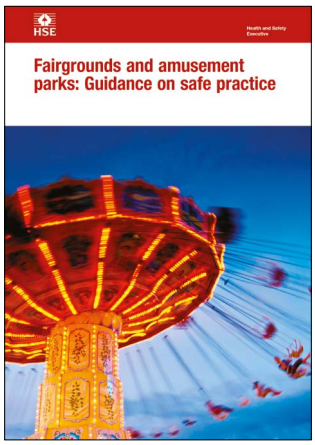
Fairgrounds and amusement parks: Guidance on safe practice



HSG175 (Third edition)
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This publication provides guidance for all those involved in the organisation, operation and management of fairgrounds and theme parks.

It is primarily for ride controllers and operators, fair organisers, designers, manufacturers, importers and suppliers of fairground rides and ride inspection bodies. It will also be useful to event organisers and employees, the self-employed and contractors working in the fairground and amusement park sector.

This third edition gives a clearer explanation of what action to take and why. It has been co-written with the Fairgrounds Joint Advisory Committee to set out measures those involved in the industry should take to reduce risks, work safely and comply with the law.

The following areas have been updated since the previous edition:

- references to health and safety law;
- guidance on maturity risk assessments (MRAs);
- terminology in the section on 'Inspecting an amusement device'.

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This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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Foreword

This guidance sets out what the Fairgrounds and Amusement Parks Joint Advisory Committee (FJAC) considers are appropriate measures for those involved in the industry to reduce risks, work safely and comply with the law. The following trade associations, in alphabetical order, together with the Health and Safety Executive (HSE) are currently represented on the committee:

Amusement Catering Equipment Society (ACES)

Amusement Device Inspection Procedures Scheme (ADIPS) Ltd

Association of Independent Showmen (AIS)

Amusement and Leisure Equipment Suppliers (ALES)

British Amusement Catering Trade Association (BACTA)

British Association of Leisure Parks, Piers and Attractions (BALPPA)

National Association for Leisure Industry Certification (NAFLIC)

Showmen's Guild of Great Britain (SGGB)

Society of Independent Roundabout Proprietors (SIRP)

About this guidance

Introduction

1 The Fairgrounds and Amusement Parks Joint Advisory Committee (FJAC) has worked for over 35 years to improve standards and exchange information relating to safety on fairgrounds, amusement parks and fairground equipment. Fairgrounds and amusement parks have been shown to be relatively safe compared to such activities as driving a car or riding a bicycle, but there have been a small number of serious accidents involving the general public and employees. Risk is part of everyday life and cannot be completely eliminated but it should be managed effectively and proportionately. This third edition replaces the 2007 edition and incorporates lessons learned and improvements developed since then.

2 This document focuses on the safety of employers, employees and the general public using fairgrounds and amusement parks, and gives advice on measures to control risk. It provides advice on issues relating to attractions, including design, manufacture, inspection, operation, maintenance, repair, and modification. It also includes advice on site layout and safe systems of work. There is a glossary at the end of the book which explains the terms used.

3 The Health and Safety at Work etc Act 1974 (the HSW Act),[1] and associated health and safety regulations, place duties on a wide range of people ('dutyholders') according to their roles (see Appendix 1). These include the following:

- **Designers, manufacturers, importers and suppliers** have a duty to ensure that the attractions are safe for use when first supplied and to provide their customers with appropriate information to allow safe use. Their duties will vary according to circumstance. **See Section C** for further guidance.
- **Organisers** (who can be companies) have overall control of the fairground or amusement park and have duties concerning safe layout and emergency procedures. **See Sections A, B, D and E.**
- **Controllers** (who can be companies) own or otherwise have control of an attraction and have a duty to operate and maintain it in a safe condition. **See Sections A, B, C, D and F.**
- **Operators** are in immediate charge of an attraction and have a duty to operate it safely. **See Sections A, D and G.**

- **Attendants** help to operate an attraction, have a duty to take reasonable care for their own and others' safety and to follow instructions. **See Sections A and G.**
- **Inspection bodies** (IBs) (who may be individuals or companies) provide inspection and testing services. Where they are engaged by other dutyholders to perform specific tasks, it must be established by that dutyholder that the particular type of inspection and testing service required is one that the IB is competent to perform. **See Sections A, C and D.**

4 An individual or company may fall into more than one category. For instance, a person may be the organiser of a fair and be both the controller and the operator of one of the attractions.

5 All the member associations of the FJAC agree the information in this guidance is appropriate to help dutyholders meet their legal obligations and expect their members to follow the systems described. Dutyholders are free to meet their legal obligations in other ways, but they need to be able to show that what they did was equally effective.

6 The system for safety of attractions set out in this guidance is shown in Section A, Table 1, although not all attractions require all of the actions listed. Section A, Table 2 summarises the actions recommended for some different types of attractions.

7 This guidance does not cover occupational risks such as manual handling, exposure to substances hazardous to health, noise etc. Advice on these and other general health and safety requirements can be found in References and further reading and on HSE's website at www.hse.gov.uk.

8 Following this guidance will ensure that dutyholders are fulfilling their legal duties. Parts of this guidance refer to the system for safety of attractions and measures related to the management of fairgrounds and amusement parks, some of which may go beyond the minimum required to comply with health and safety law. The fairground industry agrees these are key to ensuring the safety of employees, members of the public and others.

9 The word **must** in this guidance is used where there is an explicit legal requirement to take a certain action; **should** is used to indicate what to do to comply with the law – although dutyholders are free to take other action provided they are able to show that it still results in compliance with the law.

10 A summary of the main legal provisions is in Appendix 1.

Application of this guidance to devices designed before October 1997

11 Reports of pre-use inspection may not be available or needed for older attractions (those existing in Great Britain before October 1997) whose design has been proved by maturity and can be demonstrated in a maturity design risk assessment. While, in principle, the hard evidence of operational history may be an acceptable basis for proving a design, much depends on the history of modifications. Whether a design review is needed or not depends on the controller's assessment of risk, aided by advice from an IB. Guidance on the contents of a maturity design risk assessment is in Section D, paragraphs 89–92 and Appendix 2. Although maturity risk assessments can no longer be carried out, this Information is included to assist those looking at existing examples.

