Amusement Device Safety Council

Safety of Amusement Devices: Non-Destructive Testing

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Safety of Amusement Devices: Non-Destructive Testing

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Contents

Foreword

This document, through consultation and the review and analysis of guidance, promotes improvements to the existing guidance on Non-Destructive Testing (NDT) in the fairground and amusement park industry.

Current industry specific guidance on NDT exists in the following documents:

- HSG175: Fairground and amusement parks – Guidance on safe practice, second edition (2007)
- ADSC Safety of Amusement Devices: Part 1 Inspection - In Service Annual Inspection (2008)
- ADSC Safety of Amusement Devices: Design, second edition (2006)
- HSE Research Report - A review of the design review process for fairground rides RR524 2007
- ADIPS Guidance Note GN 02:09:2006, Requirements for the provision and use of schedules for Non-Destructive Testing (NDT)
- ADIPS Guidance Note GN4 06:2010, In-service annual inspection: Role of NDT and mechanical/structural Inspection Bodies.

Although the review of NDT guidance has not significantly changed the existing recommendations, it has identified a need to clarify, update and strengthen previous guidance and consolidate it into one comprehensive document.

This document is published by the Amusement Device Safety Council (ADSC), which comprises the following industry Trade Associations:

The Amusement Catering Equipment Society (ACES)
The Amusement and Leisure Equipment Suppliers of the UK (ALES-UK)
The Association of Independent Showmen (AIS)
The British Amusement Catering Trade Association (BACTA)
The British Association of Leisure Parks, Piers and Attractions (BALPPA)
The National Association for Leisure Industry Certification (NAFLIC)
The Showmen's Guild of Great Britain (SGGB)
The Society of Independent Roundabout Proprietors (SIRPS)

The ADSC is supported by the Health and Safety Executive HSE), who have provided the following foreword:

'The Health and Safety Executive was consulted in the production of this publication. It endorses the sensible, proportionate, reasonable and balanced advice and guidance to owners, inspectors and testers on managing the risk from inadequately inspected and tested fairground equipment.'

Aim and scope of guidance

This guidance aims to cover the NDT requirements for controllers, inspection bodies (IB's) and NDT practitioners. In addition, it makes reference to NDT information expected from designers, manufacturers, suppliers and importers.

This guidance aims to address for each of the principle parties:

- roles and responsibilities
- competencies
- document compliance
- inspection review and reporting requirements
- NDT schedules
- dealing with reported defects.

This guidance also sets out the requirements for an NDT schedule, including:

- document control
- content
- development
- amendment and review.

It is recognised that some IB's may have multiple roles. However, the responsibilities relating to each role do not vary.

This guidance clearly states the controller's responsibilities in relation to NDT and NDT schedules. However, it is unlikely that many controllers have the specific competencies or qualifications to develop, amend or review their NDT schedules and that these tasks are more likely to be carried out by competent parties on behalf of the controller. It should be recognised that such arrangements may not remove the controller's responsibility or liability as set out in the guidance.

It is at all times the controller's responsibility to ensure that they have in place the correct NDT schedules and to use competent persons to carry out any work.

1. NDT general

1.
Non-destructive testing (NDT) is the inspection of materials for surface and internal flaws or metallurgical condition, without interfering in any way with the integrity of the material or its suitability for service.[1]

2.
It is the application of measurement techniques in order to identify damage and irregularities in materials.

3.
When carried out correctly, NDT can provide useful information to assist in the management of amusement device safety. If inappropriate NDT is applied or NDT is not applied correctly, the results may give a false impression of the integrity and safety of the device.

4.
NDT is a primary recovery mechanism for errors in design, construction and operational activities.

5.
It may be performed during manufacture as part of quality assurance procedures to ensure that a structure or component is free from significant defects and conforms to the design specification.[2]

6.
It can be used as part of the in-service annual inspection to determine whether structures or components have deteriorated to an extent that they are no longer fit for continued service.

7.
If such deterioration is detected, then NDT can quantify the damage and provide input to the justification for maintenance or monitoring actions.

8.
NDT is only able to lead to a reduction in the probability of failure if appropriate action is taken in response to the results obtained.

