



ERL Maintenance Support Sdn Bhd

TRACK VEHICLE DRIVER/OPERATOR
REFRESHER COURSE & NEW INITIAL TRAINING

Prepared by: RTE

TRAINING OVERVIEW

TURNOUT

Overview of the selected procedures from Procedure for Station Supervisor

(G00.OMO.M15112.NA.1001.*)

- General understanding of turnout

- Overview of the selected procedures from Procedure for Train Driver

(G00.OMO.M15113.NA.1004.C / 103333#).

- Overview of the selected Procedure for Communications and Signal Book.

(G00.OMO.M15114.NA.1002.B / 125486#)

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Maintenance Track Vehicles are vehicle used for Maintenance purposes.

Before any movement, the Driver has to: -

- Get a verbal Shunting Agreement from LC/DC.
- Receive the Approval To Proceed from the OCC.
- Request for a new Approval To Proceed for:-
 - Every new start.
 - Change of direction.
 - After a break.



DRIVE ON SIGHT & UNDER CAUTION

Situation:

- Passing failed signal/s or turnout/s.
- Approaching a train/vehicle (during rescue).
- Track inspection for uncertain track section.
- Track irregularities (obstacle , flooding, bouncing).
- Person in Structural gauge (people working under TPR, coupling of vehicle or intruders).
- Receiving instruction from OCC to check for any irregularities along the tracks.



Action: Drive in a way able to stop the train/vehicle if there is any danger or obstacle in front. Maximum permissible speed 40km/h.

SAFETY ON THE LINE

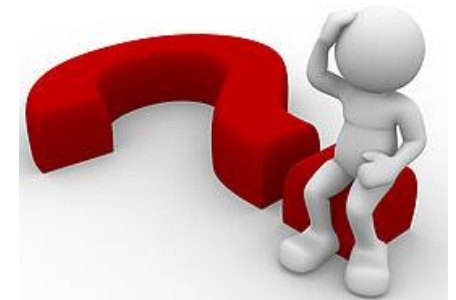
- IF SITUATION REQUIRED REQUEST FROM LC/DC TO BLOCKED ADJACENT TRACK BEFORE LEAVING TRAIN AND TO ENTER STRUCTURAL GAUGE.



- THE OCL HAS TO BE CONSIDER ALWAYS LIVE UNTIL IT IS ENSURED THAT THE OCL LINE IS DISCHARGED AND EARTHED.



- SHOULD DRIVER IS IN DOUBT OR UNCLEAR WITH AN INSTRUCTION, DRIVER SHOULD RECONFIRM THE INSTRUCTION WITH LC/DC.



SAFETY ON TRACK SIDE



- Wear high visibility vest.
- Be continuously watchful for approaching vehicles/trains.
- Never sit, stand or walk on top of the rail.
- Never step or stand on the moveable part of turn out.
- Do not cross a track immediately after a vehicle passed. Wait until adjacent track can be observe in both direction.
- Do not touch or work on running rails during lightning and thunderstorm.

TURNOUT GENERAL UNDERSTANDING

- Turnout is a combination of rails, rail tongues, motor/s and locking detector/s.
- The function is to allow movement of train from one track to the other track.

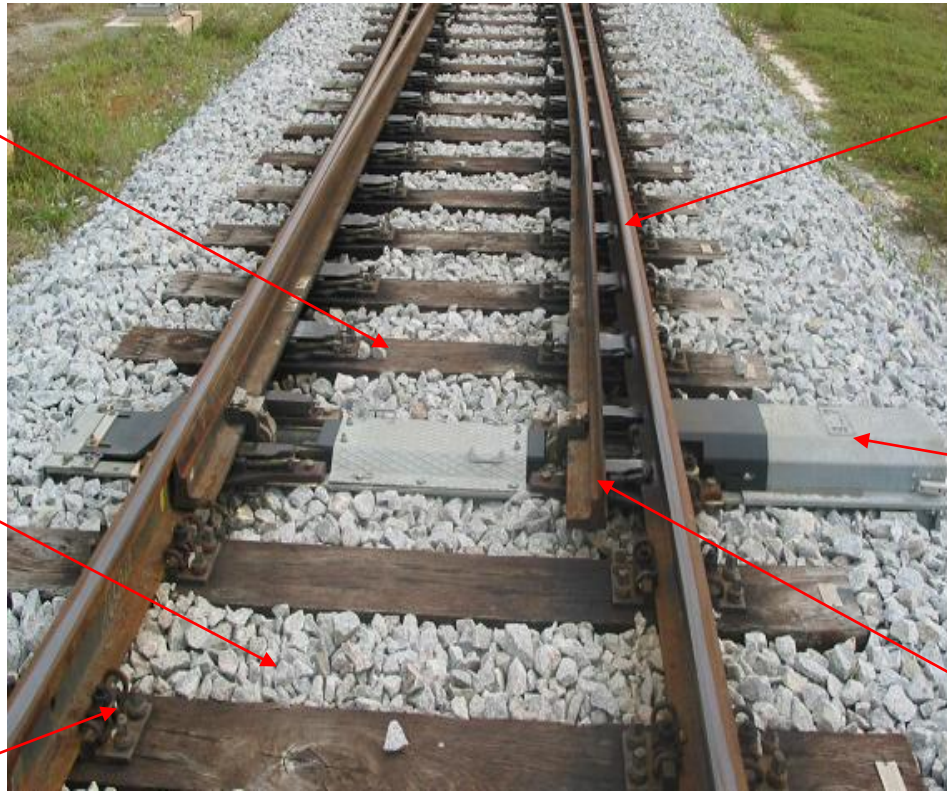
It is essential for a Vehicle Operator to identify the turnout position as if his/her working area or nature of work is related to turnout areas or equipment's.

DIVERT

TURNOUT IMAGE

SLEEPERS

RAIL



BALLAST

**POINT MACHINE
TONGUE
MOVER**

FASTENER

**TONGUE/
BLADE
MOVABLE PART**



SIWES

TURNOUT (FACING POSITION)



TURNOUT: SET TO RIGHT.
Right Blade Open & Left Blade Close.



TURNOUT: SET TO LEFT.
Left Blade Open & Right Blade Close.