Defect notification

12 Any person to whom this guidance is directed who finds a generic or serious fault on a device, which could have wider safety implications for that or other similar devices, should inform their trade association and the National Association for Leisure Industry Certification (NAFLIC). Trade associations may decide to distribute the relevant information to their members or others in the interests of safety on fairgrounds.

Section A The system for safety of attractions

What the law requires

The Health and Safety at Work etc Act 1974 requires that fairground equipment be designed, manufactured, supplied, constructed, operated, maintained and inspected so that it is safe, so far as reasonably practicable.

Other legislation such as the Construction (Design and Management) Regulations 2015 (CDM 2015),[2] the Provision and Use of Work Equipment Regulations 1998 (PUWER),[3] and the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)[4] places more detailed duties on dutyholders regarding specific aspects of machinery use such as construction, operator competence, inspection intervals etc.

For further detailed information on how the law applies see Appendix 1 Relevant legislation.

Table 1 The system for safety of attractions

Steps	Checks	Description
Design		By competent designers with knowledge of the relevant standards (see Section C).
	Design review*	Appraisal of a design (and any safety-critical modification) to check the adequacy of a design specification and the validity of the assumptions on which it is based (see Section D).
Manufacture		To the reviewed design specification.
	Assessment of conformity to design (ACD)*	A check to confirm that a device is manufactured and constructed to the reviewed design specification (see Section D).

Steps	Checks	Description
	Initial test*	A test or series of tests to check that the device operates safely in accordance with the reviewed design specification and the instructions in the operations manual. This test should be carried out by, or on behalf of, the manufacturer, supplier or importer and witnessed by an IB.*
Provision of an operations manual		Provision of adequate information required for the safe operation and maintenance of the device (see Appendix 3).
Device operation		Carried out by competent persons, suitably trained in normal operation and emergency procedures and in accordance with the operations manual and risk assessment.
Ongoing device integrity		By a series of checks, maintenance and inspection.
	Maintenance	The procedures carried out by competent persons necessary to ensure that a device is kept in an efficient state, efficient working order and in good repair.
	Daily check	Carried out by competent persons before the device is opened for use (see Section F).
	Periodic check	Carried out by competent persons in accordance with the manufacturer's specifications and any additional requirements required by modifications to the device, and/or the findings of the design review or risk assessment.
	In-service annual inspection*	The procedure necessary for a competent and independent IB to decide whether an amusement device may continue to be operated for a specified period of time (see Section D).
*The ride controller must make sure that IBs working on their equipment have the competence to do so without putting the health and safety of themselves or others at significant risk.		

Table 2 Recommended actions for different types of attractions

Type of attraction	Design review and assessment of conformity to design?	Initial test?	In-service annual inspection?	Other important safety issues and comments
Arcade	Yes[a]	Yes[a]	Yes[a]	(a) Non-permanent structures only. For fire precautions see Appendix 6. Check electrical equipment at least annually.
Boats/pedalos	Yes	Yes	Yes	Local authority-enforced when used outside fairgrounds and amusement parks.
Cableway and monorails	Yes	Yes	Yes	The Cableway Installations Regulations 2004[5] do not apply to cableway installations (on site or mobile) in fairgrounds or amusement parks that are designed for leisure purposes and not as a means of transport. They do, however, contain advice which may be useful.
Mobile climbing wall	Yes	Yes	Yes	Inspection should cover all parts of the equipment, including ropes, harnesses and connections. Local authority-enforced when used outside fairgrounds and amusement parks.
Coin-operated amusement device	No[b]	Yes	Yes	(b) Devices outside the definition given in the Glossary require the full range of pre-use and in-service inspections. Local authority-enforced when used outside fairgrounds and amusement parks.
Funhouse – with moving floors and slides etc	Yes	Yes	Yes	May be 'tented structure' (see Appendix 6).

Type of attraction	Design review and assessment of conformity to design?	Initial test?	In-service annual inspection?	Other important safety issues and comments
Hoopla or similar stall	No	No	No[(c)]	(c) Periodic inspection of electrical equipment.
Hot dog or candy floss stall	No	No	No[(d)]	(d) Periodic inspection of electrical equipment. Food safety legislation applies. See Appendix 6 for advice on gas safety.
Inflatable (bouncy)	No (should conform to BS EN 14960[6])	Yes	Yes	Supervision. Local authority-enforced when used outside fairgrounds and amusement parks.
Miniature railway	Yes	Yes	Yes[(e)]	(e) Other legislation applying to rail-bound transport systems may apply and its regulation may fall to the Office of Rail Regulation. 'A memorandum of understanding'[7] exists between HSE and the Office of Rail and Road which gives more detail.
Other inflatable (not used for bouncing or sliding)	Advised for safety-critical components	See design review if applicable	See design review if applicable	Supervision.
Pneumatic or air-supported structure	Yes	Yes	Yes	For fire precautions see Appendix 6.
Ride, adult or juvenile	Yes	Yes	Yes	

Type of attraction	Design review and assessment of conformity to design?	Initial test?	In-service annual inspection?	Other important safety issues and comments
Road train	Yes	Yes	Yes	Driving licence recommended, may be compulsory on road. Training and supervision.
Rodeo bulls	Yes	Yes	Yes	Local authority-enforced when used outside fairgrounds and amusement parks.
Safety-critical parts of ride theming (may be part of an attraction or general site theming)	Yes(f)	Yes(f)	Yes(f)	(f) A high degree of care should be applied to the safety-critical parts of any theming which could cause serious personal injury if they failed.
Self-drive, eg model cars, dodgems, karts	Yes	Yes	Yes	
Shooting gallery (hazardous projectiles)	Yes	No	No(g)	Firearms legislation may apply. (g) Periodic inspection of electrical equipment.
Shooting gallery (non-hazardous projectiles)	No	No	No(h)	(h) Periodic inspection of electrical equipment.
Simulator	Yes	Yes	Yes	
Slide, eg helter-skelter, astroslide	Yes	Yes	Yes	Supervision.
Walk-through, eg haunted house, horror maze, mirror maze	Yes	Yes	Yes	May be 'tented structure' (see Appendix 6). (j) Will be a ride if containing moving floors or sides.
Wall of death/ globe of death	Yes	Yes	Yes	Important to maintain structural integrity.

