LOCOMOTIVE CORRESPONDENCE COURSE

ENGINEDRIVERS INTERPRETATIONS AND ERRORS IN THE PERCEPTION OF RAILWAY SIGNALS

LESSON 22

Rule 53. Obedience MUST be given to all signals and employees are not allowed to judge of the necessity for signals unless compliance therewith is likely to lead to danger.

A signal is a means of passing information to the locomotive crew. It could be a hand or fixed signal all of which are covered in the rule book. For the purpose of this exercise we shall deal with automatic signals, and there are two types - Searchlight or Multi-aspect.

Searchlight signals are used for long range purposes on main lines; they have a very efficient optical system which produces an intense narrow beam of light, the colour displayed depends on the position of the three coloured roundels which are placed as required in the path of the light by an electrically driven mechanism mounted inside the signal head. One polarity will cause the green aspect to show, the opposite polarity the yellow aspect to show, and when no power is supplied to the motor the red aspect will show.

Multi-aspect signals have three colour aspects in each head, and are controlled by selection over relays and levers in the main relay shelter and signal box, and providing conditions for a particular move have been fulfilled and it proves safe, a live circuit will be established to the signal and the appropriate aspect displayed.

Electrical circuits that are used in setting up a route and a proceed indication on a signal are so locked to prevent conflicting moves. This is done by the signal control lever or relay being "approach locked" and back locked.

"Approach locking" prevents a clear signal to which a train is approaching from being fully restored to normal and a conflicting route from being set up. The signal itself can be restored to danger at any time, in case of emergency.

"Back locking" prevents a signal lever from being restored to normal position or the normal interlocking relay from being energised until the train has cleared all points on the route; this back locking prevents a set of points from being moved at any time while they are occupied by a vehicle.

OBEDIENCE TO SIGNALS AND WHY

The following show the sources of perceptual error and the explanation following is to assist you overcoming these faults.

At least six possible perceptible errors can be defined, four of these involve a complete failure to see the signal.

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1. Not knowing where it is, or where the train is in relation to the signal.

2. Accepting another signal in place of the correct one.

3. Doing something else during the time when the signal was visible.

4. Accepting some other source of information, even when the locomotive crew can see the correct signal.

5. Inadequacies in the presentation of the aspect, or the locomotive crew's sensory capacities being impeded.

6. Illusory effects by which the crew perceives the aspect as being other than what it is. Let us consider these possibilities in turn.

INCORRECT ASSESSMENT OF POSITION

In normal circumstances the Enginedriver has accurate and precise knowledge of the position of his train at any point of the journey, and is able to anticipate when the next signal will appear and this is very important because some signals are only visible for very short periods. If an Enginedriver misses a signal he becomes uncertain of his position or believes himself to be other than where he is; this aspect during fog can lead to danger. This is more so where two or more tracks are signalled for the same direction; if in doubt stop and re-locate yourself or determine which track you are on. The possibility of error in this situation is illustrated by the case of an Enginedriver of a goods train standing on the loop who thought that the train that had to pass him had in fact done so, and in the fog thought the main line caution signal was his signal and on moving ahead ran through the trap points passing the loop signal at danger. It cannot be over stated that during your time as Locomotive Assistant it is essential that you establish in your mind the location of signals.

SELECTING THE WRONG SIGNAL

When an Enginedriver is presented with a display of signals only one of which relates to the track on which he is travelling and there is more than one move towards the signals, it is possible he may know which track he is on yet select incorrectly another signal being displayed. If in doubt stop and recheck your position. Should it be a station yard and the signal applies to more than one move, await instructions from the member in charge. On the main line as far as possible signals are located on the left hand side of the track and with most diesel electric stock this means in some cases you rely on the Locomotive Assistant to quickly interpret the signal aspect. Even when the relative positions of a signal displayed is considered. a change in aspect of another signal in a similar position, if the crew is not alert could cause the crew member to select that signal in place of his own. This could lead to a collision of converging trains or shunting moves. Only by becoming familiar with the tracks and yards through which you pass can this type of accident be avoided.

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DISTRACTION

The correct assessment of his position enables the Enginedriver to anticipate the appearance of the next signal, providing he is not doing something else at the critical moment. Activities in the cab should be so regulated that when approaching road crossings and signals both crew members are disengaged; should however an unexpected fault occur while the locomotive is in motion it is essential that one member pay strict attention to signals, otherwise a signal could be missed.

With front end driving cabs, which offer views with a greater variety of potential distractions, subjective thoughts alone may be sufficient to divert an Enginedriver's attention and it is easy to imagine the situation where a crew lapses into a reverie and wake up to find themselves past a signal. In some areas the monotony of looking for signals, especially on routes well known, at some stage may result in a general lowering of vigilance and may increase the tendency to pursue subjective thoughts, or fall asleep. Inattentiveness may also be induced by physical fatigue brought about not only by shift work but the member's personal activities when not at work.

