owner and maintainer of the nsw rail network

RAIL INFRASTRUCTURE CORPORATION

Discipline
Rolling Stock Engineering Standard

Category
Maintenance

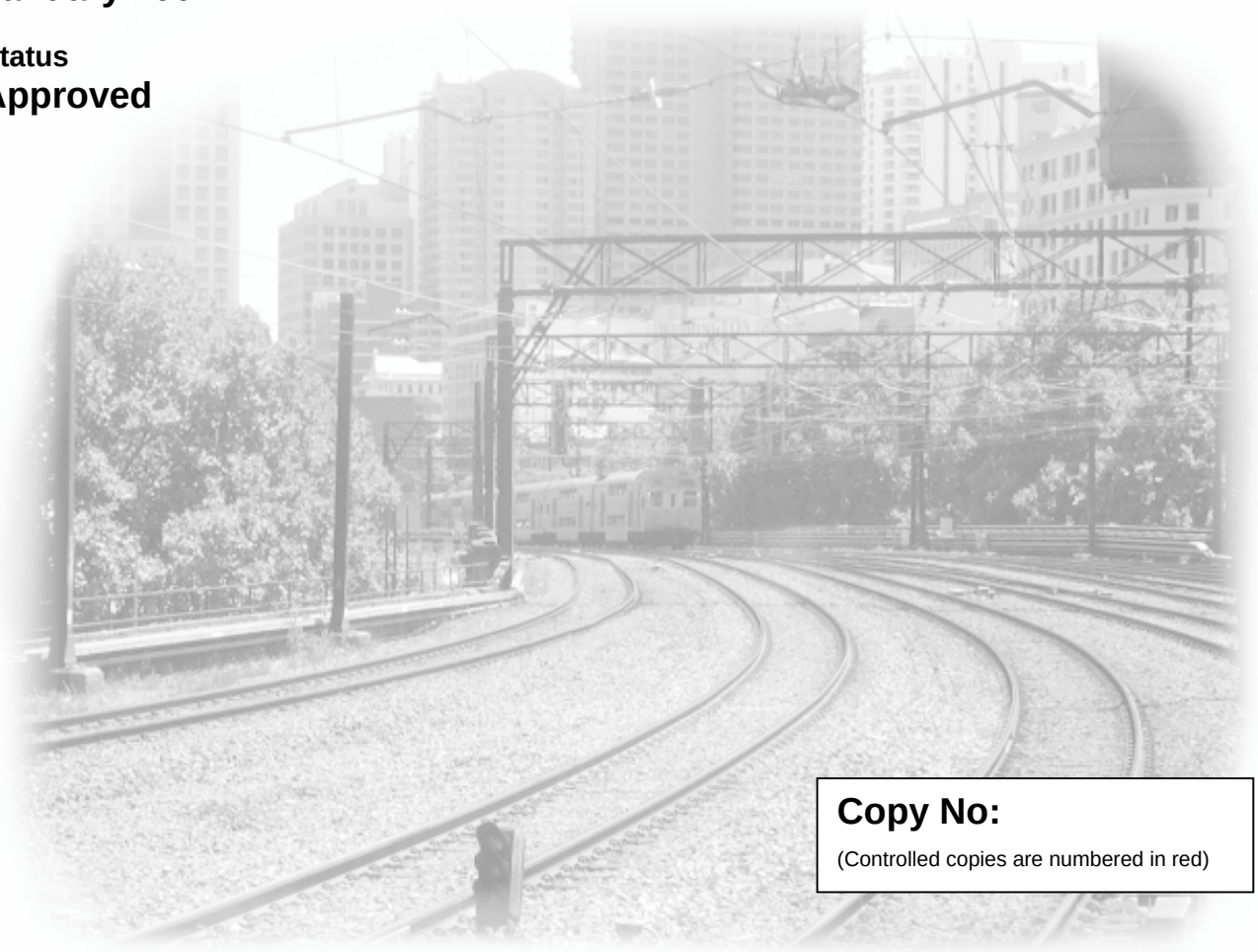
Title
APPLICATION OF NON DESTRUCTIVE TESTING

Reference Number
RSS 0072

Version
1.0

Date of Issue
January 2004

Status
Approved



Copy No:

(Controlled copies are numbered in red)

DISCLAIMER

Rail Infrastructure Corporation has used its best endeavors to ensure that the content, layout and text of this document is 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. Rail Infrastructure Corporation will not be liable to pay compensation in respect of the content or subsequent use of this document for any other purpose 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 willful default.

DOCUMENT APPROVAL

The technical content of this document has been approved by the relevant RIC engineering authority.

