

Australian Standard™

**Amusement rides and devices**

**Part 3: In-service inspection**



This Australian Standard was prepared by Committee ME-051, Amusement Rides and Devices. It was approved on behalf of the Council of Standards Australia on 18 July 2003 and published on 21 August 2003.

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The following are represented on Committee ME-051:

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Australian Amusement Leisure and Recreation Association  
Australian Industry Group  
Australian Ski Areas Association  
Department for Administrative and Information Services, S.A.  
Department of Infrastructure, Energy and Resources, Tas.  
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Inspection interests

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**STANDARDS AUSTRALIA**

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**RECONFIRMATION**

**OF**

**AS 3533.3—2003**

**Amusement rides and devices**

**Part 3: In-service inspection**

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Technical Committee ME-051 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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## NOTES

Australian Standard™

## Amusement rides and devices

### Part 3: In-service inspection

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-051, Amusement Rides and Devices, in response to a request from the Institution of Engineers, Australia. The Institution requested the Standard be prepared to outline what was required during the in-service inspection of an amusement ride or device so a set of competencies could be prepared for persons conducting such inspections and be used in a proposed accreditation scheme for inspection personnel.

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee ME-051. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

It should be noted that compliance with this Standard may not necessarily fulfil all legal obligations.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA

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**Australian Standard**

**Amusement rides and devices**

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**Part 3: In-service inspection**

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## 1 SCOPE

This Standard specifies the basis for in-service inspection of amusement rides and devices. The activities of all those involved in the operational (day-to-day) inspection and checking of the ride or device, the regular inspections related to preventative maintenance and the periodic inspection of the equipment, along with the documentation thereof, are specified.

This Standard does not apply to the in-service inspection of passenger ropeways. See AS 3533.2 for requirements for passenger ropeways.

## 2 OBJECTIVE

The objective of this Standard is to establish formats for the systematic in-service inspection of amusement rides and devices for use by interested parties, including ride proprietors, supervisors and inspection personnel, to promote safety of rides and devices.

## 3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

### AS

|        |                                                                                                                        |
|--------|------------------------------------------------------------------------------------------------------------------------|
| 1065   | Non-destructive testing—Ultrasonic testing of carbon and low alloy steel forgings                                      |
| 1171   | Non-destructive testing—Magnetic particle testing of ferromagnetic products, components and structures                 |
| 1710   | Non-destructive testing—Ultrasonic testing of carbon and low alloy steel plate—Test methods and quality classification |
| 1851   | Maintenance of fire protection equipment                                                                               |
| 1851.1 | Part 1: Portable fire extinguishers and fire blankets                                                                  |
| 2062   | Non-destructive testing—Penetrant testing of products and components                                                   |
| 2084   | Non-destructive testing—Eddy current testing of metal tubes                                                            |
| 2177   | Non-destructive testing—Radiography of welded butt joints in metal (series)                                            |
| 2207   | Non-destructive testing—Ultrasonic testing of fusion welded joints in carbon and low alloy steel                       |
| 2452   | Non-destructive testing—Determination of thickness                                                                     |
| 2452.1 | Part 1: Determination of the wall thickness of pipe by the use of radiography                                          |
| 2452.3 | Part 3: Use of ultrasonic testing                                                                                      |
| 2550   | Cranes, hoists and winches—Safe use (series)                                                                           |
| 2824   | Non-destructive testing—Ultrasonic methods—Evaluation and quality classification of metal bearing bonds                |
| 3507   | Non-destructive testing—Radiography of steel castings and classification of quality                                    |

**AS**

- 3533 Amusement rides and devices
- 3533.1 Part 1: Design and construction
- 3533.2 Part 2: Operation and maintenance
- 3978 Non-destructive testing—Visual inspection of metal products and components
- 3998 Non-destructive testing—Qualification and certification of personnel
- 4100 Steel structures
- 4544 Non-destructive testing—Eddy current testing for the detection of surface flaws
- 4544.1 Part 1: In non-ferromagnetic metallic products

**AS/NZS**

- 1554 Structural steel welding
- 1554.1 Part 1: Welding of steel structures
- 1554.2 Part 2: Stud welding (steel studs to steel)
- 1554.3 Part 3: Welding of reinforcing steel
- 1891 Industrial fall-arrest systems and devices (series)
- 2574 Non-destructive testing—Ultrasonic testing of ferritic steel castings
- 3002 Electrical installations—Shows and carnivals
- 3760 In-service safety inspection and testing of electrical equipment
- 3788 Pressure equipment—In-service inspection
- 4812 Non-destructive examination and discard criteria for wire ropes in mine winding systems

**4 DEFINITIONS**

For the purpose of this Standard, the definitions below apply.