9.
NDT may also need to be performed on a device where there has been a modification or a repair of a safety critical component.

[1] HSG 175: Fairgrounds and Amusement Parks – Guidance on safe practice, App 5, para. 1
[2] HSG 175: Fairgrounds and Amusement Parks – Guidance on safe practice, App 5, para. 1

2 Designers, manufacturers, importers and suppliers

General

10.
Section 6 of the Health and Safety at Work Act (HSWA) states that the "supply chain" (designers, manufacturers, importers and suppliers) have a duty to:

- carry out or arrange for the carrying out of such testing and examination necessary to make sure the device is safe and without risks to health
- take such steps as are necessary to ensure that adequate information about the use for which the article is designed or has been tested and about any conditions necessary to ensure that it will be safe and without risks to health at all times when it is being used has been provided.

11.
Should it be found during the ADIPS inspection process that a suitable NDT schedule has not been provided by the supply chain, the final duty passes to the controller, who should not operate an amusement device without having adequate maintenance documentation.

- Under these circumstances, it may be necessary for a competent person, such as the Design Reviewer, to develop a schedule.

NDT carried out during manufacture

12.
The HSWA requires the designer and/or manufacturer to determine and carry out all "testing and examination" required during the manufacturing process. This may include NDT.

13.
Manufacturers should record the significant findings of NDT carried out during the manufacturing process so that defects found during in-service annual inspection may be assessed with reference to the original condition.

14.
The NDT reports provided by the manufacturer should be:

- reviewed by those carrying out any pre-use inspection process and any additional NDT requirements determined
- retained by the controller of an amusement device so that they may be referred to, if necessary, during in-service annual inspections.

3 NDT schedules and inspection

Design review (NDT schedule)

15.
The design review should include a review of the inspection and maintenance schedules, including the NDT schedule and confirm that they are sufficiently detailed and are appropriate for the device in question. [3]

16.
The design reviewer should be competent to review the NDT schedule or should engage someone suitably qualified to do so.

17.
In particular, the design reviewer should confirm that the NDT schedule has been provided and that it:

- accurately applies to the design of the device for which he is carrying out a review
- is sufficiently detailed in all the required areas and parts
- identifies safety critical components that require NDT
- sets out the periodicity of required inspection and testing
- identifies NDT methods to be used
- details defect acceptance criteria.

In-service annual inspection (NDT)

18.
The aim of the NDT discipline of in-service annual inspection is to determine whether components have deteriorated to an extent likely to cause danger and to determine the fitness of an amusement device for continued further safe use for a specified period.

19.
In order to be effective, the inspection techniques selected must be capable of detecting the deterioration at a sufficiently early stage and with sufficient reliability.

[3] HSG175: Fairgrounds and amusement parks – Guidance on safe practice, para. 94

4. NDT documentation

Responsibility

20.
The controller should have a satisfactory and up-to-date written NDT schedule available for each device where NDT is required.

21.
If there is no requirement for NDT, this should be clearly stated in the operations manual.

22.
Controllers may develop or modify the schedules provided that they have the competence and follow the processes required by paragraphs 40-51 and 59-62 of this document. However, in practice, this expertise will normally be provided by a competent IB.

23.
All NDT should be applied under the control of a procedure which is produced and approved by competent personnel. This information is likely to be provided by the NDT IB undertaking the inspection but may have already been provided by the designer.

Document control

24.
Inspection requirements will change during the life of a device in response to changes to the device and in-service experience etc. The amendment of NDT schedules therefore requires appropriate change control processes.

25.
The NDT schedule should be treated as a controlled document and as a part of any quality system used by the controller. It should be controlled to ensure that any changes and the current revision status of the document are identified.

26.
The latest version should be readily identifiable and clearly accessible in the operations manual.

General description

27.
The NDT documentation required may be in one document or spread across a series of documents. The information is split into two distinct areas:

1. NDT schedule - The identification of safety-critical components that require NDT and details of any defect acceptance criteria.
2. NDT procedures – A written description of the application of the appropriate NDT technique based on the information in the schedule.