DOCUMENT SUPPLY and CONTROL

The Primary Version of this document is the electronic version that is available and accessible on the Rail Infrastructure Corporation Internet and Intranet website.

It is the document user's sole responsibility to ensure that copies are checked for currency against the Primary Version prior to its use.

Controlled hardcopy versions of this document will be issued by the Principal Engineer Rolling Stock & Mechanical Assurance.

Controlled hardcopy versions of this document may be made and issued to sub-contractors if they are registered using a local document management and distribution system.

When controlled hardcopy versions are issued using a local document management system each copy is to be uniquely identified in the Control Box provided on the front of the document. The identifier used must identify the local distribution centre and the copy number. The identifier is to be marked using a colour other than black or grey.

COPYRIGHT

About This Standard

This standard is based on the following TRS Standard:

TRS 1356 Specification for Application of Non- Destructive Testing.

Version History

Version 1.0

January 2004

This page has been intentionally left blank

Table of Contents

This page has been intentionally left blank

1 Scope

This standard specifies the relevant Australian Standards and certain other requirements for the applications of DDT methods. It is applicable to the manufacture and repair of all railway components that require NDT to demonstrate conformances to quality standards.

2 Types of Tests

The test methods in common use include:

2.1 Surface Methods

These are for detecting surface cracks and discontinuities.

- Magnetic Particle Inspection (MPI) to AS 1171
- Dye Penetrant Inspection (DPI) to AS 2062

2.2 Sub Surface Methods

These are for determining the extent of surface cracks and discontinuities, and detecting internal cracks and defects.

- Ultrasonic Inspection (UI) to AS 2207
- Radiographic Inspection (RI) to AS 2177

These methods may be used individually or in combination.

3 Application of NDT

NDT is applied to welds and components as required by application codes, Statutory Authority direction or when a new need becomes apparent.

3.1 NDT Specified by an Application Code

Many railway components are covered by application codes (eg Australian Standards, RSS standards and Workshop Procedures) which specify NDT requirements.

Examples of application codes are:

Unfired Pressure Vessel Code	AS 1210
Structural Steel Welding Code	AS 1554
Aluminium Welding Code	AS 1665
Welding of Stainless steel	AS1554.6
Welding of steel castings	AS 1988
NDT of Axles	RSS 0033
Boiler and Pressure Vessels – In Service Inspection	AS 2788
Pressure Piping	AS 4041

3.2 Unspecified NDT

Selection of an appropriate method for any component depends on factors such as material type, surface condition, mature of defect and access to the defect location.

Selection of the method may require expert assessment and drafting of a procedure. An operator with basic training can satisfactorily assess simple situations requiring MPI or DPI.

In all cases, testing shall be done to the appropriate application code, procedure and/or method code.

3.3 Procedures

All NDT operations shall have a written procedure. Simple operations may require only a general purpose procedure, but complex operations or tests on critical components should have a custom developed procedure.

4 Requirements for NDT Personnel

NDT operators require levels of training and experience which vary with the test method and the complexity of the component requiring testing. The minimum level of training required for basic testing is shown below. For all methods, further training is required to achieve full understanding of the method selection, procedure development and interpretation of application and method codes.

4.1 Surface Methods – MPI and DPI

These are simple methods which are commonly applied in workshops, depots and in the field. Personnel require at least a one day training course and supervision by an experienced operator during their initial testing operations.

4.2 Ultrasonic Inspection

Ultrasonic testing, interpretation, evaluation for code compliancy and reporting require high levels of training and skill. The minimum qualification normally required is acceptance by an Australian Institute of Non-Destructive Testing (AINDT) at technician level.

(Rail Flaw Detection Operators are trained in their specific operations.)

4.3 Radiographic Inspection

Because ionising radiation can severely damage living cells, paramount importance is given to safety issues in radiographic inspection.

Extensive training is required in safety, parameter selection and radiographic interpretation. Radiographers must be licensed by the Department of Health, Radiation Safety Branch.

The minimum qualification normally required is acceptance by the Australian Institute of Non-Destructive Testing (AINDT) at technician level.

5 References

5.1 RIC Standards

RSS 0033 Non Destructive Testing of Axles

5.2 Australian Standards

AS 1210	Unfired Pressure Vessel Code
AS 1554	Structural Steel Welding Code
AS1554.6	Welding of Stainless steel
AS 1665	Aluminium Welding Code
AS 1988	Welding of steel castings
AS 2788	Boiler and Pressure Vessels – In Service Inspection
AS 4041	Pressure Piping

6