**4.1 Amusement device**

Any arrangement of equipment through or on which a patron moves, where the desired effect is primarily achieved by virtue of the patron's self-powered motion or any other system that is not covered by the term 'amusement ride'.

**4.2 Amusement ride**

An arrangement of structural or mechanical elements (or both), which has as its prime function the provision of movement of patrons in some controlled manner such that the patrons are not necessarily required to move themselves to obtain the desired effect.

NOTE: Within this Standard the word 'device' may refer to an amusement ride or an amusement device. Some regulatory authorities may refer to amusement rides and devices as 'amusement structures'.

**4.3 Ancillary equipment**

Equipment forming part of the operational complement of the ride or device that is required, by AS 3533.2 or specific legislation, to comply with other Standards or requirements because of its specialized nature or purpose.

**4.4 Assembly**

The process of converting a ride or device from its condition for transport to that of being suitable for operation in the case of a mobile ride or device. For a fixed ride or device, the process of building up from 'as supplied' component parts.

## 4.5 Authority

The authority having statutory powers to enforce legislative requirements regarding the design, manufacture, installation, registration and operation of amusement rides and devices covered by this Standard.

## 4.6 Competent person

A person who has acquired through training, qualifications or experience, or a combination of these, the knowledge and skills enabling that person to perform a specified task.

NOTE: Appendix A provides suggestions for the training, qualifications or experience, considered appropriate to possess for the various competent persons referred to in this Standard.

## 4.7 Design

The preconceived scheme and substance of the ride or device contrived to achieve the purpose of the ride or device.

## 4.8 Failure

The cessation of the capacity of a component, element or assembly to undertake the task for which it is included in a design.

## 4.9 Fail-safe

A state or condition whereby, if any component of an amusement device fails, a system exists to prevent any increase of the assessed risk associated with the device.

## 4.10 Fault

An observed condition—

- (a) precedent to a failure and may include —
  - (i) corrosion;
  - (ii) wear;
  - (iii) cracking;
  - (iv) instability;
  - (v) unusual noise or vibration; or
  - (vi) any other discovery that a component is no longer suitable for purpose or is likely to become unsuitable for purpose; or
- (b) creating a risk to health and safety, e.g. sharp edges, trip hazards or a breakdown in electrical insulation.

## 4.11 Inspector

The competent person appointed by the proprietor to carry out the work of inspection as set out in this Standard.

## 4.12 Log

A medium for retaining records permanently, which may include electronic files, paper-based logs or logbooks as prescribed by regulation.

## 4.13 Manual

A document that is specific or particular to a ride or device and contains information as to the safe management of the ride or device in respect to aspects such as its transportation assembly, operation, maintenance, life or limitations.

#### 4.14 Operation

All aspects of the management and control of the ride or device while it is carrying people so that they experience the ride or motion that the ride or device is designed to supply.

#### 4.15 Operator

The person responsible for controlling or operating the controls of an amusement device.

#### 4.16 Passenger ropeway

A ropeway or cableway to which the motion of a prime mover is transmitted, used, or designed or intended to be used, for conveying in a horizontal or inclined plane passengers on skis, or supported by chairs, or enclosed in cars which are—

- (a) attached to or supported by a moving rope or cable; or
- (b) attached to a moving rope or cable but supported by a standing rope or cable, or other overhead structure,

and includes the prime mover and any transmission machinery, supporting structure and equipment, used or intended to be used in connection with a ropeway or cableway. It does not include equipment such as funicular railways, cog railways, cablecars running on rails or equipment such as flying foxes.

#### 4.17 Patron

A person participating in an amusement ride or device who does not require any formal training or previous experience to be able to participate in a safe manner.

#### 4.18 Proprietor

The person having, at any given time, the legal responsibility for the management of an amusement device, i.e. the owner or lessee of the device.

#### 4.19 Roller coaster

A device where patrons are transported in wheeled vehicles along a permanent track permitting (in part or in whole) the motion to be the result of the acceleration due to gravity. Such devices may be categorized as ‘inverting’ roller coasters where, by virtue of a rotation of the track, patrons attain an attitude of head below abdomen for at least some portion of the ride.

#### 4.20 Set-up

The situation of a ride or device remaining assembled for operation at any one location for a period of time.

#### 4.21 Site manager

The person or organization having legal control of the site at which a ride or device is set up.

#### 4.22 Supervisor

The person who, for the time being, is appointed by the proprietor of an amusement ride or device to oversee and manage the day-to-day operation and safety of the ride or device.