NDT schedule

28.
The NDT schedule should include the following information:

- component parts that require NDT inspection
- the frequency of testing
- NDT methods for each component part
- defect acceptance criteria
- name of the competent person issuing the NDT schedule
- date of issue.

29.
The schedule should list and unambiguously identify the precise components to be tested, e.g. by component reference number, by reference to drawings, or photographs. This will provide information on any preparation, e.g. degreasing, removal of paint or other protective finishes, and disassembly required to facilitate inspection.

30.
If a sampling methodology has been chosen, the schedule should specify the sampling percentage and the system that should be used to identify and record which specific components require NDT for each inspection period.

31.
The components sampled should be varied from one inspection to the next and their identities documented to ensure that, over a number of in-service annual inspections, all sampled components have been inspected.[4]

32.
The schedule should specify the changes to the sampling methodology should any significant defect indications be found. If any significant defects are found in the sampled components, the remainder may need to be examined. In addition, the future sampling methodology should be reviewed and the NDT schedule amended accordingly.

[4] HSG175: Fairgrounds and amusement parks – Guidance on safe practice, para. 145

NDT procedures

33.
The procedures should be sufficiently detailed to define the NDT technique to be applied. They may be supplemented with detailed written instructions and techniques where necessary.

34.
NDT techniques and procedures are generally the province of a competent NDT practitioner as the procedures specify precisely how the NDT is carried out.

35.
ISO 9712:2012 – Non-destructive Testing - Qualification and certification of NDT Personnel. defines NDT procedures and techniques as follows:

- NDT procedures – A written description of all essential parameters and precautions to be observed when applying NDT in accordance with standard(s), code(s) or specification(s).
- NDT techniques – A specific way of utilising an NDT method e.g. ultrasonic immersion technique.

Development - Responsibility and competence

36.
For newer devices, the “supply chain” (designers, manufacturers, suppliers and importers) should have supplied an NDT schedule and may also have supplied the procedures. Older devices may need NDT schedules to be developed or amended.

37.
It is the duty of the controller to ensure that an NDT schedule is in place and that it has been drawn up by a competent person (see also paragraphs 15 -17 and 59-62).

38.
In practice, controllers rely to a great extent on the independence and breadth of technical knowledge and experience of IB’s to develop NDT schedules.

39.
Whilst it is possible that a single person could provide all required NDT information, it is more likely that the schedule would be developed by a mechanical/structural engineer and the procedures by an NDT practitioner.

Developing NDT schedules

40.
The process used for compiling an NDT schedule should be conducted in a wide ranging and systematic manner. It is more effective if it involves a range of people, e.g. IB's, manufacturers and controllers, and documentation (see para. 41).

41.
To determine the components and their inspection frequency, the NDT schedule should take account of the following factors, where relevant:

- history/documentation – manufacturers information, pre-use and in-service inspection reports, NDT records, modifications, technical guidance etc.
- design fatigue lives
- operation and maintenance – technical supervision, maintenance etc.
- service conditions – current condition, age, environmental conditions etc.
- generic information about the type of device and its components
- deterioration mechanisms and failure modes – corrosion, fatigue cracking etc.

42.
A review of these factors requires sufficiently detailed and reliable records. Inadequate documentation can give rise to increased uncertainty and hence increase the risk.

43.
It is recognised that using empirical data can play an important part in the development of a schedule, the process of identifying components to be tested and the frequency of inspection. This method shall only be used by those with sufficient experience of the deterioration mechanisms and failure modes of the particular device, the components being assessed and where there is a sufficient store of knowledge available to accurately predict where and when defects might occur.

44.
Where there are many devices of a similar design that have operated for many years, there is more likely to be sufficient empirical data to assist a competent person in this assessment.

45.
Where there is insufficient knowledge of the design, operation, condition and deterioration, design fatigue lives and residual lives can provide an important guide in order to determine components requiring NDT and their inspection frequency.

46.
As a component moves closer to its original design life, the amount, level and scope of any inspection may need to change as the deterioration mechanism may still be anticipated even if it has not yet been observed.

47.
Anyone relying on such calculations should ensure that they are carried out by a competent person. They should also be able to interpret the information that such calculations reveal and understand their limitations.