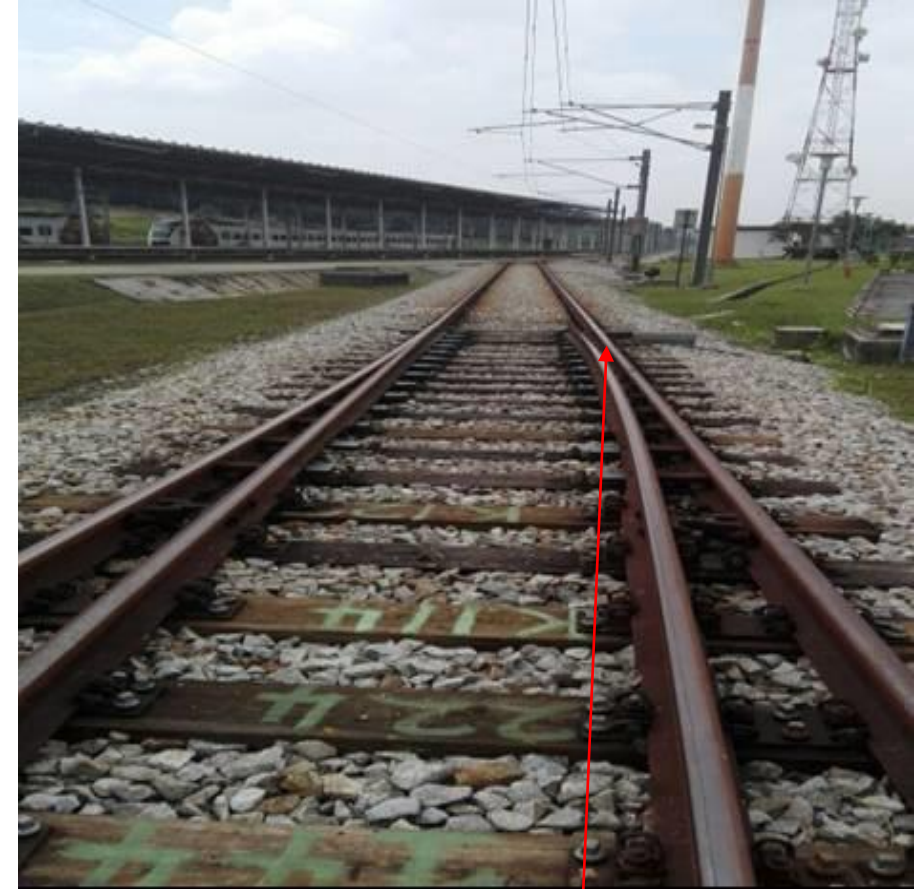
CAUTION!

WARNING!

TURNOUT (TRAILING POSITION)



TURNOUT: SET TO RIGHT.
Left Blade Open & Right Blade Close.



TURNOUT: SET TO LEFT.
Right Blade Open & Left Blade Close.

CAUTION!

WARNING

TUMBLER OR MANUAL POINT



**SET TO
LEFT**



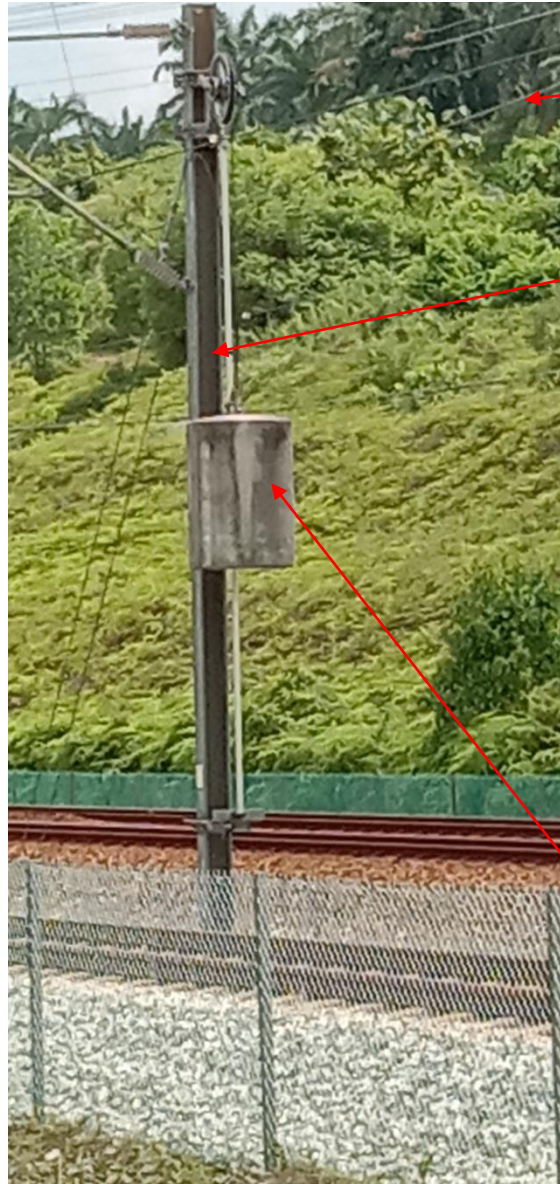
**SET TO
RIGHT**



- An axle counter is a system used in railway signalling system to detect the clear or occupied status of a section of track between two points.
- The system generally consists of a wheel sensor (one for each end of the section) a unit for counting the axles of the train both into and out of the section.



