

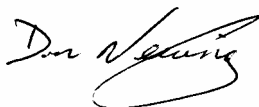
DIS137

Directional Interlocking

Issue 3

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Approved by:

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SSI Signalling Principles Group**SSISPG DIS-137:
Directional Interlocking****1. DOCUMENT STATUS**

This is an approved SSI Signalling Principles Group (SSISPG) discussion paper. Draft 2 was approved at the SSISPG meeting on 14th March 2007, subject to minor amendments incorporated in Issue 3.

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3. PURPOSE OF PAPER

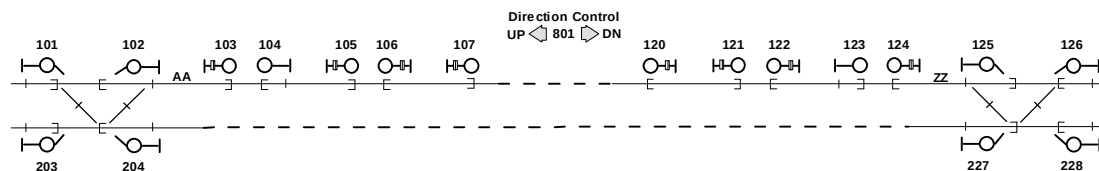
The purpose of this paper is to obtain approval from SSISPG for the data intended to control directional interlocking of bidirectional sections on the Trent Valley Four Track, Colchester-Clacton and other resignalling schemes.

This paper does not cover operation by ARS, or where signals are relay-controlled from an SSI.

4. INTRODUCTION

The Trent Valley Four Track (TV4T) and Colchester-Clacton resignalling schemes include several long, bi-directionally-signalled auto sections. These are to be signalled in accordance with the principles outlined in the document "Reversible Working Intermediate Signals" ver.3, produced by NR's Principles Signal Engineer North. This DIS paper describes the data methods to be used to achieve this. It is anticipated that the same methods will be used on other schemes, hence the controls are described in generic terms.

5. PRINCIPLES



Before setting a route onto the bidirectional section, the signaller has to first establish the line direction, using a separate direction-control. In the above layout, with the direction-control 801 set for the down direction:

- routes onto and within the bidirectional line in the down direction can be set (routes 101A, 203A and 123),
- all routes onto and within the bidirectional line in the up direction are locked out (routes 104, 126B, and 228B),
- all the automatic signals for the down direction can clear as usual,
- all the automatic signals for the up direction will be held at red, and
- all the AWS magnets for the up direction signals will be suppressed.

And contrariwise with the direction-control set for up direction moves.

Conventional opposing locking will be provided between the controlled signals reading on and off the section, e.g. between 101A, 203A, 102B and 104 routes. It will not be necessary to apply opposing locking between routes at opposite ends of the section, as this will be achieved through the direction-control. For example, 101A will require the direction-control set for the down-direction, while 126B will require the direction-control set for the up-direction, so there is no need for any direct locking between these two routes.

Note that the exit signals, 102 and 125, are NOT interlocked with the direction-control. This allows a train that has just entered the bidirectional section to be routed back out again, without having to change the direction-control for the whole line (which might not be possible, if there is another train further down the bidirectional section).

Changing the direction-control will require that there are no routes set into or within the section, and that the section is clear. Proving that the section is clear will prevent the direction-control from being changed if a train has been called-by into section without route-locking, e.g. if a fault has prevented the setting of route 101A. The section is proved clear for 15 seconds to cover intermittent loss of train detection (the equivalent of the 15 second track -clear time in sub-route locking); the 15 seconds is not necessary if all sections are detected by axle-counter. Proof of route-locking free is required to cover a train in-route between the entry signals (101, 203, 126 and 228) and the first section-track. Because all section tracks are proved clear, proving of subsequent route-locking within the bidirectional section from 101, 203, 126, 228 or from 123 or 104 is un-necessary.

After interlocking start-up, any previously-set direction may no longer be appropriate, so the direction-control will be undefined until set by the signaller. In this case, the signaller will be allowed to set the direction-control with the section occupied, in order to deal with trains already in section.

A facility will be provided on the Technician's Terminal to bar the direction - control from being changed.

If a lockout system is provided that locks-out only wrong-direction moves, then this should be interlocked with the direction-control. Giving the lockout release should prove that the direction-control is set for normal-direction running, and setting the wrong-road direction-control should prove that the lockout is normal and in traffic mode.

If a lockout system is provided that locks-out both directions of running, then it will not be interlocked with the direction-control.

6. SIMPLE EXAMPLE

First consider a simple example, with no SSI boundaries.

The following identities are required for the 801 direction -control:

T801: this is a summation track identity. It is set in IPT, using the track combination command, testing all track-sections between the two exit signals 102 and 125.

R801(UP) this route is set when 801 is set for up-direction moves.

R801(DN) this route is set when 801 is set for down-direction moves.

The relevant R801 route set should be tested in the QST data of all routes reading into and within the section, and in the aspects of all controlled and