48.
When deciding on the period between NDT inspections, the aim should be to ensure that sufficient inspections are carried out to identify at an early stage any deterioration which is likely to affect the safe operation of the device.

49.
Inspection intervals should have a degree of conservatism (factor of safety) commensurate with the potential uncertainties and limitations in the information available and the assessed risk of failure.

50.
The schedule should designate the particular NDT methods to be used. The competent person should have knowledge of the method together with any significant limitations in its use.

51.
In certain instances, an NDT schedule can be developed based on a similar device (but not copied),[5] in which case, the processes and competencies described above should be followed so that any physical or operational differences between similar devices are taken into account.

Developing NDT procedures

52.
A suitably qualified NDT practitioner should develop or define the NDT procedures to be used. The procedures must be reliable and repeatable so that results can, if necessary, be compared to previous results.[6]

53.
NDT technique selection should be based on the test method to be used and the capability to detect and assess the deterioration types anticipated/sought and their characteristics, e.g. location, orientation.

54.
NDT can be applied without stating a particular defect to look for. The defect description is then defined by the capabilities of the technique applied.

5 ADIPS Guidance Note GN 2:09.2006
6 ADSC Safety of Amusement Devices – Part 1 Inspection, In-service Annual Inspection 2008, para 230 / HSG175: Fairgrounds and Amusement Parks – Guidance on safe practice, App 5, para 3

55.
In order to decide upon the correct techniques and procedures, the NDT schedule, containing adequate details of the component or structure, will be required.

56.
The majority of the NDT techniques and procedures are likely to be for areas where there are already procedures laid down in existing technical standards. Where this is the case, the relevant standard shall be clearly referenced. [7]

57.
Some components, welds or structures may require individual and special techniques. If such techniques are not already detailed within existing technical standards then, whilst they may be developed by level 2 NDT practitioners, they will need to be approved by someone qualified to level 3 for that particular NDT method.

Amending NDT schedules

58.
It is good practice to review the schedule as a result of the following:

- modifications
- repairs (future checking of the repair for example)
- problems discovered on similar devices
- the results of inspections or operational experience of the device, which have increased inspection requirements.

Competence

59.
Competency requirements for the amendment of NDT schedules are the same as those required for their development.

60.
A documented review should be performed before any removal or change to the requirements of an NDT schedule. The purpose of this review is to enable both the controller and competent person to satisfy themselves that the safety of the device will not be compromised if the schedule changes.

61.
Amendments to the NDT schedule or changes to inspection requirements shall only be carried out by a competent person. In these circumstances, it is good practice, where possible, for any person amending NDT schedules to consult the designer/manufacturer.

7 ADIPS Guidance Note GN 2:09.2006

62.
The relevance of factors to be considered when undertaking a review of the NDT schedule will vary with each device. However, in all instances where an NDT schedule is being amended, the reviewer should be able to assess the factors affecting the device's integrity (see paragraph 41). If in doubt, more specialist technical advice should be sought.

Modifications and repairs

63.
Note that, in relation to NDT, under paragraph 186 of *HSG 175: Fairgrounds and Amusement Parks – Guidance on safe practice*, a controller should not use a device after a modification or repair to a safety critical component until details of any relevant tests and inspections, which may include NDT, are recorded in the operations manual. [8]

64.
It is good practice for the competent person to review the continued suitability of the NDT schedule for the device when any modifications or repairs are made. This review will ensure that the schedule remains adequate and is revised, if necessary, so that information on the modifications or repairs is taken into account in establishing the scope and frequency of any future NDT inspections.

8 ADSC Safety of Amusement Devices – Part 1 Inspection, In-service Annual Inspection 2008, para 28

5. Controllers

Role

65.
The controller should have specific NDT documentation for each device that is adequately controlled (see paragraphs 24-26) and includes the up-to-date NDT schedule and information on the examination and inspection of the device once in use. This should include all NDT reports and related inspection reports from the manufacturer as well as previous in-service inspection reports.

66.
They should carry out any necessary preparatory work to enable the NDT inspection to be carried out in accordance with the schedule.