FAILING TO LOOK AT SIGNAL

An Enginedriver may sometimes fail to look at a signal correctly because of deficiencies in the physical characteristics not only of the signal but also between the signal and its background; this is more so with semaphore signals, than with automatic signals. The possibility of an Enginedriver's perception likewise can be affected by his physical or physiological outlook.

PERCEPTIVE ILLUSION

When an Enginedriver fails to see a signal because of the previously stated conditions these can only be proved by inquiry as to who was at fault, the Enginedriver or the signal. Cases have been stated where an Enginedriver indicates he saw a yellow when in fact it was red. These can only be proved by detailed examination of signalling equipment in relation to train movements. Enginedrivers are trained to perceive signals correctly and not to make errors. Observations of drivers at work leads one to believe that this assumption is well founded; crews display a great interest in their work, which to the layman is quite exceptional and leads them to spend a fair amount of leisure time in studying the operations of the railways in general.

It seems reasonable to conclude that the Enginedriver is highly motivated and that if he does make an error, it is not due to any lack of conscious endeavour to perform his work well.

In conclusion, the aim of this paper has been to suggest some of the causes of error in the perception of railway signals by train crews.

LESSON 22

QUESTIONS

1. (a) When are trains permitted to run ahead of time? R.153
   (b) When are trains not permitted to run ahead of time? R.152-R153

2. When and for what purpose are curve warning boards erected? R.154.

3. When a train running "clear of all" other trains is in an Open Section or Single Line Automatic Area and enters an Unattended Station to allow two timed trains to cross, what information must the Enginedrivers of the timed trains receive? R.165.

4. (a) What is the instruction regarding the interval between trains in an "Open Section"?

   (b) What is the instruction regarding trains setting back in an "Open Section"? R.168

5. In a "Double Line Area" what precautions must the Enginedriver take when he observes a train standing on the opposite running line? R.183

6. What are the instructions regarding defective tank wagons on a train? R.236

7. What is the instruction regarding the running of unpiped or defective vehicles? R.251

8. When and for what purpose and in what areas are the following forms used:- Mis 21-29-31-39-46?
   Tab.Reg.32-33, R96-73. Tab.Reg.22

9. What speed must be observed when tablets are exchanged-
   (a) Where automatic tablet exchangers are not in use?

   (b) Where automatic tablet exchangers are in use? Tab.Reg.3

10. When can the Signalman NOT authorise shunting outside "Station Limits" without a tablet? Tab.Reg.9

11. (a) When can the Signalman authorise trains to shunt outside "Station Limits" without a tablet?

    (b) What is the limit of travel under these conditions? Tab.Reg.9

12. On whose authority can an Enginedriver proceed with his train and what would he be instructed to do if the O.C.T.R. has not received security telegrams from all stations in the area to be suspended under "Safeall Authority"? Tab.Reg.20

13. When running under "Safeall Authority"-
    (a) What signals does the "Safeall Train Advice authorise the Enginedriver to pass at "Stop"?

    (b) At what speed must trains travel over facing points at stations where signals are suspended? Tab.Reg.20

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14. When a train is scheduled to run without a tablet on "Safeall Authority" what action must be taken by the Station Staff to stop this train at a station where signals are suspended

(a) How is this done?

(b) What undertaking must the Enginedriver of a light locomotive send to the O.C.T.R. on arrival at the end of the suspended area? Tab.Reg20.

15. When tablet working and signalling have been suspended, under what conditions may tablet working be resumed? Tab.Reg20.

16. When a train running under tablet encroaches on the time of a train authorised to run under "Safeall Authority", what is the procedure? Tab.Reg.20.

17. When a Signalman is unable to communicate with the Signalman at the other end of the section whose permission is required to obtain a tablet on what authority may trains proceed? Tab.Reg21.

18. What instructions are issued to the Enginedriver when a "Switch Out Station" is opened or closed at an unusual time and what are the Enginedriver's duties regarding these instructions?Tab.Reg22.

19. Where it is provided in the W.T.T. or T.A. that a "Switch Out Station" will switch out after a specified train has cleared but this train is running late, what advice will the Enginedriver require before proceeding? Tab.Reg.22.

20. If an Enginedriver approaching a "Switch Out Station" at which staff are not on duty finds incorrect or imperfectly displayed signals exhibited by either semaphore or colour light signals, what action must be taken before the train proceeds? Tab.Reg.22.

21. Describe all procedures that can be used to clear a disabled train from a "Tablet Section". Tab.Reg.27.

22. A train is derailed and has become an obstruction. Describe the procedure to clear the "Tablet Section" by working trains from each end of the section to the point of obstruction.Tab.Reg28

23. A train locomotive fails while an assisting locomotive is attached at the rear and can only be moved to the station in the rear, what must be done to clear the section by removing the train in two parts? Tab.Reg29-31. R74-75.

24. List the circumstances when "Pilot Working" will be instituted. Tab.Reg.33.

25. State how and when a tablet damaged in delivery may be used to run a train through the section. Tab.Reg.35.