

TECHNICAL INSTRUCTION

TI 026
Issue 1
February 2006
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NETWORK RAIL - SIGNAL ENGINEERING

TPWS Loop Positioning – Minimum Separation

Relevant Standard: NR/SP/SIG/10138, Issue 3, April 2004

Thales has revealed that the trainborne TPWS equipment fitted to over 95% of rolling stock is not fully compliant with the design standards used to determine loop positioning. During investigation of this issue it was also revealed that the company standard has misinterpreted the original information provided compounding the problem.

Thales has requested a Temporary Non-Compliance Pending Standards Change to bring its equipment into compliance with the maximum hold-on timer value specified in the Group Standard (GE/RT 8030). This change has a minimal effect. However it is necessary to align the Company Standard with the revised timer value and correct the existing error within the standard.

Signal Designers should note that:-

The rules for positioning of the TPWS transmitter loops are formulated to prevent the trainborne equipment from incorrectly pairing arming and trigger loops. The correct arming loop must always be paired with the correct trigger loop to ensure the system intervenes when required and, conversely, unwarranted interventions are avoided. When the same direction frequency sets are used for two successive TSSs, or between an OSS and TSS, the distance between the loops must be sufficient to ensure that a vehicle making an opposite direction move cannot encounter the second loop whilst the trainborne sub-system is holding detection of the arming frequency (governed by the hold-on timer).

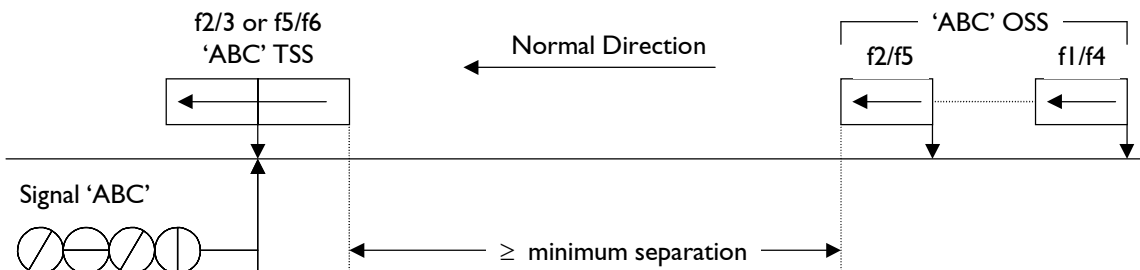
The minimum distances given in NR/SP/SIG/10138 are based on a maximum hold-on timing of 150ms as specified in GE/RT8030. Thales has stated that with component tolerances this could be 155.1ms and, given the potential for changes to components, should be considered as 160ms. For the purpose of loop positioning, a value 160ms will now be used. The error in the company standard was to measure the loops from trailing edge to trailing edge instead of the actual loop separation (trailing edge to leading edge) and to ignore any loop lobes, effectively distorting the field and making the detected separation smaller than the physical separation.

An updated version of NR/SP/SIG/10138 will be issued in due course. Pending the publication of the updated version, the current version of NR/SP/SIG/10138 (Issue 3, April 2004) should be applied subject to the following amendments as a result of the change to the timer value and to correct the measuring error:

Appendix A

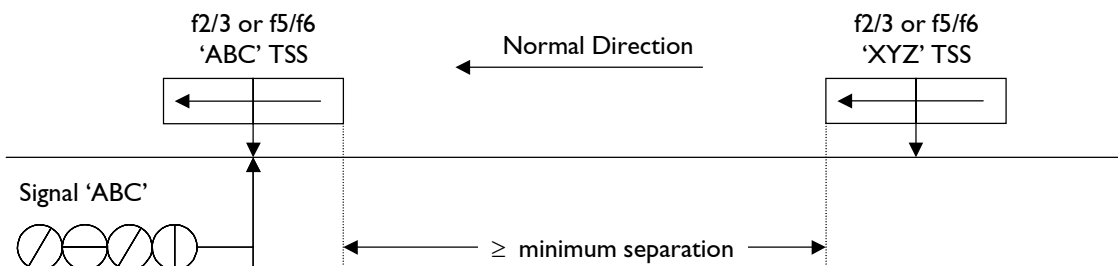
Paragraph a) - Replace "10 metres" with "11 metres".

Replace the existing figure A.1 with the following figure:



Note: in above diagram f2/3 TSS must not be paired with f1 and f2 OSS and f5/f6 TSS must not be paired with f4 and f5 OSS. The alternative combinations are allowed without minimum separation.

Replace the existing figure A.2 with the following figure:



Note: in above diagram f2/3 TSS must not be paired with another f2/3 TSS and f5/f6 TSS must not be paired with another f5/f6 TSS. The alternative combinations are allowed without minimum separation.

In first bullet of the section titled "Basis for calculating reduced minimum separation distances of OSS and TSS when active together" replace "(max 150mS)" with "(max 160mS)"

In the paragraph beginning "Refer to Figures A1" replace "150 mS" with "160mS". Add a new sentence stating "It should be noted that the 160ms time applies from the moment a train leaves the field area of one loop until detection of the field area of the next loop. The field may be distorted by the train under floor equipment extending the effective area beyond the loop. The distances given and the method of calculation thus include an allowance of 2 metres to accommodate these factors."

In the paragraph beginning "Refer to Figures A2" replace "150 mS" with "160mS". Add a new sentence stating "It should be noted that the 160ms time applies from the moment a train leaves the field area of one loop until detection of the field area of the next loop. The field may be distorted by the train under floor equipment extending the effective area beyond the loop. The distances given and the method of calculation thus include an allowance of 2 metres to accommodate these factors."