67.
They should engage competent IB's to carry out their inspections. The ADSC member associations require that only NDT IB's registered with ADIPS may be engaged by their members to carry out NDT on devices covered by the scheme unless specialist skills are required e.g. NDT of ropes.

68.
When engaging an NDT IB, the controller should confirm with the IB that they are providing personnel who can perform the inspection work required by the NDT schedule.

69.
When engaging an NDT IB, the controller should arrange for the results of inspection to be sent immediately to the IB responsible for the mechanical/structural inspection.

6. Mechanical/Structural IB

Role

70.
The IB is responsible for confirming the completion of the mechanical/structural pre-use inspection process for new devices or the in-service annual inspection process for devices in-service.

71.
The mechanical / structural inspection is the responsibility of an IB registered with ADIPS for those disciplines.

72.
As a part of the normal scope of their inspection the mechanical/structural IB conducts a thorough visual examination of all areas of the device. Where specified by the NDT schedule or as deemed appropriate, visual examination shall be supplemented by NDT.

73.
Where inspection is required to be supplemented by NDT, the IB shall require an NDT practitioner's report in order to assist them in their assessment of the integrity of the mechanical/structural components. In such circumstances, the IB should ensure that they have the NDT practitioner's report confirming the completion of the NDT inspection and that they have reviewed it appropriately (see paragraphs 82-85).

74.
They should review this work along with the NDT schedule and confirm that it contains enough detail for the purposes of their inspection. Any deviation from the NDT schedule should be justified and documented in their report.

75.
The NDT schedule should be complete as per the requirements outlined in section 4.

76.
IB's carrying out mechanical / structural in-service inspection should identify in their reports if NDT has been sub-contracted or carried out by a third party.

77.
If any of the required information is missing, incomplete or invalid, then in-service annual inspection cannot be completed. In such circumstances a DOC cannot be issued.

NDT schedule

78.
During the in-service annual inspection, the mechanical/structural IB should review the NDT schedule in relation to the following:

- that it contains sufficient detail for the purposes of their inspection
- the NDT schedule in the controller's operations manual gives the correct level of detail as set out in section 4
- the NDT schedule is particular to the device
- the NDT schedule used in the inspection is the current schedule
- any modifications or repairs that require NDT to confirm the ongoing operational safety of the device
- any recommendations made by the manufacturer, or industry guidance to change the NDT schedule and/or the inspection procedures
- information arising from other inspections, problems or incidents on similar devices.

79.
If the IB believes the NDT schedule requires review, this should be recommended to the controller prior to completing the in-service annual inspection.

Modifications and repairs

80.
When carrying out an in-service annual inspection, the IB should gain confirmation from the controller on whether or not modifications or repairs have been carried out since the initial test or last in-service annual inspection.

81.
If it is determined from the controller during in-service annual inspection that a safety critical modification or repair has been carried out, the IB should check for:

- details of the modification or repair
- records of any relevant NDT
- necessary amendments to the NDT schedule.

NDT reports

82.
When assessing the NDT reports, the IB should check that the NDT practitioner has included the following:

- the date of examination
- the date of the report and a unique reference number
- the inspector's name, ADIPS registration number, where applicable, and their qualifications
- the NDT schedule reference number on which the inspection was based
- identification of the specific components examined and locations where NDT methods have been applied
- identification of the NDT method(s) and procedures(s) used
- the results of inspection, i.e. indications observed above a certain acceptance criteria or all indications if no acceptance criteria is defined
- the NDT report gives enough information to demonstrate that the inspection has been carried out in accordance with the current NDT schedule for the device
- any further information required by relevant standards, e.g. *BS EN ISO 17638:2009 Non-destructive testing of welds: Magnetic particle testing.*

83.
The IB should ensure that the NDT reports relied upon to form an assessment of the integrity of the device are recent enough to be relevant. NDT should normally take place no more than one month prior to the mechanical/structural in-service annual inspection if the device has remained in use.

84.
Any evidence of specific defect trends should be considered as this may signify extra inspection and testing is required. If the IB considers a review or amendment is required, they should make suitable recommendations to the controller of the device.