OCL & KILOMETER BOARD



OCL Wire

OCL Pole

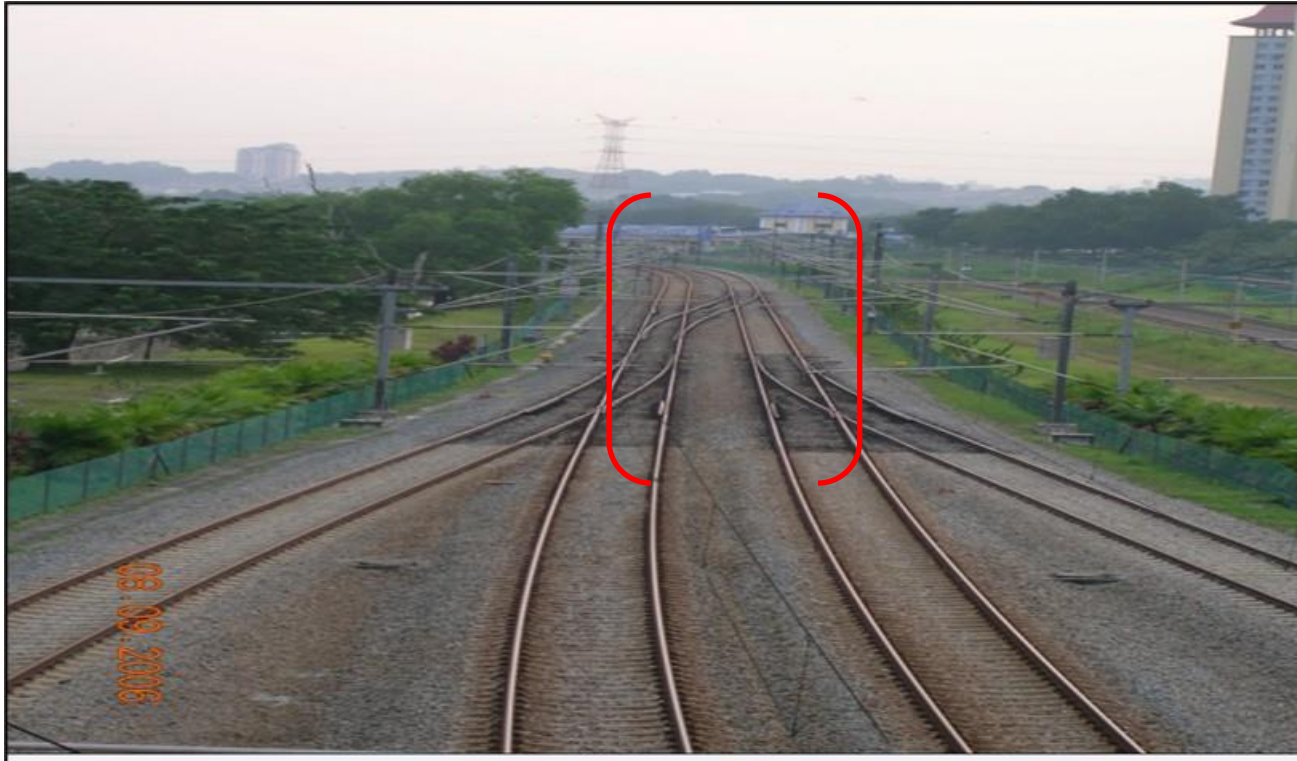


CAUTION
Overhead
Power Lines

OCL Counter Weight

Kilometer Board





DIVERT

- A crossover is a pair of switches that connects two parallel rail tracks.
- It allows a train on one track to cross over to the other.
- A crossover can also join two tracks of the same direction, possibly a pair of local and express tracks, and allow trains to switch from one to the other.

SHUNTING MOVEMENT

MOVEMENT IN THE DEPOT AND KLS REVERSING TRACKS ARE CALLED SHUNTING MOVEMENT.

WHEN EXECUTING SHUNTING MOVEMENT, ALL DRIVERS SHALL DRIVE ON SIGHT & UNDER CAUTION AND TO ADJUST TRAIN/VEHICLE SPEED WITHIN THE SPEED LIMIT IN A WAY THAT THEY ABLE TO STOP THE TRAIN/VEHICLE BEFORE ANY OBSTRUCTION OR DANGER.

BEFORE EXECUTE SHUNTING MOVEMENT AT DEPOT DRIVER MUST MAKE A SHUNTING AGREEMENT WITH LC/DC.

REMINDER: SPEED LIMIT 25KM/H.

DANGER

THE DRIVER MUST BE AWARE THE POSSIBILITIES OF ANOTHER TRAIN OR VEHICLE OCCUPYING THE SAME TRACK SECTION.

NOTE

DRIVERS HAVE TO SHUNT TRAIN, SHUNTING LOCO OR TRACK VEHICLE UP TO THE END “END OF SHUNTING ROUTES” OR TO THE AGREED STOPPING POINT.

SHUNTING AGREEMENT

Must Contain:

1. Vehicle name or number and location
2. Purpose of the movement
3. Destination
4. Additional information, if any

Reminder:

Vehicle preparation before execute shunting movement:

- Check vehicle for any irregularities
- Check vehicle equipment functionality
- Perform brake test
- Perform radio check and radio test (test call)



AGREEMENT

SHUNTING MOVEMENT – DEPOT AREA



Workshop Area



Track 8 Wheel Lathe
& Spray Cabin



Track 8 Auxiliary Workshop



Washing Plant



Stabling Area

SHUNTING MOVEMENT – DEPOT AREA



Entering Buffer End 31 - Shunt Signal D72
Leaving Buffer End 31 - Shunt Signal D71



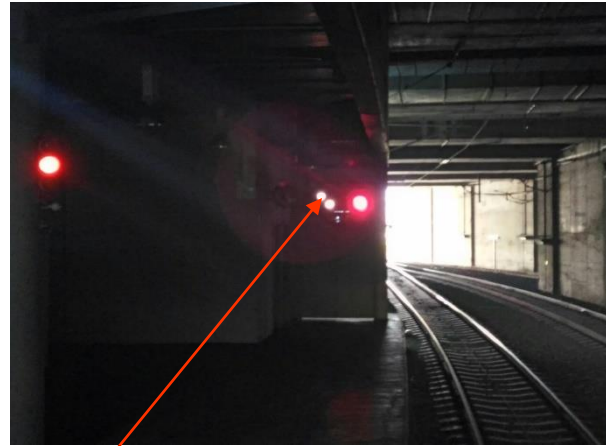
Entering Buffer End 1
Shunt Signal D2
Leaving Buffer End 1
Shunt Signal D1