Type of attraction	Design review and assessment of conformity to design?	Initial test?	In-service annual inspection?	Other important safety issues and comments
Water walkers	Advised for safety-critical components	See design review if applicable	See design review if applicable	Supervision.

Section B Managing for health and safety

What the law requires

You must put in place suitable arrangements to manage health and safety. The Management of Health and Safety at Work Regulations 1999 (the Management Regulations) require employers to put in place arrangements to control health and safety risks. For further guidance see *Managing for health and safety*.[8]

Self employed people whose work activities pose a risk to the health and safety of others must comply with health and safety law. The nature of most fairground rides and the work carried out at fairs means that most self employed people working at fairgrounds will have duties to comply with health and safety law.

As a minimum, you must have:

- a written health and safety policy (if you employ five or more people);
- conducted assessments of the risks to employees, contractors, customers, partners and any other people who could be affected by your activities. These must record the significant findings in writing (if you employ five or more people). Any risk assessment must be suitable and sufficient ;
- arrangements for the effective planning, organisation, control, monitoring and review of the preventive and protective measures that come from risk assessment;
- access to competent health and safety advice (see www.hse.gov.uk);
- provided employees with information about the risks in your workplace and how people are protected;
- provided instruction and training for employees in how to control the risks;
- ensured there is adequate and appropriate supervision in place;
- consulted with employees about their risks at work and current preventive and protective measures.

CDM 2015 applies to construction projects in the fairground industry and may place duties on those involved in the planning, design and management tasks associated with the build up and strip down of fairground rides.

CDM 2015 complements the Management Regulations and integrates health and safety into the management of construction work. The key principles will be familiar to those already managing risks effectively.

They are:

- eliminate or control risks so far as reasonably practicable;
- ensure work is effectively planned;
- appoint the right people and organisations at the right time;
- make sure everyone has the information, instruction, training and supervision they need to carry out their jobs safely and without damaging health;
- have systems in place to help parties cooperate and communicate with each other and coordinate their work;
- consult workers with a view to securing effective health, safety and welfare measures.

Any actions you take to comply with CDM 2015 should always be proportionate to the risks involved. For further guidance see *Managing health and safety in construction*.[2]

Identify what needs to be done

13 Safety doesn't just happen. It requires everybody's commitment and willingness to work in an organised way to achieve good standards. The most important steps to take in managing health and safety are to Plan, Do, Check and Act (see *Managing for health and safety*[8]). These concepts are recognised in all sections of this book. You can find out more in References and further reading.

Plan

14 Think about how you currently manage health and safety for yourself, your employees and the public. Then decide what you can or need to do, to improve this. Your plan should cover what you need to do, how you will manage and carry it out and how you will review the process and improve it as necessary. The planning process should identify the hazards, assess the risks and help determine what control measures are required. Sections C to G of this guidance indicate how to manage safety effectively.

Do

15 You then need to implement your plan. You will need a system to ensure you address the risks you identify, sensibly, responsibly and proportionately. Risk assessment will form an important part of this and is explained in detail below. You should keep the administration and management down to the minimum necessary to ensure you identify and control the risks.

Check

16 You should make sure that your plans have been implemented and assess how well the risks are being controlled and if you are achieving

your aims. In some circumstances formal audits may be useful. You should also investigate the causes of accidents, incidents or near misses; they could give clues and warning of failings in how you are managing risks.

Act

17 It is important that you review what you have done so you can make sure it is all working as you intended and that what you are doing is effective.

18 Learn from any accidents you or others have and do what you can to prevent them happening again – and revisit your plans regularly to see if you can do anything to improve what it is you are doing.

Risk assessment

19 As part of managing the health and safety of your business you must control the risks created by your attraction. To do this you must think about what might cause harm to people and decide whether you are doing enough to prevent that. This is known as risk assessment and it is something you are required by law to carry out. If you have fewer than five employees you don't have to write anything down.

20 Risk assessment is about identifying and taking sensible and proportionate measures to control the risks in your workplace, not about creating huge amounts of paperwork. You are probably already taking steps to protect your employees and members of the public, but your risk assessment will help you decide whether you should be doing more.

21 Think about how accidents and ill health could happen and concentrate on real risks – those that are most likely and which will cause the most harm. The following might help:

- Think about your workplace activities, processes and the substances used that could injure people or harm their health.
- Ask your employees what they think the hazards are, as they may notice things that are not obvious to you and may have some good ideas on how to control the risks.
- Check manufacturers' instructions for equipment as they can be very helpful in spelling out the hazards.
- Some people may have particular requirements, for example new and young workers, migrant workers, people with disabilities, temporary workers, contractors etc.

22 Having identified the hazards, you then have to decide how likely it is that harm will occur. Risk is a part of everyday life and you are not expected to eliminate all risks. What you must do is make sure you know about the main risks and the things you need to do to manage them responsibly. Generally, you need to do everything reasonably practicable to protect people from harm.

23 Make a record of your significant findings – the hazards, how people might be harmed by them and what you have in place to control the risks. Any record produced should be simple and focused on controls. If you have fewer than five employees you do not have to write anything down but it is useful to do this so you can review it at a later date; for example if something changes. If you have five or more employees you are required by law to write it down. Few workplaces stay the same, so it makes sense to review what you are doing on an ongoing basis.

Who should do a risk assessment?

24 Every employer and self-employed person having control of or working on fairground equipment, and whose activities create risks for their employees or members of the public, must assess the risks to workers and others who will be affected by their work or business. Dutyholders in the fairground and amusement park industry will be involved in a range of risk assessments. For example:

- Designers must:
  - identify how the public or workers might be injured, including risks arising from building up and taking down the ride and inspecting and maintaining it, as well as from its use as an attraction and in emergency situations;
  - determine possible effects of 'foreseeable misuse' (see paragraphs 28–32 for a definition) by the public, controllers or operators.
- Manufacturers must identify the risks to their employees and others during the manufacturing process.
- Installers of fixed structures must identify the risks to their employees and others during the installation process, such as risks from working at height, manual handling, electricity etc.
- Organisers:
  - must assess site risks, for example access, transport, limitations of space, overhead power lines;
  - should produce a site layout which will minimise the risks;
  - must identify any planning, equipment, information and training needed to deal with emergencies.
- Controllers must assess the risks to employees and others from transporting, building up, taking down, maintaining and operating the attraction.

