOP: EMERGENCY CONTROL PANELS.
INSTRUCTIONS FOR OPERATION

To be read in conjunction with Circular S. & I. No.732.

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1. The emergency station control panel at the end of the main relay shelter is to be used only on instructions from Train Control (or the Upper Hutt C.T.C. controller if train control communication has failed). When required, an emergency signalman will be appointed by the train controller or the C.T.C. controller.

2. TO TAKE EMERGENCY CONTROL :
(a) Check that all levers are in their normal positions (RED signal levers vertical, all other levers turned to the left).

(b) Press the "INDICATION CHECK" button to see that all indications are correctly displayed. If a train is shown on thetrack diagram by a red light, tell the C.T.C. controller.

(c) Reverse N°.5 lever by turning it to the right. This will liven all panel indications and show that emergency control has been taken at the panel.

3. PANEL OPERATION: .
(a) Track Indications..
A red indication on a section of the track diagram indicates a train.

The 5T and 4T diagram indications, when alight, show that a departure signal has been cleared at the next station for an approaching train or that the train is in the block section on its way. These lights will remain alight until the block sec- tion has been vacated and 30 seconds thereafter. While alight, no other train can be signalled into the block section.

(b) Signal Levers (Nos.2 and 8)
To move trains to the right across the diagram, turn the lever to the right and to move trains to the left, turn the lever to the left. The signal indications are shown by lights above the signal levers.

DEPARTURE SIGNALS : THE EMERGENCY SIGNALMAN MAY NOT CLEAR A DEPARTURE SIGNAL FOR DESPATCHING A TRAIN WITHOUT THE PERMISSION OF TRAIN CONTROL. IF TRAIN C0NTROL COMMUNICATION HAS FAlLED, THE PERMISSION OF THE C.T.C. OPERATOR OR THE O.I.C. OF THE STATION TO WVHICH THE TRAIN IS BEING SENT MUST BE OBTAINED BEFORE A DEPARTURE SIGNAL IS CLEARED FOR THE DESPATCH OF A TRAIN.

APPROACH LOCKING : If a signal is cleared while a train is shown approaching the signal on the diagram and it is necessary to restore the signal to stop, the route will be locked until an automatic time release operates.

The releasing time is 90 seconds for each signal.

While a route is approach-locked, points and opposing signals are locked.

Signal levers should be put back to normal when the whole train has passed over the motor points track circuit immediately past the signal.

(c) Points Levers (Nos.1 and 7)

At each end of the yard the 3 motor-operated turnouts move together in response to one lever (No.1 or No.7). When setting the points, think only of the Main line points (nearest the Home signal). Normal is for movements from Main to Main and Reverse is for movements from Main to Loop or Loop to Main. The other turnouts are provided to give fouling protection and allow two opposing trains to be signalled into the station together (one on the Main and the other on the Loop).

Do NOT attempt to operate the points levers unless the F (for free) light is showing.

Do NOT leave a points lever out of correspondence with the points indication, except while local control is in force during which time neither points nor signal levers should be moved.

4. TO GIVE LOCAL CONTROL (NOTT APPLICABLE TO RIMUTAKA LOOP)

While Mangaroa is under emergency control, "Local Control" can be given to enable train crews to shunt.

Lever No.3 is normally in position C and the illuminated "C" above this lever shows that the station is under central (Emergency) control. To give local control, check that –

(a) Signal levers are normal and showing red lights.

(b) Points levers are normal and showing N lights.

Turn lever No.3 to position L. This will give local control exactly as it is normally given by the C.T.C. operator and when local control has been taken the L light will show.

PROCEDURE FOR OPERATION OF LOCAL CONTROL PANELS IS POSTED AT THESE PANELS.

5. TO TAKE BACK CONTROL (NOT APPLICABLE TO RIMUTAKA LOOP):

When shunting is finished, points will be normal, signals Red and the L light showving above lever No.3.

Turn lever No.3 to C. The "C" light will show that Central (Emergency) Control is again in force.

The operation of local control panels by train crews is the same whether the station is under C.T.C. control or emergency control. When a guard wants to take or give up local control, he will speak on the telephone to the C.T.C. controller who can call the emergency signalman to the telephone by sounding the hooter.