SHUNTING MOVEMENT – KLS REVERSING TRACKS

Two unit of trains or 8 car train can enter (occupied) KLS reversing track



Stop Aspect

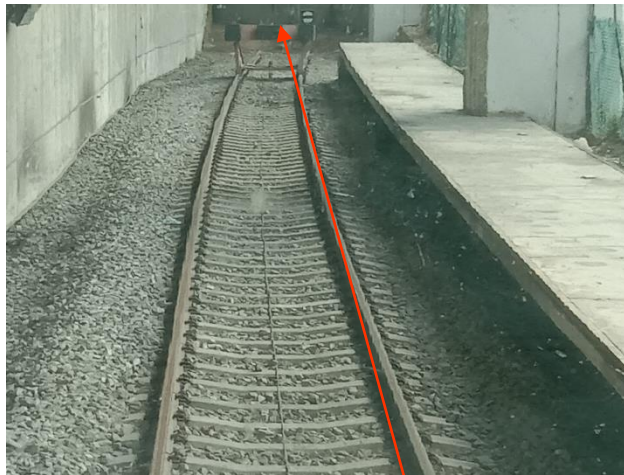


Proceed Aspect

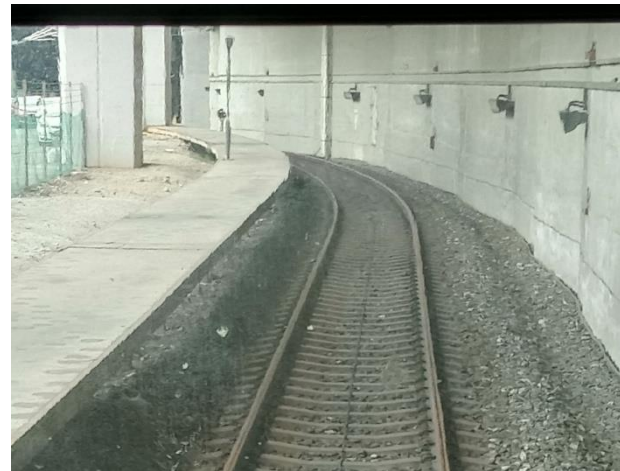


Entering Reversing Track

Drive On Sight & Under Caution



Stopping at Reversing Track



Leaving Reversing Track

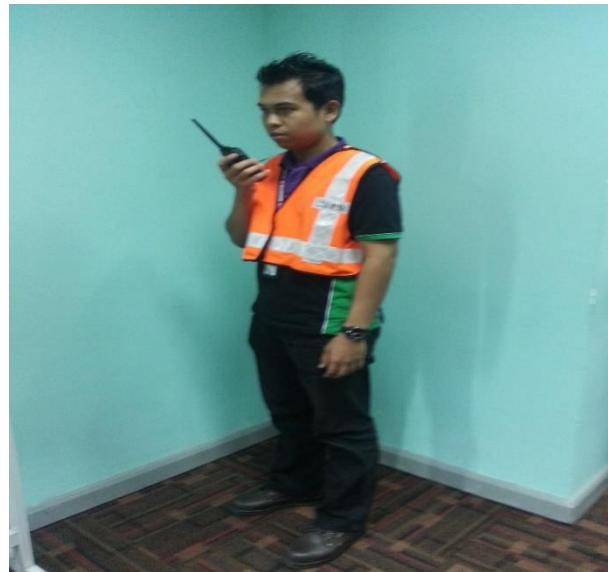
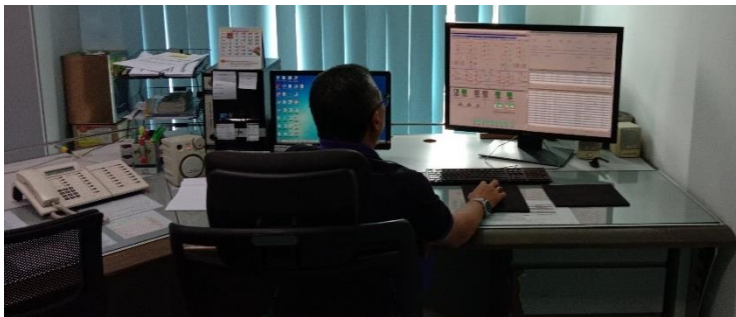


Speed Limit 25 km/h

COMMUNICATIONS GENERAL DESCRIPTION

- Only on-duty qualified persons are permitted to use the radio.
- Qualified persons must use radio communication for matters only directly related to Operations and Maintenance.
- Any irrelevant, unidentified, or false radio communications including any obscene or impolite language are strictly prohibited.
- Failure or improper operation of any communication equipment's must be reported to the OCC as soon as possible by means of the suitable form of communications.

- The OCC is the communication centre for the ERL - CRS System.
- All matters concerning operations, maintenance, emergencies, power supply and etc. are to be directed to the OCC.
- All communications to/from OCC must be communicated via facilities which are connected to the voice recorder.





- Based station (radio console) in OCC.
- Trainborne radio. (onboard train and shunting locomotive)
- Hand portable radio. (walkie-talkie) for moveable used for Operations and Maintenance personnel.

ADDITIONAL COMMUNICATIONS EQUIPMENTS

- Private Automatic Branch Exchange. (PABX)
- Handphone.
- Close Circuit Television. (CCTV)
- Passenger Information Display. (PIDS)
- Public Address (PA) system.



HANDPORTABLE RADIO

HANDPORTABLE RADIO CHECK:

To ensure hand portable in good working condition check:

- Battery.
- Signal coverage.
- Aerial.
- Set the correct group channel.



HANDPORTABLE RADIO TEST (Test Call):

- After radio check.
- During maintenance vehicle preparation.
- After battery change. (Hand portable)
- After changing to a new location of work.
- Before pushing or pulling.
- Before opening Permit to work.

PRINCIPLES FOR VERBAL COMMUNICATION

- **IDENTIFICATION:**
Vehicle name/number.
- **LOCATION:**
Exact area e.g. kilometer board, track, station & in front which signal.
- **PURPOSE:**
Reason or details report.
- **ADDITIONAL INFORMATIONS:**
Related to operational & safety decision.





- Speak clearly and concise.
- Speak without dialect, if possible.
- Use short sentences.
- Keep the conversation short.
- All instructions must be repeated back and confirmed before execution.

REMINDER:

- One person talking at a time.
- The rest listen.
- No interruption.
- Wait until the communication ends.
- Unless Emergency Call.



- Go ahead: Proceed with your message.
- Over: My transmission is finished and expect a response.
- Standby: Wait, I will call back.
- Affirmative : Permission granted/read back is correct.
- Roger: Transmission acknowledged.
- Copied: Transmission acknowledged and finished.
- Negative: Permission not granted/that is not correct.



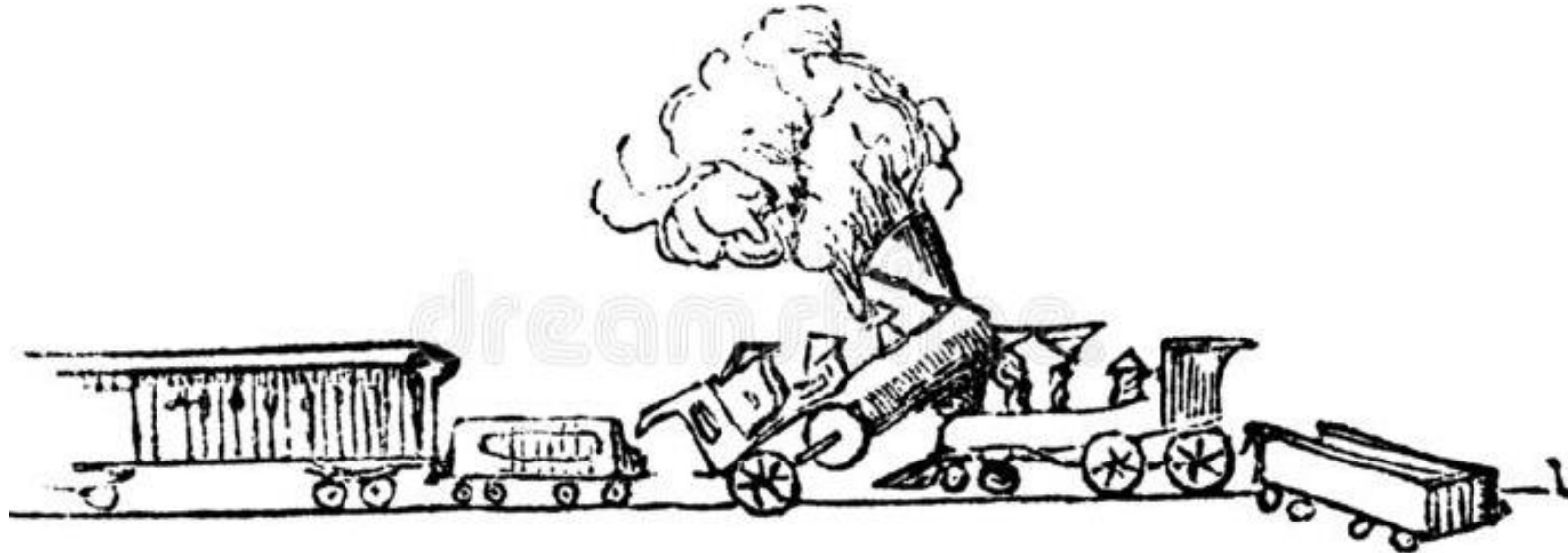
TRANSMISSION OF ALPHABET & NUMBERS

A Alpha	B Bravo	C Charlie	D Delta	E Echo
F Foxtrot	G Golf	H Hotel	I India	J Juliet
K Kilo	L Lima	M Mike	N November	O Oscar
P Papa	Q Quebec	R Romeo	S Sierra	T Tango
U Uniform	V Victor	W Whiskey	X X-ray	Y Yankee
Z Zulu				

1 ONE	2 TWO	3 THREE	4 FOUR	5 FIVE
6 SIX	7 SEVEN	8 EIGHT	9 NINE	0 ZERO
67 SIX SEVEN	0082 ZERO ZERO EIGHT TWO			

EXECUTING INSTRUCTION

Any instruction given by the Operations Control Center, driver are also responsible in observing all necessary Safety Procedures, Rules and Regulations.



