

Ref	NR/GN/SIG/50013
Issue	I
Date	February 2003

Methodology for the demonstration of compatibility with interlockings (formerly RT/E/C/50013)

This temporary front sheet facilitates change to the new Network Rail Standards referencing nomenclature.

The Ref above will be formally allocated to this standard when it is next changed in the meantime the contents, date and issue number of this Network Rail Standard are UNCHANGED and with immediate effect it should be referred to as “(new ref) formerly (old ref)”.

This document is the property of Network Rail. It shall not be reproduced in whole or part nor disclosed to a third party without the written permission of the Standard Owner.

© Copyright 2004 Network Rail

Uncontrolled copy once printed from its electronic source.

Published & Issued by: Network Rail; 40 Melton Street, London NW1 2EE



Railtrack Company Code of Practice

METHODOLOGY FOR THE DEMONSTRATION OF COMPATIBILITY WITH INTERLOCKINGS

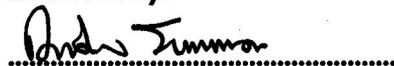
This document is the property of Railtrack PLC, part of the Network Rail group of companies.

It shall not be reproduced in whole or in part, nor disclosed to a third party, without the written permission of the Standard Owner.

© Copyright 2002 Railtrack PLC, part of the Network Rail group of companies.

ENDORSEMENT & AUTHORISATION

Endorsed by:



A Simmons, Professional Head of Signal Engineering

Accepted for issue by:



P McAleer, Acting Head of Business Standards

Authorised by:



A McNaughton, Chief Engineer

ISSUE RECORD

ISSUE	DATE	COMMENTS
I	February 2003	New Code of Practice

IMPLEMENTATION

The provisions of this code of practice may be used from the date of issue.

DISCLAIMER

Railtrack PLC, part of the Network Rail group of companies, has used its best endeavours to ensure that the content, layout and text of this document are accurate, complete and suitable for its stated purpose. It makes no warranties, express or implied, that compliance with the contents of this document shall be sufficient to ensure safe systems of work or operation. Railtrack PLC, part of the Network Rail group of companies, will not be liable to pay compensation in respect of the content or subsequent use of this document for any purpose other than its stated purpose or for any purpose other than that for which it was prepared except where it can be shown to have acted in bad faith or there has been wilful default.

SUPPLY

Copies of documents are available electronically, within Railtrack's organisation. Hard copies of this document will be available to Railtrack staff on request to the Document Controller and to other organisations from Technical Indexes Ltd (01344 404409).

Published & Issued by **Railtrack PLC (part of the Network Rail group of companies)**
Railtrack House
Euston Square
LONDON
NW1 2EE

Contents

1. INTRODUCTION.....	4
1.1 PURPOSE	4
1.2 SCOPE	4
2. SOURCE DOCUMENTS.....	4
2.1 PREVIOUS SAFETY CASE DOCUMENTATION	4
2.2 OTHER STANDARDS	5
2.3 OTHER DOCUMENTS	5
2.4 IDI DOCUMENTS.....	5
3. DESCRIPTION OF EQUIPMENT.....	6
3.1 ROUTE RELAY INTERLOCKING (RRI).....	6
3.2 SOLID STATE INTERLOCKING (SSI).....	6
3.2.1 <i>Control Centre Equipment</i>	7
3.2.2 <i>Trackside Functional Modules (TFM)</i>	7
3.2.3 <i>Data Links</i>	8
4. INFRASTRUCTURE ASSUMPTIONS	8
5. SUSCEPTIBILITY ANALYSIS.....	8
5.1 RADIATED, CONDUCTIVE AND INDUCTIVE INTERFERENCE-RELAY INTERLOCKING ..	9
5.2 LARGE RAIL-TO-EARTH VOLTAGES CONDUCTED INTO TFM	9
5.2.1 <i>Generation of Voltage Spikes</i>	9
5.2.2 <i>Capacitive Coupling</i>	10
5.2.3 <i>Magnitude of the Spikes</i>	10
5.2.4 <i>Effect of Spikes on SSI</i>	11
6. METHODOLOGY FOR DEMONSTRATION OF COMPATABILITY.....	11
6.1 RELAY INTERLOCKING CASE	11
6.2 SSI INTERLOCKING CASE	12

I. INTRODUCTION

I.1 Purpose

The purpose of this document is to provide a methodology to demonstrate compatibility with interlocking systems installed on the a.c. and d.c. electrified railway on Railtrack controlled infrastructure. This is achieved by specifying criteria/standards against which test results from new rolling stock should be compared to enable a safety case to be made.

I.2 Scope

This document covers:

- Route Relay Interlocking (RRI) systems installed on a.c. and d.c. electrified Railtrack controlled infrastructure. This only includes relay room installations. External line circuits, TDM systems and vital Reed FDM systems which may form part of the interface between the RRI and trackside equipment are covered by other IDI documents [14, 15, 16].
- Solid State Interlocking (SSI) systems installed on a.c. and d.c. electrified Railtrack controlled infrastructure. This includes control centre equipment and Trackside Functional Modules (TFMs) which are manufactured by Westinghouse and ALSTOM in accordance with Railtrack specifications. Data Links (TDLs) and Long Line Links (LLL) which are used to send SSI data are covered by another IDI document [16].

Note: In the context of this document, “Solid State Interlocking” refers to the system developed by the British Railways Research Division in the 1970s and completed under a tripartite agreement between BR, GEC General Signal Ltd and Westinghouse Signal Ltd. This document does not cover other types of computer based interlockings.

2. Source Documents

2.1 Previous Safety Case Documentation

1. “Juniper Project – Electric Traction Interference: Non Track Circuit Systems” AEA Technology Rail Ref. PRJ-SCSE(JUN)-RP-16, Issue 2, September 1998.
2. “Compatibility of Class 357 Electrical Systems with Miscellaneous Systems on LTS Routes”, ADtranz Ref. 3EER300000-1179, Issue D, July 2000.
3. “Class 365/5 Trains: AC Full Service EE&CS EMC Safety Case Assessment-Module 3 Other Signalling Systems”, AEA Technology Ref. PRJ-SCSE(ELAC)-SA-18, Issue 2,