When the station is under emergency control, the local control panels will be used by train crews only for shunting and, unless otherwise instructed by the emergency signalman will signal each train into the station by clearing the Home signal from the central panel and will despatch each train by clearing the Departure signal (with the permission of Train Control) from the central panel.

6. TO GIVE UP EMERGENCY CONTROL :

Upon instructions from Train Control or the C.T.C. con troller, check that all levers, except N°.5, are normal and indications in correspondence, then restore No.5 lever to normal.

The panel lights going out will show that emergency control has been given up. Advise Train Control by telephone "EMERGENCY CONTROL AT MANGAROA (or Rimutaka Loop) GIVEN UP". The emergency signalman may be required to stand by while the C.T.C. operator checks points and signal operation by C.T.C. and this can be followed on the panel by holding the "indication check" button in.

The signal maintainer, when testing, may require emergency control to be given up and taken again.

7. FAILURE OF APPARATUS :

In all cases of failure of apparatus, the maintainer MUST be called.

(a) Track circuit failures.
These will be shown on the track diagram as a train.

(b) Failure of motor points. If the points do not move or move only part way, the indication will re-appear (N or R) when the lever is restored to its original Position. Leaving the lever in this position, the points should be inspected for an obstruction.

If an "N" or "R" light is showing, the lever may be left in the same position and the points will be safe for traffic without isolating or hand-winding. If an indication light "N" or "R" for the desired position of the points is not showing sbove the points lever, then trsins must NOT pass over the motor points before they are ISOLATED AND HAND WOUND and this applies to BOTH turnouts over which the train must pass. The points must remain "ISOLATED" until the whole train has passed over them. (See attached booklet describing the hand-operation of motor points).

The motor points at this station are of the G.R.S. type, (See also Traffic Code Instruction No.49 (5).

(c) Failure of Signals.

Before assuming that a signal has failed, check that the points are correctly set by the indications on the panel, that an opposing signal is not clear and that spproach-locking is not the cause.

Provided that tho correct points indication is showing, a train may be hand-signalled past a Home signal that has failed.

If a Departure signal fails, advise train control and state whether the points indication is showing (see Automatic Signalling Regulation No.19). See Traffic Code Instruction No.49 (6).

If a track circuit within station limits fails, the C.T.C. controller may authorise "Local Control" so that the low speed light of the Home signal can be used.

(d) Failure of Local Control (not applicable to Rimutaka Loop)

If local control cannot be given, the shunt will have to be abandoned unless the maintainer is on hand.

If local control cannot be taken back, the C.T.C. controller may authorise the working of the station from the local control panels until the fault is rectified.

K.D. CROFT.
DISTRICT TRAFFIC MANAGER

District Traffic Manager's Office
WELLINGTON
31st October, 1955.

Local Instruction No.L.732C

NEW ZEALAND RAILWAYS

MANGAROA : LOCAL CONTROL PANELLS.

A. TO TAKE LOCAL CONTROL :

1. Check that –
(a) The black points lever is in position N.
(b) The Red signal lever is in its mid-position.
(c) The White control changeover lever is in position C.

2. Request local control from the C.T.C. operator by telephone.

3. When the "L" light above the white lever is alight, turn this lever to position L.

The points "N" light, the red signal indication light and the "BLOCK OPEN" indiction light will appear to show that local control has been obtained.

The Main line points, Departure signals and the low speed light on the Home signal can now be controlled from the local control panel for shunting purposes. The switch-locked points will also be free. When the switch-locked points are used in the normal position, they should be locked with the locking handle of the switch-lock. In the reverse position, this handle will not lock them.

"BLOCK OPEN" means that a Departure signal can be cleared.

B. TO RESTORE TO C.T.C. CONTROL :

1. Check that –

(a) Switchlocked points are normal, locked and padlocked.

(b) The black points lever is in position N and the "N" light is alight.

(c) The Red signal lever is in mid-position and the red light above it is alight.

2. Turn the white control changeover lever to position C.

3. Tell the C.T.C. operator that shunting is completed.

4. Wait in front of the local control panel until the panel indication lights go out.

5. Close and padlock the local control panel door.

K.D. CROFT.
DISTRICT TRAFFIC MANAGER

District Traffic Manager's Office
WELLINGTON
31st October, 1955.