DO NOT EXECUTE ANY INSTRUCTION

- Which is driver did not properly understood and confirmed by the OCC.
- Which is the instruction obviously affecting safety and may lead to an accident.
- Which is given to driver by an unauthorized person.



- The LC/DC issues the complete instruction and should not be interrupted by his Vehicle Operator.
- All instruction must be repeated by Vehicle Operator back before execution.
- The Vehicle Operator repeats the instruction & LC/DC must confirm that instruction read back is correct.



- The Vehicle Operator reports, request “Approval” or giving information to LC/DC.
- LC/DC repeats the report, respond to request or acknowledging the information.
- The Vehicle Operator must confirm that respond back by acknowledging.



CONTROL CALL

- One Way Communication.
- No Need To Repeat.
- Communicate at Least Every.
10Second To 1Minute.
- Permanent Announcement.

DESTINATION CALL

- Two Way Communication.
- Repeat Immediately.
- Communicate Constantly.
- Permanent Conversation.

EMERGENCY CALL

- First priority
- Override others call
- Introduce word 'Emergency'



EMERGENCY CALL CONTENT

- Leading word "Emergency"
- Name and department
- Vehicle name/number
- Type of incident
- Location of the incident
- Other details which are important

REMINDER:

- Press Emergency Call Button & the alarm will trigger at OCC. (if unable to speak)
- Not all situation is not consider an emergency, example a small fire burning situation especially if the driver couldnt delt with the fire extinguisher him/her self.
- If having a radio malfunctioning use other kind of communication to contact LC/DC.

Verbal "**Approval to Proceed**" is an authorization to move when communication by signals malfunction. The verbal "Approval to Proceed" can only be issued by the OCC.

DANGER!

NEVER COMBINE VARIOUS APPROVALS TO PROCEED.

REMINDER !

PROVIDE ADDITIONAL INFORMATION IF THIS COULD ENHANCE/SUPPORT SAFETY!

WARNING

IT IS NOT ALLOWED TO COMBINE A RADIO TEST WITH AN APPROVAL TO PROCEED.

- Drivers must ensure that they are fully familiar and must obey all signals applicable to their movement.
- All fixed signals are equipped with identification markers which must be quoted to OCC when required.



Note:

- Direction number for down track (direction from KLS to KLIA) is indicated with alphabet T for 'TURUN'.
- Up track (direction from KLIA to KLS) is indicated with alphabet N for 'NAIK'.

CATEGORY & TYPE OF SIGNALS

Main Signal:

- Home Signal.
- Exit Signal.
- Automatic Block Signal. (ABS)

Subsidiary Signal:

- Distant Signal.
- Repeater Signal.
- Shunting Signal.

Additional Signal:

- Call On Signal.
- Route Indicator.
- Destination Indicator.

Type Of Markers & Sign Board:

- Permanent.
- Temporary.



SIGNAL STATUS INDICATION

- The distance between the signals varies between 950 m to 1850 m.
- Main Signal is a multi coloured light signal and used to indicate the status of the block ahead.

GREEN Aspect: PROCEED

- Block ahead is cleared and movement is allowed.
- Allows the maximum speed according to the line speed, except if there are no other speed restrictions or instructions.

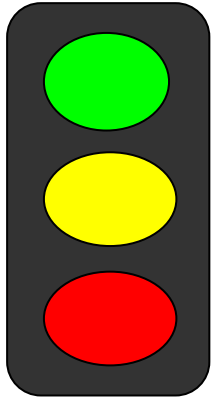
YELLOW Aspect: CAUTION

- Reduce speed and prepare to stop at the next signal. (if STOP Aspect)
- Reduce speed for diverging of track. (Attach with Route/Direction Indicator)

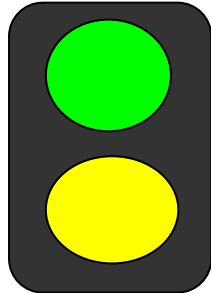
RED Aspect: STOP

- Block ahead is occupied and no movement is allowed.
- Stop for all trains, maintenance vehicles and locomotive.
- Stop approximate 10 meters in front of Red Aspect signal.