85.
Scopes/techniques of relevant NDT inspections should be taken into account. If those aspects do not match the identified failure modes, e.g. MPI has been used when the expected failure mode is sub-surface, then great caution should be placed on the validity of such results.

Defects and rectification

86.
The IB should assess any defects reported by the NDT practitioner and determine what the appropriate actions may be, the time within which any defects must be remedied and the resultant review process required. The IB will need to take into account the following:

- the type and magnitude of the deterioration, its cause and mechanism and any limitations of the NDT information available
- whether the deterioration has been present since entry into service (manufacturers NDT reports may provide a valuable reference)
- if the deterioration has initiated during service and the rate at which it is proceeding (previous in-service inspection reports may provide a valuable reference)
- whether the deterioration is within any levels of tolerance (the NDT schedule's acceptance criteria will provide a valuable reference).

87.
A number of standards can be followed to assess flaws and degradation, e.g. *BS 7910:2005 Guide to methods for assessing the acceptability of flaws in metallic structures*. Many of these standards take into account the accuracy of NDT methods. However, some do not and care should be taken when interpreting the results.

88.
Where any significant defects are found during an NDT inspection the IB carrying out the mechanical/structural inspection should agree any appropriate corrective actions with any relevant parties, such as the manufacturer, before any such action is taken.

89.
The mechanical/structural report, which should reference the NDT report, should specify whether the defect requires action before the amusement device is used or within a specified time.

90.
If the NDT report identifies a defect requiring repair, modification or replacement then the IB cannot complete the inspection process before appropriate actions are taken and any necessary inspection procedures are completed. This may involve the completion of all of the pre-use inspection procedures.

7. NDT Practitioners

Role

91.
The role of the NDT practitioner is to check for defects in the components and structures of devices as required by the NDT schedule and to complete such examination with the required effectiveness and reliability.

92.
They shall complete an inspection and clearly report upon any significant defects found.

93.
NDT inspection cannot be deemed to be the examination of the mechanical and structural components of a device, for wear, deterioration and integrity as NDT is only a part of this inspection process.[9]

94.
The NDT practitioner may also act as the mechanical/structural IB. In such instances the IB should be:

- registered with ADIPS in the relevant disciplines
- specifically charged with carrying out these parts of the inspection process as the mechanical/structural IB
- responsible for all aspects of the role of the mechanical/structural inspection.

Competence

95.
Personnel engaged in NDT of amusement devices should hold personal certification to the appropriate level for each NDT method used as defined in *ISO 9712:2012 – Non-destructive Testing - Qualification and certification of NDT Personnel.* Where personnel are qualified using an organisational based scheme, the Inspection Body is required to demonstrate that such qualifications comply with recognised schemes, e.g. SNT-TC-1A.

[9] ADIPS Guidance Note GN406:2010

96.
ISO 9712:2012 – Non-destructive Testing - Qualification and certification of NDT Personnel. classifies certified NDT practitioners into the three following levels, depending upon their respective qualification:

- Level 1: an inspector working under supervision by a person qualified at least to Level 2
- Level 2: the main level of practitioner. They can prepare written instructions from appropriate NDT standards and evaluate the results
- Level 3: an inspector competent to establish, review and validate NDT instructions and procedures.

Document review

97.
Prior to carrying out their inspection the NDT practitioner should confirm the following:

- that there is an NDT schedule present
- that the NDT schedule has adequate identification information to demonstrate that it relates specifically to the device that is to be inspected
- that the schedule sets out sufficient detailed information on the components requiring inspection and the amount of preparation that should be carried out prior to the inspection
- that the schedule details NDT methods for which they are competent and hold current approvals
- that there is access to all parts of the ride required, taking account of any sampling required.

98.
If the above points cannot be confirmed, the NDT inspection cannot be completed.

99.
It is not the responsibility for the NDT practitioner to review the detailed technical adequacy of the schedule. However, should they notice that the schedule is not sufficient, they should discuss their concerns with the controller and the mechanical/structural IB.

100.
If the NDT practitioner has knowledge of reported defects found on other similar devices, it is good practice to notify the controller and the mechanical/structural IB.