25 In some cases the duties will overlap, for example if someone both designs and manufactures an attraction or where an organiser is a controller. If this is the case, dutyholders must:

- identify any control measures, precautions, information, instructions and training needed to make sure that all jobs are done safely;
- review their assessment, where relevant, in the case of changes in design, manufacturing process, modifications, operating conditions, operational experience etc.

What is 'reasonably practicable'?

26 Many of the requirements of health and safety legislation require you to take 'reasonably practicable' steps and precautions to manage risks. The term 'so far as reasonably practicable' means you have to take action to control health and safety risks except where the cost (in terms of time and effort as well as money) of doing so is grossly disproportionate to the reduction in the risk.

27 If you follow the guidance set out in this publication you will normally be doing enough to comply with the law.

What is 'foreseeable misuse'?

28 People's behaviour on fairground equipment can be affected by many things, including psychological issues, fear, bravado, peer pressure, intoxication etc. Controllers must take all reasonably practicable steps to ensure that the people they allow onto their device do not misuse equipment or behave in ways such that they create a risk to the safety of themselves or others.

29 Foreseeable misuse is the use of an amusement device in a way not intended by the designer or controller and which results from predictable human behaviour.

30 Foreseeable misuse may include irrational or improbable behaviour, eg through fear. It is unlikely to include deliberate or outrageously reckless actions, eg passengers deliberately attempting to defeat restraint systems. The law requires that people do not interfere with items provided for health and safety and this will include members of the public, unauthorised ride staff and employees.

31 Foreseeable misuse could arise from the following:

- passengers using cameras/phones on rollercoasters;
- passengers deliberately failing to observe safety instructions such as raising arms on launch coasters etc;
- passengers, especially children, trying to leave the device shortly before it stops moving.

32 Conversely, the following do not constitute reasonably foreseeable misuse:

- people climbing over or otherwise defeating a properly installed and effective safety device or area perimeter safety fencing;
- passengers changing seats on a ride while in motion.

Consultation with employees

33 Workplaces where employees are involved in taking decisions about health and safety are safer and healthier. Collaboration with your employees helps you to manage health and safety in a practical way by helping you spot workplace risks. Examples of how to do this include:

- making sure health and safety controls are practical;
- increasing the level of commitment to working in a safe and healthy way;
- consulting employees in good time on health and safety matters. In workplaces where a trade union is recognised, this will be through union health and safety representatives. In non-unionised workplaces, you can consult either directly or through other elected representatives;
- involve employees in assessing the risks arising from their work;
- involve them in devising proposals to manage and/or control these risks;
- discuss with them the best ways of providing information and training.

34 For further information on your legal duties see *Consulting employees on health and safety: A brief guide to the law*.[9]

35 HSE's Worker involvement webpages provide more information on consulting with your employees (www.hse.gov.uk/involvement).

Section C Designing, manufacturing, importing and supplying an attraction

What the law requires

Section 6 of the HSW Act requires that any person who designs, manufactures, imports or supplies any article of fairground equipment must:

- ensure, so far as reasonably practicable, that the article is designed and constructed so it will be safe and without risks to health when it is being used for the entertainment of members of the public;
- carry out, or arrange for, testing and examination as needed to ensure they can comply with the above bullet point;
- take such steps as are necessary to make sure that the person supplied with the article of fairground equipment is given adequate information about how it was designed and tested, the use for which it has been tested, and how it is to be used so it will be safe when that use involves entertaining members of the public;
- take such steps as are necessary to make sure, so far as reasonably practicable, that people supplied with the article of fairground equipment are also provided with details of any changes to the information mentioned above where there may be a serious risk to health or safety.

CDM 2015 will apply to all construction projects, including those carried out in the fairground industry, and may include the design, manufacture, build up and strip down of both fixed and travelling machinery as well as other temporary and fixed structures. For further guidance on CDM 2015 see *Managing health and safety in construction*.[2]

Designers

36 Amusement devices can range from relatively simple designs, such as small juvenile rides, to large, adult devices of considerable complexity. The safety of the equipment during operation and use must be considered adequately at the design stage.

37 As a designer of an amusement device you must ensure that it has been designed and constructed so that it will be safe when it is being:

- assembled, dismantled, transported and installed;
- operated, cleaned, maintained, inspected and tested;
- used by the public.

38 You must specify the conditions in which the amusement device is expected to operate and include any limitations on use. You must also ensure the design:

- is supported and proved by any testing, examination and research needed to demonstrate that the device will be safe when used as intended;
- is sufficiently detailed to ensure that it can be built, operated, maintained and inspected safely (including any special requirements for installation);
- is validated as a whole, which is especially important when parts of the device are made by different manufacturers;
- provides safe access for maintenance and inspection, and egress for evacuation.

39 If your design incorporates facilities for disabled riders you must make sure it is safe for such use and clearly defines any restrictions on that use.

40 You should ensure that the device is designed in accordance with relevant standards and guidance, eg BS EN 13814[10] and the Amusement Device Safety Council's (ADSC's) *Safety of amusement devices: Design*.[11] This work should be thoroughly documented and all necessary quality assurance relating to the design should be carried out.

41 You should make recommendations to the manufacturer/importer/supplier, as appropriate, for items to be included in a commissioning schedule to make sure that the amusement device is properly commissioned before first being put into use.

42 You should identify the information that should be included in the operations manual – the operating and emergency (including evacuation) instructions, inspection, maintenance and non-destructive testing (NDT) schedules etc – so that the amusement device can be operated safely. This documentation should be in a language that is understandable by the people to whom the amusement device is being supplied.