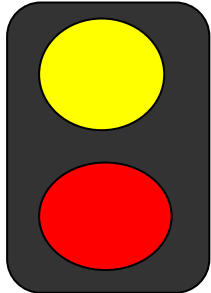
SIGNAL ASPECT



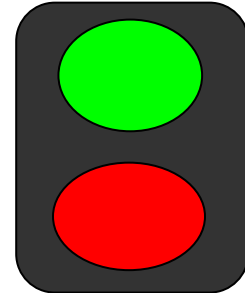
3 ASPECT: GREEN, YELLOW AND RED



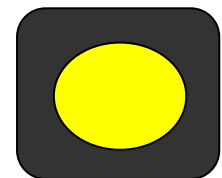
2 ASPECT: GREEN, YELLOW



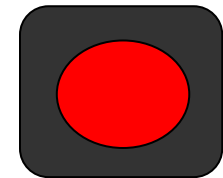
2 ASPECT: YELLOW, RED



2 ASPECT: GREEN, RED

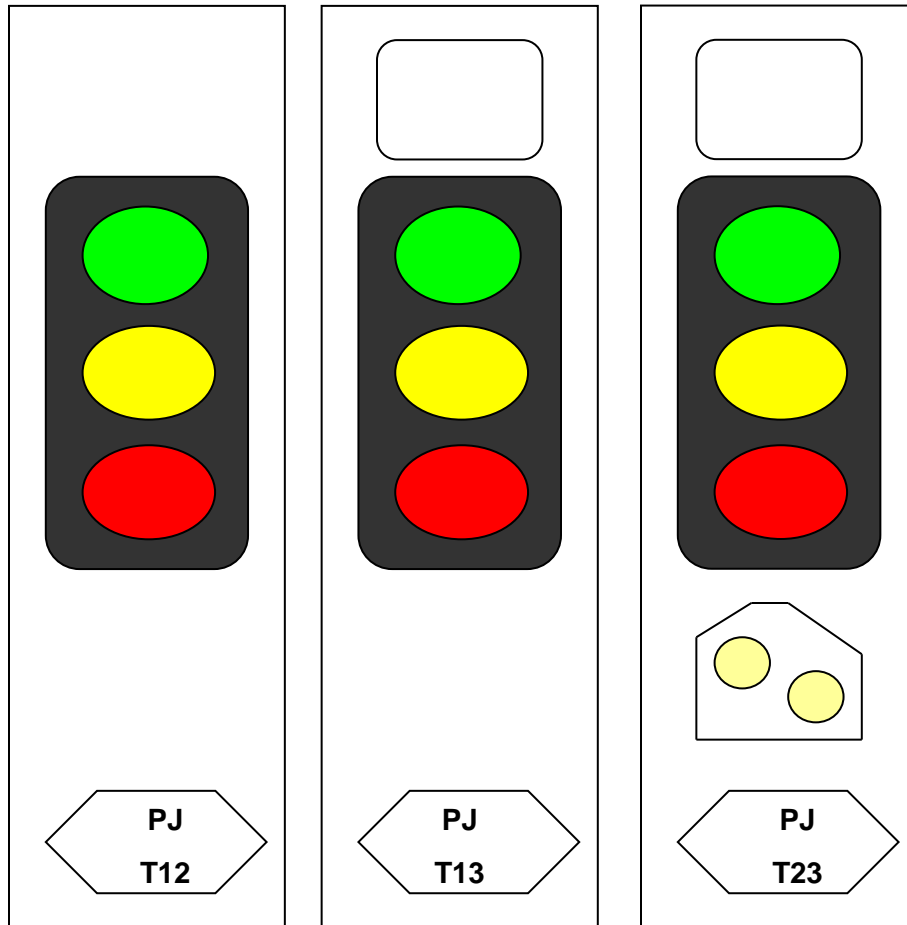


1 ASPECT: YELLOW



1 ASPECT: RED

HOME SIGNAL



SECTION CODE

KS,BS,XA,PJ,ST,KA

DIRECTION OF TRAVEL

T (Turun) or N (Naik)

IDENTIFICATION MARKER

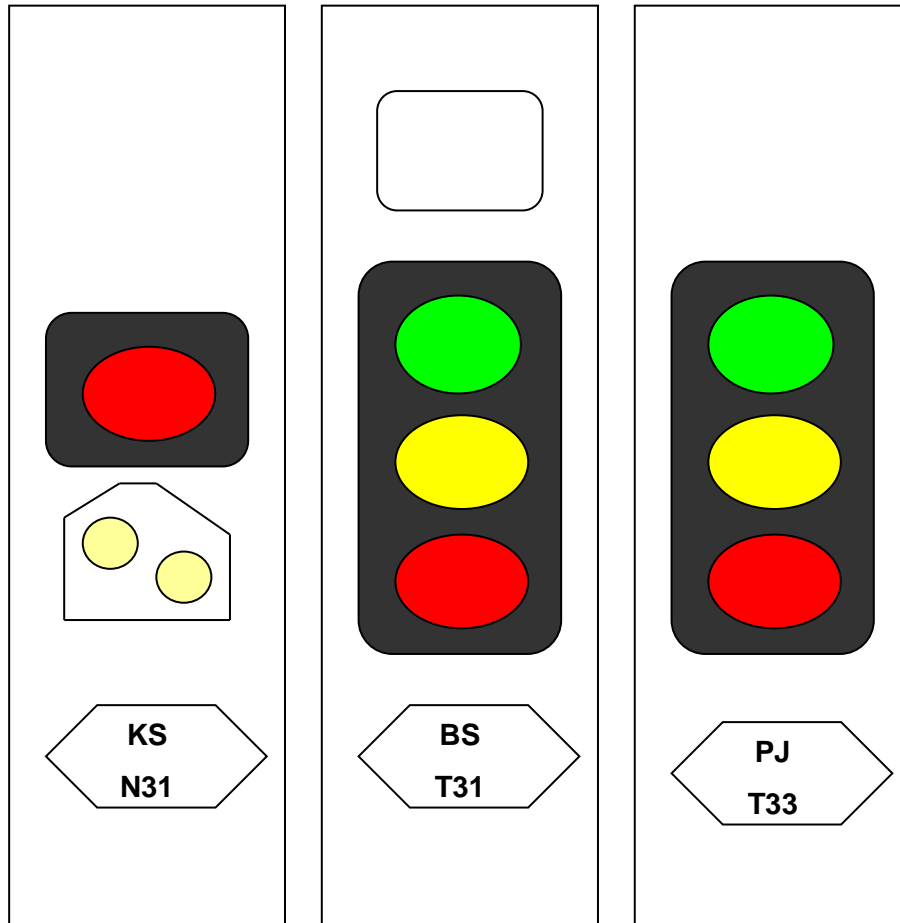
1 (Outer Home) or 2 (Inner Home)

TRACK

2, 3

- Location of these signals is when entering into a station and terminal.
- Identification marker number '1' to indicate signal for Outer Home and '2' signal for Inner Home.

EXIT SIGNAL



SECTION CODE

KS, BS, XA, PJ, ST, KA

DIRECTION OF TRAVEL

T (Turun) or N (Naik)

IDENTIFICATION MARKER

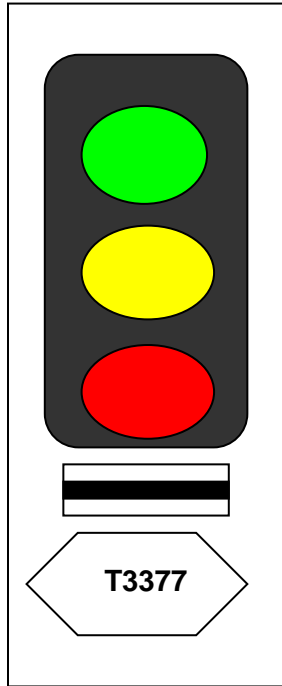
3 (Exit) , 4 or 5 (Additional Exit)

PLATFORM/TRACK

1, 2, 3 or 4

Location of these signals are when leaving a station and terminal or into reversing track KLS.

AUTOMATIC BLOCK SIGNAL



DIRECTION OF TRAVEL

T (Turun) or N (Naik)