#### 4.23 Vehicle

Any carrier (e.g. car, gondola, chair, capsule, compartment or similar) on or in which patrons are supported, contained or carried when participating in an amusement ride or device.

## 5 TYPES OF IN-SERVICE INSPECTION

The following range of inspection activities is covered by this Standard:

(a) *Post-assembly inspection and test run*

This activity provides for the recognition of conditions due to site specific issues and issues related to that particular assembly that, for mobile or transportable rides and devices, may compromise the safety of the ride or device within the period of one set-up.

NOTE: This inspection is the responsibility of the proprietor. However, it may be delegated, under specified conditions, e.g. within a job description, to the supervisor.

See Clause 11.1.

(b) *Formal set-up inspection*

This activity provides verification of a post-assembly inspection, if called for by a site manager.

NOTE: A formal set-up inspection should be carried out by a competent person who is independent of the persons involved in the assembly of the device.

See Clause 11.2.

(c) *Daily inspection and test run*

This activity provides for the early recognition of conditions that can compromise the safety in operation of the ride or device within operations spanning a period of one day.

NOTE: This inspection is the responsibility of the proprietor. However, it may be delegated under specified conditions, e.g. within a job description, to the supervisor.

See Clause 11.3.

(d) *Annual inspection*

This activity encompasses such regular inspections as may be required by statute or, where such inspections are not legally required, the inspections determined in accordance with the annual inspection requirements in AS 3533.2.

Electrical systems and components shall be included in this activity. Inspection of electrical systems and components may be carried out by a suitably qualified competent person either independently of, or as a delegate of, the principal inspector.

NOTES:

- 1 The equivalent of an annual inspection should be conducted when there has been a change of ownership of the ride or device.
- 2 In some jurisdictions the qualifications of inspecting personnel are established by legislation.

See Clause 11.4.

(e) *Major inspection*

This activity is to provide a thorough basis for an assessment of the prospective life of an amusement ride or device in certain circumstances (see AS 3533.2).

Electrical systems and components shall be included in this activity. Inspection of electrical systems and components may be carried out by a suitably qualified competent person either independently of, or as a delegate of, the principal inspector.

NOTE: In some jurisdictions the qualifications of inspecting personnel are established by legislation.

See Clause 11.5.

(f) *Designer and manufacturer stipulated inspections*

This activity encompasses any particular maintenance inspection, test or procedure that is indicated as mandatory within the original manuals or other documentation provided at the time of supply or are advised to a proprietor or otherwise made public, from time to time, by the designer, manufacturer, importer or supplier of a ride or device.

NOTE: If the frequency of the inspection, test or procedure is not determined by the original designer or manufacturer, the frequency should be established by a competent person.

See Clause 11.6.

(g) *Ancillary equipment inspection*

This activity is to provide for the in-service inspection of ancillary equipment to ensure it is monitored in an appropriate manner.

See Clause 11.7.

## 6 INSPECTIONS INVOLVING MULTIPLE DISCIPLINES

For some inspections, a single inspector may not have all the competencies required for all aspects of the inspection. An inspector undertaking such inspections shall use the services of other competent persons for aspects outside his or her qualifications. For example, an inspector may be a qualified structural engineer but may need to refer the inspection of electrical equipment or pressure vessels to other competent persons.

## 7 INSPECTIONS BY IN-HOUSE PERSONNEL

At any time, any inspection may be carried out by the proprietor of a ride or device or by competent personnel nominated by the proprietor. The proprietor may instigate such inspections, particularly if any of the following conditions arise:

- (a) An incident relating to the ride or device or similar equipment.
- (b) The receipt of information from—
  - (i) employees or other persons;
  - (ii) the designer or manufacturer (manufacturer's bulletins);
  - (iii) the industry in general (word of mouth, publications, Internet or other sources);
  - (iv) an engineer competent to provide advice; or
  - (v) a regulatory authority.

Where the proprietor determines to employ his or her own personnel in the conduct of inspections of types listed in Clause 5, Items (d), (e), (f) or (g), there shall be a quality system within the organization that either—

- (A) conforms to recognized Standards and is audited on a regular basis; or
- (B) is subject to regular reviews and check inspections carried out by an independent competent person so as to verify the performance of in-house personnel.

Inspections carried out in-house shall be conducted as specified in Clause 11.

## 8 CLASSIFICATION OF RIDES

If the ride classification has not been recorded in the log, prior to carrying out an inspection, a competent person shall classify the ride in accordance with AS 3533.1 and that classification shall be recorded in the log.