Design risk assessment (DRA)

43 ADSC's *Safety of amusement devices: Design* defines a DRA as: 'the process of assessing the hazards that an amusement device might pose, the likelihood of those hazards causing a risk and the control measures that are necessary to control those risks adequately'. This is part of the design process and is distinct from the risk assessments required under health and safety law.

44 As a fundamental element of the design process you should assess all the risks associated with the design, as well as those risks arising out of the activities specified in paragraph 37, and record this in the DRA. It should be used to help specify the safety functions of the amusement device.

When more than one designer is involved

45 The overall design of an amusement device may include contributions from a number of people. For example, there may be separate designers for passenger cars, passenger restraints, track, control systems etc. It is important that the process of producing the overall design is coordinated and managed effectively to ensure that all safety-related aspects are considered and combined effectively.

46 For fairground equipment designed in Great Britain the responsibility for coordinating the design work lies with the person responsible for the overall design of the device.

47 Where the fairground equipment has been designed and manufactured outside Great Britain, the supplier or importer (which may be the ride controller) assumes the responsibility for ensuring the amusement device is safe to operate. In such cases they should take all reasonable steps to make sure that the advice in paragraphs 35–41 has been followed.

Pre-use inspections

48 Before an amusement device is used for the first time the safety-related features of the design should be checked through a process of pre-use inspections, using an appropriately registered IB (see Section D paragraphs 99–140 for more information on pre-use inspections).

Designers and the design review process

49 The first step in pre-use inspection is the process of design review. This should preferably be carried out before the device is manufactured. The designer should make all information required by the design review IB available as the design review cannot be completed without it.

50 Where you know that an IB has been appointed to carry out a design review, you are encouraged to consult with them as early as possible in the design process. This is so that any potential problems can be resolved at an early stage rather than at the end of the process, where even a seemingly minor requirement might be extremely difficult, expensive or time-consuming to implement.

Modifying an existing design

51 If an existing device is to be modified, the controller of the device should select a competent person to coordinate the modification process. This is to ensure that all the safety-related aspects of the modification are considered.

52 Designers who become aware of a feature of their design that might lead to danger should:

- take all reasonable steps to make sure controllers using that version of the device are made aware of this;
- tell controllers about details of any safety-critical modifications that are required to make sure the machine can operate safely.

53 The controller should ensure that the safety-critical aspects of a modification to an existing design are subject to pre-use inspection. See paragraphs 201–205 for details of what constitutes a safety-critical modification and paragraphs 99–140 for details of pre-use inspections.

54 Any person within the supply process who becomes aware of a design deficiency that might lead to danger should take all reasonable steps to ensure that others known to be in the supply chain and any controllers using that version of the device are provided with the information necessary to avoid failure of the device.

Manufacturers

55 During the manufacturing process you as a manufacturer should ensure that:

- every device fully meets the design specification in terms of materials, material properties, dimensions, quality and manufacturing standards etc;
- parts are clearly marked in a manner which will avoid errors in assembly;
- those constructing the device (eg welders, electrical technicians etc), including any subcontractors, are suitably qualified and competent to do so.

56 Where you use subcontractors for part of the manufacturing process, you should specify the following:

- the name of the individual or organisation which has the overall coordinating role for manufacture (either yourself or someone appointed to act on your behalf);
- the extent and limits of all contractors' duties and responsibilities;
- the expected criteria for quality assurance and quality control.

Quality assurance

57 You should make sure that:

- all components and materials used are of the correct quality;
- all aspects of manufacture are controlled by measures designed to produce a consistent and high standard of quality, eg by reference to established quality assurance procedures;
- people manufacturing the device are competent;
- it is manufactured to the appropriate standards.

Control systems

58 Where the device has safety functions that make use of one or more electrical, electronic or programmable electronic safety-related control systems, you should ensure that the system, including any software that may have a safety function, is designed, developed and quality assured using the principles set out in relevant standards.

Non-destructive testing (NDT)

59 You should also check that any NDT required during the manufacturing process has been done. It is good practice to keep the records of such tests for the lifetime of the device. You should supply any relevant NDT reports for inclusion in the operations manual; this is because if NDT subsequently finds flaws it will not be known whether these flaws have arisen during operation.

Commissioning test schedule and initial test

60 You should ensure that a written commissioning test schedule is in place that can be used by those people who are expected to install and put amusement devices into use.

61 It should confirm that the device has been manufactured and installed so that all operational and safety systems are functioning correctly. It should also list the tests that should be carried out during initial test in a separate schedule. See Section D paragraphs 127–135 for more information on the initial test.

62 The commissioning process in itself is not a substitute for an adequate initial test to be witnessed by the IB. To make sure the installation process is managed effectively, the commissioning process and initial test should be seen as separate exercises and clearly identified as such.

Installing an amusement device as a fixed structure

63 This section refers to the assembly of a device designed to be fixed rather than frequently erected and dismantled. For a new fixed structure, installation can be part of the manufacturing or supply process (depending on the design of the device and the terms of the contract). Installation may also involve more than one manufacturer and may be wholly or only partly under the controller's control.

64 CDM 2015 will apply to all construction projects, including those undertaken in the fairground industry, and may include the design, manufacture, build-up and strip-down of fixed machinery as well as other temporary and fixed structures. For further guidance on CDM 2015 see Appendix 1.

65 The parties involved must cooperate and coordinate to ensure they are clear as to who is responsible for what and at which stage of the

manufacture/installation. This should be confirmed in writing before any work begins and any modifications to the plan confirmed in writing to all interested parties.

66 If a device is installed as a fixed structure, but later dismantled and reinstalled, this should be considered as a modification. However, as long as no changes to the design have been made, a design review will only be required for the design of the foundations. The extent of the design review is a decision to be reached by an IB competent to undertake design review.

67 An initial test will still be required to confirm that the device has been installed/reinstalled correctly and that items such as theming have been properly added. If any new theming is involved this should be subject to pre-use inspection if it can affect the safety of the amusement device.

Converting a mobile amusement device to a static fixed device

68 There are times when a device that was originally designed for mobile use will be used as a fixed structure. As the controller, you should ensure that use of the device in this way does not introduce any new risks, for example deterioration of packing leading to instability over time. If in doubt, you should seek advice from the designer/manufacturer.