TRACK

2 or 3

KILOMETER DISTANCE

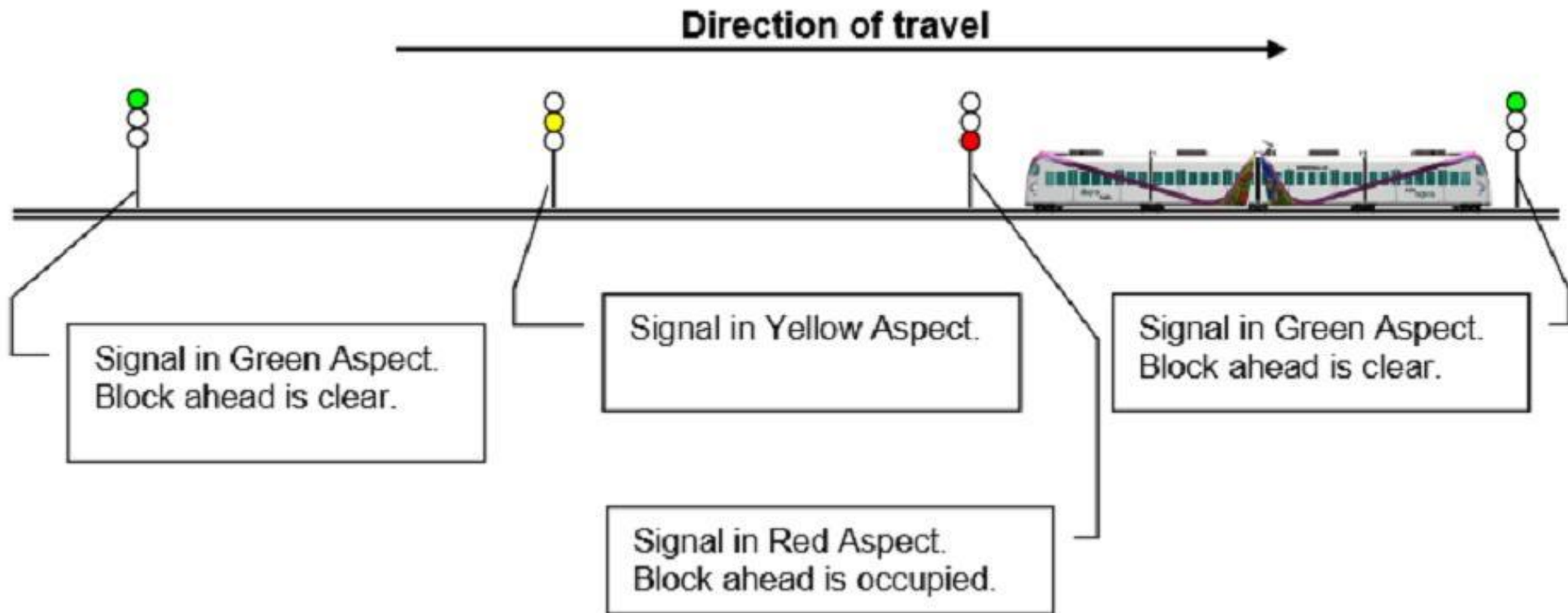
HUNDRED METERS

- Location of these signals are between 2 stations.
- Distance between the signals varies between 950m to 1850m.



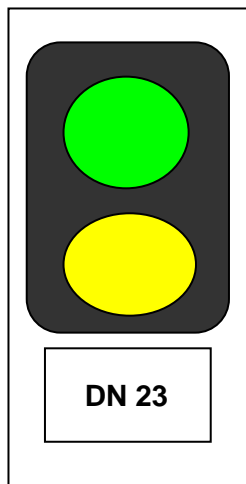
ABS THE SYSTEM

- Signal function is based on track occupancy. (referRefer diagram below)



DISTANT SIGNAL

- Located in braking distance in front of Home Signal.
- Indicates the status of the Home Signal.
- Place at the right hand side on the mainline.
- Only used during bi-directional operation.



NOTE

Distant Signal Showing **Green** Aspect:

- Indicates That Home Signal in front is proceed aspect - Green Or Yellow.

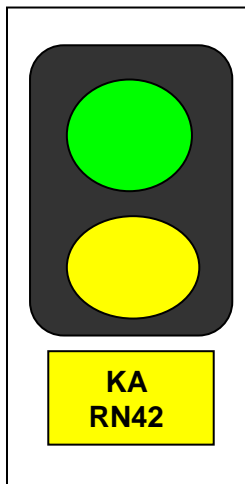
Distant Signal Showing **Yellow** Aspect:

- Indicates That Home Signal in front is stop aspect.



REPEATER SIGNAL

- Repeats the status of the Main Signal ahead.
- Located in area where signal visibility is not available.
- An obstruction or sharp curves in front of the Main Signal.
- Placed at right or at the left hand side of the track.



NOTE

Repeater Signal Showing **Green** Aspect:

- Indicates That Signal in front is proceed aspect - Green Or Yellow.

Repeater Signal Showing **Yellow** Aspect:

- Indicates that Signal in front is stop aspect.

SHUNTING SIGNAL



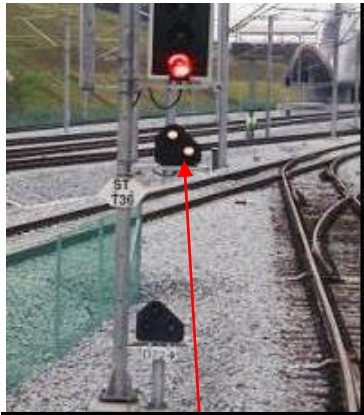
PROCEED



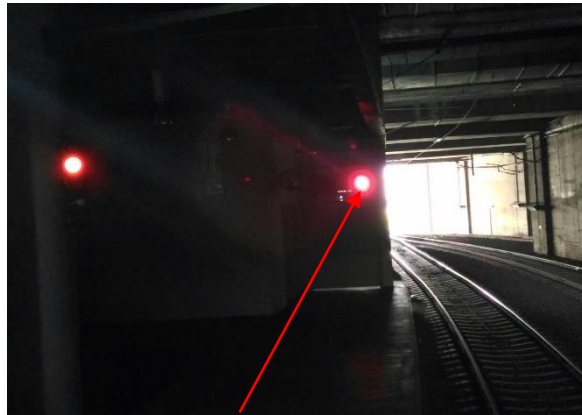
STOP

- Location of these signals are at shunting area. (KLS reversing track & Depot)
- Identification number “S” for KLS reversing track & “D” for Depot.
- Proceed aspect two white light illuminates slanting 45°.
- Stop aspect two white light illuminates horizontal.

CALL ON SIGNAL



PROCEED



STOP



PROCEED

- Illuminates when signal is given by LC/DC to train/vehicle as an approval to proceed entering an occupied platform. Usually to rescue train at Stations.
- Only illuminated when a route is set from Main Signal KLS to enter KLS Reversing track.

NOTE: SPEED RESTRICTED

- 40km/h entering station. (Drive On Sight & Under Caution)
- 25km/h entering reversing track. (Shunting area)

ROUTE INDICATOR & DIRECTION INDICATOR



ROUTE INDICATOR



DIRECTION INDICATOR



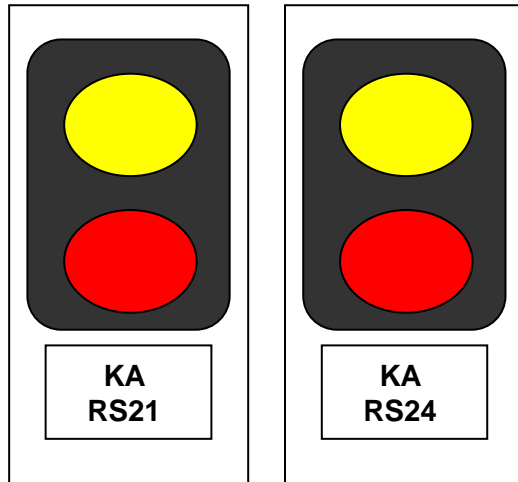
Route Indicators:

- Located at relevant Home and Exit Signals to indicate the particular route setting when more than one diverging track is possible.
- The number 1 to 4 indicates the track to which the route has been set.

Direction Indicator:

- Alphabet 'D' and 'T' indicates route has been set to Depot and Test Track respectively.

ROUTE SET SIGNAL



- Is a stop signal with either a Yellow or Red aspect.
- Identified by the alphabet 'RS' followed by number of the relevant main signal and to inform drivers that the route has been set.
- Located at KLIA2 to permit train depart to KLIA.
- Indicates that the status of the in-front signal KA_S24 and KA_S21.-

Route Set Signal at **Yellow Aspect**:-

- Proceed as per normal line speed, as next signal is **Yellow Aspect** or **Red Aspect**.