NDT procedures

101.
All NDT should be applied under the control of a procedure that has been produced and approved by competent personnel.

102.
The NDT practitioner may not vary the details set out in the NDT schedule without:

- written instruction from the duty holder of the NDT schedule (the controller) who should reissue the NDT schedule (see paragraphs 24-26)
- confirming the basis of the variation with the controller and the mechanical/structural IB acting for the controller
- noting the variation from the previous inspection in the NDT practitioners report.

103.
The NDT practitioner should ensure that any NDT equipment used in the inspection is working correctly and calibrated in accordance with the relevant requirements of ISO/IEC 17020 and any relevant standard, e.g. *ISO 3452-2:2006 – Non-destructive testing – Penetrant testing Part 2: Testing of penetrant materials*.

104.
The NDT practitioner should satisfy himself that the surface finish of a component meets the requirements of the appropriate standard and is satisfactory for the NDT technique used.

Reports

105.
The NDT practitioner should provide a written report to the controller detailing the components tested and the results obtained.

106.
All relevant inspection reports are required to clearly convey the extent and scope of an inspection and identify any areas within the defined scope where inspection was not undertaken.

107.
Any limitations to the inspection, for example poor/limited access, should be recorded in the report, so that the controller and the mechanical/structural IB are made aware of the extent of inspection and any further work required in order to satisfactorily complete the inspection before the DOC can be issued.[10]

10 ADSC Safety of Amusement Devices: Part 1 Inspection, In-service Annual Inspection 2008, paras. 38-40

108.
When writing the NDT reports the NDT practitioner should include the details described in paragraph 82.

109.
The types, sizes, locations and orientations of defect indications should be written into the NDT report where relevant.

110.
The results of the NDT inspection must be provided immediately to the mechanical/structural IB who will decide upon the action to be taken.

111.
The NDT practitioner should also include the following in their report, where relevant:

- details of any additional tests that have been carried out and why
- information on any tests omitted from the schedule and why
- any recommendations for the controller/IB relating to the NDT schedule.

Defects and rectification

112.
Where any significant defects are found during an NDT examination an appropriate course of action must be agreed by the IB carrying out the mechanical/structural examination.[11] It is not the role of the NDT practitioner to advise the controller on any such actions, although they can, of course, offer advice to the mechanical/structural IB responsible.

11 ADIPS Guidance Note GN406:2010

References

This appendix is not exhaustive but lists selected legislation, standards, information documents and other publications, in addition to those referenced on page 4, relevant to the compilation of this document:

The Health and Safety at Work etc. Act 1974

The Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and Guidance L22 (Second edition). HSE Books, 1998, ISBN 0 7176 1626 6.

Pressure Systems Safety Regulations 2000 (SI 2000 No. 128): '"Safety of pressure systems'. Approved Code of Practice L122, HSE Books, 2000, ISBN 0 7176 1767.

ISO/IEC 17020:1998 – General Criteria for the Operation of Various Types of Bodies Performing Inspection.

IAF/ILAC-A4:2004 – Guidance on the Application of ISO/IEC 17020.

ISO 9712:2012 – Non-destructive Testing - Qualification and certification of NDT Personnel.

ISO 17638:2003 Non-destructive testing of welds - Magnetic particle testing.

BS 7910:2005 Guide to methods for assessing the acceptability of flaws in metallic structures.

EA-4/15 – Accreditation for Non-Destructive Testing.

UKAS RG 7 – Accreditation for Inspection Bodies Performing Non-Destructive Testing.

HSE Document 'CRR 363/2001 Best practice for risk based inspection as a part of plant integrity management'. Document prepared by J B Wintle and B W Kenzie, TWI, and G J Amphlett and S Smalley, Royal and SunAlliance Engineering. 2001.

HSE Document: 'Best Practice for the Procurement and Conduct of Non-Destructive Testing, Part 1: Manual Ultrasonic Inspection'. Document prepared by B A McGrath, Inspection Validation Centre, AEA Technology. 2000.

HSE Project: 'Programme for the Assessment of NDT in Industry (PANI)'. Work managed by AEA Technology. 1997-1999.

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