69 CDM 2015 will apply to all construction projects including those undertaken in the fairground industry and may include the build-up and strip-down of fixed machinery as well as other temporary and fixed structures. For further guidance on CDM 2015 see Appendix 1.

70 If the process of dismantling the amusement device and its subsequent assembly as a fixed device does not involve intrusive processes, or any changes that may affect the safety of the device, the necessity for a pre-use inspection may be limited to an initial test. The scope of that initial test will depend on any risks associated with any items added to the device not normally associated with mobile devices.

71 If safety-critical modifications have been made to the device the full range of pre-use inspections should be carried out before it is brought back into use.

Importing an amusement device

Importers

72 You are an importer if you bring a device into the country either temporarily or permanently. If you buy a foreign device through an agent who is permanently resident in Great Britain, the agent is normally the importer.

73 You are responsible for ensuring that the pre-use inspections (design review, ACD and initial test) are carried out and that the designer and manufacturer have followed the information in this guidance. You can do this by checking that the operations manual contains the necessary reports on the pre-use inspections.

74 The device should not be used unless these pre-use inspections have been carried out and a Declaration of Operational Compliance (DOC) has been issued.

75 It is recommended that in purchase contracts for new devices you should request that designers, manufacturers and importers follow the appropriate guidance in this book and in *Safety of amusement devices: Design*.[11]

76 You should take care to check that the documentation you receive follows the requirements of the pre-use inspections in this guidance. Differences in methodology, practice, procedures and certification requirements between countries can lead to different interpretations of what is required, for example:

- use of design criteria inappropriate for Great Britain, eg wind loading;
- incomplete review, eg with no, or inadequate, attention to control systems or passenger-containment systems;
- false assumptions, eg that a component or a safety-control system will never fail or that it will fail safe.

Supplying an amusement device

Suppliers

77 You become a supplier if you sell (or hire out) any device, new or second-hand. Make sure you do everything possible to check that the designer, manufacturer and importer, as appropriate, have complied with their legal requirements and have followed the advice in this guidance.

78 You should do this by checking that the operations manual contains the necessary reports on the pre-use inspections: design review, ACD and initial test. If these have not been done, you should take steps to have these completed before the device is first used.

79 You must provide the controller with all the information and instruction necessary for safe use before the device is first used. You should include the reports of pre-use inspections and any modifications stemming from them. Written information provided should be in English (and in the language of the controller if different).

80 If you hire out a device you should confirm that there are documents demonstrating that the device has been subjected to pre-use and in-service annual inspection by competent persons.

Section D Inspecting an amusement device

What the law requires

The Provision and Use of Work Equipment Regulations 1998 require that work equipment such as fairground attractions be inspected regularly by a competent person to ensure it can be operated, adjusted and maintained safely and that any deterioration (for example defect, damage, wear) can be detected and remedied before it results in unacceptable risks.

Inspections can vary from a simple visual external inspection to a detailed comprehensive inspection, which may include some dismantling and/or testing. An inspection should always include those safety related parts necessary for safe operation of equipment, for example restraint systems or electronic controls. The extent of the inspection required will depend on:

- the complexity of the device;
- the number of individual examination types required, eg NDT, electrical, structural, pneumatic etc;
- other device dependent factors which may require more frequent examination of some parts.

Other legislation may apply to work on all or discrete parts of fairground equipment, such as the:

- Pressure Systems Safety Regulations 2000 (PSSR);
- Control of Substances Hazardous to Health Regulations 2002 (COSHH);
- Control of Lead at Work Regulations 2002 (CLAW);
- Construction (Design and Management) Regulations 2015 (CDM 2015);
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

Inspection and testing

81 This section provides guidance for a system of pre-use and in-service inspection of amusement devices which, if followed, will normally ensure compliance with a controller's legal duties in this area. See Section F for guidance on maintaining and carrying out the daily checks which are required to operate a device safely.

82 Ride controllers must ensure their devices are inspected annually by a competent person. Ride controllers should be able to demonstrate the steps they have taken to make sure they have appointed a competent person to inspect their device – see paragraphs 94–96. There is no legal obligation to use an inspector from any particular registration scheme.

83 There are currently three HSE-recognised and supported, industry-run schemes for the inspection and testing of amusement devices:

- The Amusement Device Inspection Procedures Scheme (ADIPS), currently administered by ADIPS Ltd on behalf of ADSC, is based on the system for the safety of attractions set out in this guidance. HSE currently supports this version of the scheme. ADIPS Ltd also functions as a registration body for the competence assessment, registration and administrative control of IBs. It is supported by all the major ride-owning trade associations who recommend it to their members for the pre-use inspection, in-service annual inspection and certification of all amusement devices.
- Within ADSC's ADIPS scheme sits the pre-use and in-service inspection regime for all coin-operated amusement devices that do not fall under the main ADIPS scheme. This is administered by the British Amusement Catering Trade Association (BACTA).
- The PIPA scheme is administered by the Made Up Textiles Association (MUTA). This scheme is also recognised by HSE as being appropriate for the inspection and certification of inflatable amusement devices.

Amusement Device Inspection Procedures Scheme

84 ADIPS covers:

- the types of inspection required for amusement devices;
- documentation required by amusement device operators;
- inspections required for coin-operated passenger-carrying amusement devices which are administered under the BACTA (ADIPS) scheme.

Types of inspection covered in ADIPS

85 There are four types of inspection within ADIPS that fall into two categories: **pre-use inspections** and the **in-service annual inspection.**

Pre-use inspections

86 These should be carried out before an amusement device is used for the first time in Great Britain, or after any safety-critical modifications to an existing amusement device. These are:

- design review (paragraphs 105–121);
- ACD (paragraphs 122–127);
- initial test (paragraphs 128–141).

In-service annual inspection

87 This should be carried out at least once every 12 months (see paragraphs 144–152). Note that an IB may require a further examination at a specified shorter period.