Route Set Signal at **Red Aspect**:-

- Stop and hold position, as next signal is **Red Aspect**.

PERMANENT YELLOW

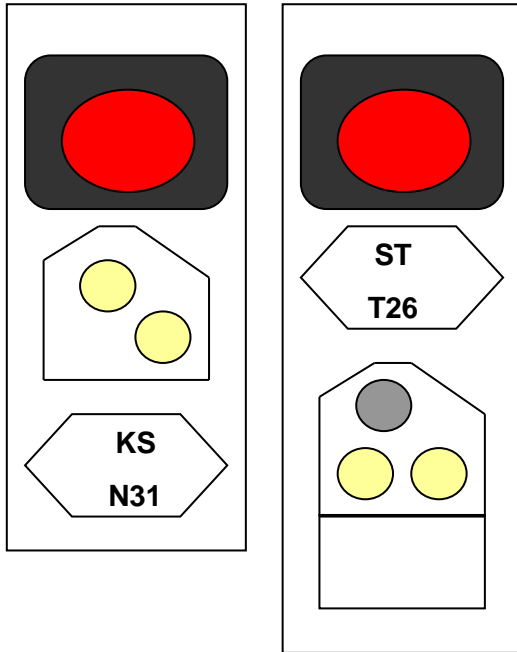


- Permanent Yellow The Permanent Yellow signal is located at test track.
- It indicates that the next signal Main Signal entering STS is Red Aspect or Yellow Aspect.

NOTE:

- Main signal ahead ST T35. (Exit Test Track to enter platform 1 STS)
- ST T35 two Aspect **Yellow** & **Red**. (Caution to enter platform 1 STS)
- Permanent **Yellow** always indicates caution while ST T35 **Yellow** or **Red Aspect**.

PERMANENT RED



- Permanent Red These signals are located at both entrances into the depot & reversing track.
- Indicates that function of Main Signal ends here or border between depot/ reversing track with mainline.
- Speed limit 25km/h.
- The drivers to obey the Shunt Signals at Depot or Call-On Signal as an approval to proceed. (To KLS Reversing Track)

NOTE:

When Entering Depot To Make Shunting Agreement With LC/DC Before Entering Depot.
Switch Radio Channel to OPS 1002
Obey the Shunt Signal as an approval to proceed.



HEADSHUNT/BUFFER – END/STOP








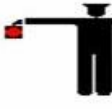



- End of Shunting Route The End of Shunting Route is placed on each buffer stop in the depot area and at the end of the reversing track.
- At signal KA T32 and track 3 KA T33 at the formerly known as CRS platform in KLIA.
- At the end of test track (Track 143).
- KLIA2 T41 & T44 and KLS N42.

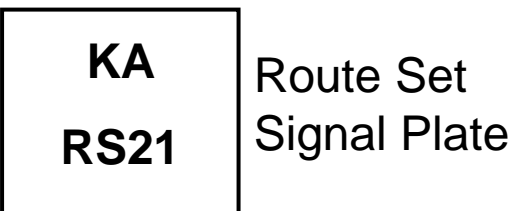
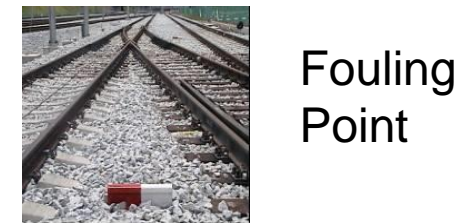
HAND SIGNAL

- Used where main or subsidiary signals and signal boards are unavailable or impractical.

- Signal Aspect **Red: STOP** • **Green: PROCEED** • **Yellow: CAUTION**
- The signal lamp used to perform hand signals shall be capable of displaying **Red**, **Yellow** and **Green** lights.
- Visibility of at least 50m must be ensured.

Meaning	Hand Signal	Night Hand	Flag (Day)
Proceed! Resume Authorised Speed!	One arm out-stretched parallel to ground 	One arm out-stretched with Green signal lamp 	One arm out-stretched with Green signal flag/rounded device 
Slow down. Caution. Prepare to stop	One arm out-stretched and waving down/up from side 	One arm out-stretched and waving down/up from side with Yellow signal lamp 	One arm out-stretched and waving down/up from side with Yellow signal flag 
Stop! Come to a full stop before the signal	Arms out-stretched with upright forearms 	One arm outstretched with Red signal lamp 	One arm outstretched with Red signal flag/rounded device 

PERMANENT MARKERS & SIGN BOARDS



PERMANENT



Stop Marker



Stop Marker
With
Hazard Light



Speed Limit
Board



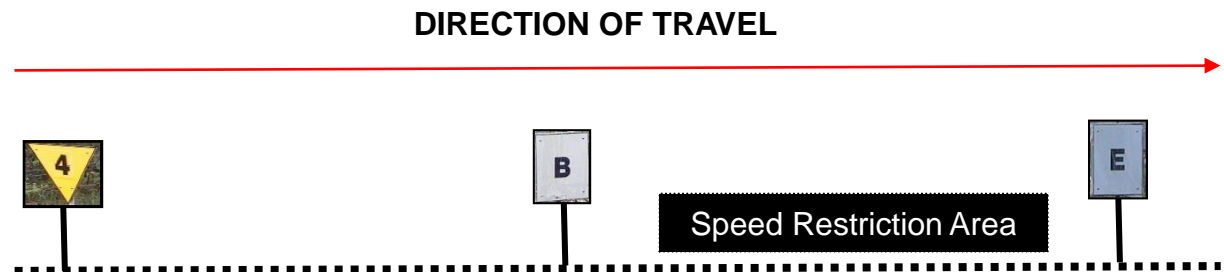
Beginning of
Speed Restriction
Board



Ending of
Speed Restriction
Board

TEMPORARY

SPEED RESTRICTION BOARDS



ENTERING DEPOT – FROM NORTHERN SIDE



Main Signal
Permanent Red
(Home)
ST
T26

Shunting Signal
D3



BEFORE PROCEED
OBSERVE SIGNAL ASPECT &
ACTIVATE WARNING DEVICE
(HORN)

LEAVING DEPOT – FROM NORTHERN SIDE

Main Signal
(Additional Exit)
ST
N46



WARNING

BEFORE PROCEED
OBSERVE SIGNAL ASPECT &
ACTIVATE WARNING DEVICE
(HORN)

Shunting Signal
D2

ENTERING DEPOT - FROM SOUTHERN SIDE



Main Signal
Permanent Red
(Exit)
ST
N36

Shunting Signal
D73

WARNING

BEFORE PROCEED
OBSERVE SIGNAL ASPECT &
ACTIVATE WARNING DEVICE
(HORN)

LEAVING DEPOT – FROM SOUTHERN SIDE



Main Signal
(Exit)
ST
T36

Call on
Signal

Shunting Signal
D72



BEFORE PROCEED
OBSERVE SIGNAL ASPECT &
ACTIVATE WARNING DEVICE
(HORN)



THE END



Have a
Great Day!