Maturity risk assessment (MRA)

88 When ADIPS was introduced in 1997, it was recognised that there would be devices in use that had not been subject to pre-use inspections and did not have complete design documentation, but which were, nevertheless, demonstrably well-designed and maintained. An arrangement was therefore reached to allow such devices to continue to operate. The controllers of these devices were given until 2004 to prepare an MRA that could be used to demonstrate safety through maturity of a device. This only applied to devices that had operated in Great Britain before 1997.

89 It is accepted that there will be a number of older amusement devices operating that now have an MRA instead of the ADIPS pre-use inspections. To help assess the adequacy of these MRAs, guidance on the background to the MRA process – and information on what should be included in one – is outlined in Appendix 2. This information may be used by both IBs and HSE inspectors to determine the adequacy of the MRA.

90 The MRA was intended to be a one time, stand-alone assessment of the design, safety and fitness for use of an amusement device based on its condition at the time of the assessment and on its operational history. The assessment was designed to be in addition to, and separate from, the operational risk assessment. The operational risk assessment, of which the MRA would be a part, would still need to be kept in date but the MRA itself would become a historical document. The MRA concession was for a specified period and has now closed. No new MRAs will be accepted and pre-use inspection will be required.

91 Where devices are being brought into use after a long period of dormancy and do not have the necessary calculations, drawings or documents available, it may not be possible to conduct a DR. This is an exceptional situation which should rarely arise.

92 However, in these rare circumstances, an IB competent to conduct a DR should assess the entire device in order to create the equivalent of a design risk assessment. This should be used to determine the level of work which must be undertaken to prove to their satisfaction that the design will not present a significant risk to passengers, onlookers, passers-by, inspectors, operators and maintenance personnel.

93 In some instances this will allow for operational history and a series of tests and measurements to assist in proving the design is sound. Should operational history, tests and measurements be insufficient to allow the IB to form an opinion that the design is safe, then drawings and calculations should be commissioned, reviewed and the findings documented within the final report produced.

Register of inspection bodies (IBs)

94 Ride controllers must use a competent inspector to carry out the required inspections on their equipment. They should be able to demonstrate how they assured the competence of that inspector. Competence means someone with the necessary skills, knowledge and experience for the work they do. The fairground and amusement park industry trade associations have agreed, because of the safety benefits it has brought to the industry, that at the time of writing they will only recommend IBs registered with ADIPS Ltd – the ADSC version of the ADIPS scheme – to carry out inspection and certification of their members' amusement devices.

95 An IB may be registered for any or all of the types of inspection. They should only work within the scope of their registration. For example, IBs only registered to carry out in-service annual inspection should not carry out design reviews etc.

96 Any fairground or amusement park industry registration scheme should contain rules for each type of inspection, identifying the organisational, competency and independence requirements necessary for an RIB to be registered with the scheme. The rules should be based on the requirements of BS EN ISO 17020.[12] and should require all IBs to compile and maintain a quality management system demonstrating how they comply with the requirements of the scheme.

Administration of ADIPS Ltd

97 ADIPS Ltd currently operates the ADSC version of the ADIPS scheme:

- In this version of the scheme, ADIPS Ltd administers the IBs who carry out the four types of inspections needed on amusement devices. They have prepared a series of forms (available from ADIPS Ltd) used by IBs and only IBs competent for the type of work they carry out can register with this scheme.
- The BACTA scheme only applies to qualifying coin-operated, passenger-carrying amusement devices. In this scheme only the initial test and in-service annual inspection are required. BACTA maintains a register of inspectors for these inspections.

Independence of inspection bodies (IBs)

98 IBs should ensure that the inspectors involved in pre-use or in-service inspection are independent of the ownership, design, manufacture, supply, import, use or maintenance of the devices they are inspecting.

99 Where specialist expertise is required during pre-use or in-service inspection, it may be necessary to use a person who is not independent of the supply process. For example, it may be appropriate in some instances to use the manufacturer of a specialist component to give advice on its

fitness for further use. The competence of any specialist used is the responsibility of the person who appoints or contracts them. Any use of such specialists should be with the agreement of the relevant IB.

The pre-use inspection process

100 The controller of an amusement device is responsible for ensuring that the three pre-use inspections are satisfactorily carried out before it is put into operation with the public, either for the first time following its manufacture or import, or after any safety-critical modification. The controller may appoint an IB to take overall responsibility for arranging the work, confirming the completion of the pre-use process and issuing the DOC, although the final responsibility for the adequate completion of the pre-use inspection process rests with the controller. This IB is known as the appointed IB (AIB). The AIB may collate the work of others to complete the process and issue the DOC, or they may carry out some or all of the work themselves, depending on the circumstances and complexity of the task. Where only one body is involved it will automatically become the AIB.

101 The AIB should confirm before issuing the DOC that any requirements for further procedures and testing outlined during pre-use inspections have been satisfactorily completed.

102 This pre-use inspection process should apply to all new or newly designed devices and controllers should liaise with their IB early in the purchase process to make sure all of the documentation required is obtained from the manufacturer or importer.

103 In cases where parts of the design calculations, drawings or other documentation may not be present, ie for older devices, a risk-based approach should be followed to make sure the device is safe for use. This should be based on the manufacturer's design risk assessment and, where this does not exist, a person competent to conduct a design review should create an equivalent assessment.

104 For further guidance on completing the pre-use inspection process where the documentation is inadequate, see ADSC's *Safety of amusement devices: Design*.[11]

Design review

105 Design review is the first of the pre-use inspection procedures. Its purpose is for an independent and competent IB to assess a design prepared for a device, and conclude whether the designer has adequately addressed all issues that may affect the safety of the device that will be relevant throughout its intended operational life. Only IBs deemed competent to carry out design review work by their registration body should undertake this work.

When is a design review needed?

106 A design review should be carried out on all amusement devices before they are used for the first time in Great Britain. It will also be needed for safety-critical parts of a device that have been modified.

Application of a design review

107 It is essential that a design review clearly identifies the precise model number or design version of the device. If the designer or importer has not specified a design version number, the IB should identify the amusement device to which the review applies. This identification should appear on all documentation.

108 The design of a type of amusement device may vary over time as the designers and manufacturers change and update the original specification; modifications to the design may be minor or substantial. Changes may or may not be safety-critical. It cannot therefore be assumed that, simply because a device bears a physical resemblance to an earlier model, it is the same in every regard. If a design is modified in any way that affects safety a further design review will be needed.

109 If a design review is carried out and intended to apply to a series of identical devices, this should be clearly stated on the front sheet. In such cases the IB may be unable to confirm that the existing design review is valid for each device in the series without further work being done. For example, the design drawings referenced in the original design review will need to be available to the IB so they can check that the design of the new device is identical to the one previously reviewed. In such cases the other pre-use inspections will still be required for each individual device.

110 If a person intends to buy, import or supply a new device and an existing design review (such as one for an earlier model) is provided as evidence that the new device is safe, they should obtain written confirmation from the original design review IB that their design review is valid for the new device and applies to it in all respects. In such cases the other pre-use inspections will still be required for each individual device.

Managing design review

111 When a design review is commissioned, an IB should be selected by the person commissioning the work to take overall responsibility for coordinating the design review process and for confirming that the design of all relevant component parts of the device have been reviewed by competent IBs and their findings presented. This IB may subcontract to, and/or collate the reports issued by, other registered IBs where such bodies have been appointed by other parties (eg designer, manufacturer or controller) to carry out discrete parts of the overall review.

112 The coordinating IB is responsible for ensuring the competence of anyone subcontracted by them. They are not responsible for the quality of reports carried out by other registered IBs, who bear that responsibility themselves.

Contents of a design review

113 The design review should include (but not be limited to) the adequacy of the following where applicable:

- the design risk assessment;
- the design calculations;
- the design documents, which should be consistent with appropriate standards, specifications, guidelines and industry practice;
- details of any non-evidence-based assumptions, particularly those on which any calculations are based (eg fatigue life);
- the design and operation of any control system (electrical, electronic or other, programmable or otherwise);
- the structural/mechanical safety of the amusement device, including any theming which would present a risk if it were to fail;
- the suitability of the containment system (and the adequacy of any passenger restraints included as part of this system);
- the suitability of any railings, fencing and guarding;
- the operating instructions, which should be clear, complete and sufficiently detailed, including any restrictions on use, eg component fatigue lives, passenger speeds, weather etc;
- access and egress arrangements, eg for evacuation in emergencies and during maintenance work;
- the suitability of the initial test schedule;
- inspection and maintenance schedules, including the NDT schedule, that are sufficiently detailed.

114 Some modifications may require only limited review. In such cases, the coordinating IB should confirm the extent of the review.

When is a design review complete?

115 A design review should reach one of four conclusions:

- the device will be safe if built and operated and maintained to the design that has been reviewed; or
- deficiencies in the design have been identified, but the device is considered to be safe to operate where specified written operating, inspection and/or maintenance arrangements are in place to address those deficiencies (eg limitations in operating conditions such as reduced numbers of cars, reduced speed, specified inspections of critical parts etc); or

- deficiencies in the design have been identified, but the device is considered to be safe to operate for a limited number of cycles. In this case the design review should be limited, either by date or by number of completed ride cycles, and after it expires:
  - either a further review must be carried out to determine whether the device is safe to operate and what conditions of operation, maintenance and/or inspection are required; or
  - written confirmation has been received from the design review body that all outstanding issues have been satisfactorily resolved; or
- the design of the device is deficient to the extent that the device cannot be safely brought into service. In such cases the design review should state the reasons why. This should be communicated to the person who commissioned the review as soon as possible.

Deficiencies in the design

116 Where the design review identifies deficiencies or where there is inadequate information available to allow a design review to be carried out satisfactorily, this should be brought to the attention of the person who commissioned the design review, who should take appropriate action to rectify the deficiency.

117 Where any re-design has been carried out, it should be subjected to design review, to the extent determined by a competent design review IB.

118 A design review may produce findings that have implications for the safety of other devices. The controller and the design review body are advised to contact their trade association and/or the appropriate registration body in such cases. The ride manufacturer/designer/supplier should also be informed.

Completing the report of design review

119 As a minimum, the report of review should contain **all of** (but not be limited to) the following:

- information on the scope of the design review, eg whether it deals with a part (structural, electrical etc) or all of the design;
- a means of identifying the specific device, including any model numbers;
- a list of the drawings, with drawing dates and revision numbers, calculations and information reviewed;
- the results of the review of the relevant items outlined in paragraph 113;
- any measures that are required for safe operation;
- any extra information identified by the review that is required for the future inspection, operation and maintenance of the device;
- any time/cycle limitations;
- items that require further consideration at either the ACD or initial test stages.

120 The report of design review is not a substitute for the information that must be provided by the designer, manufacturer, importer or supplier, which is required for the safe operation, inspection and maintenance of the device. This information should be in the operations manual (see Appendix 3 for further details).

121 The design review may find some safety-related matters that still need to be proved by testing or other procedures. Where this is the case, the IB should state this in the design review report, including details of any further information and test results they need to allow the review to be completed. The design review will not be complete until any further safety-related work specified has been completed.

Assessment of conformity to design (ACD)

122 ACD is the second of the pre-use inspections. Its purpose is for an independent and competent IB to check that the safety-critical aspects of a manufactured device conform to the reviewed design.

123 The ACD for a device coming into use for the first time in Great Britain should cover the entire device, including structural, mechanical, electrical, control system, electronic, hydraulic and pneumatic assemblies. An assessment of a safety-critical modification, however, may need to cover only the parts affected.

124 As with the process of design review, it may be that more than one IB will be involved in checking the ACD of a device, especially if the device is large or complex. In this case, the person who commissions an ACD should appoint an IB to take overall responsibility for coordinating the process. This IB may subcontract to, and/or collate the reports issued by, other registered IBs.

125 The ACD should confirm that the design review corresponds specifically to the device being assessed. The process should involve using the drawings and information referenced in the design review. Examples of areas that may need to be considered are:

- critical structural and ergonomic dimensions;
- mass of components which could affect safety;
- conformity of materials to the design specification;
- conformity of electrical, hydraulic and pneumatic assemblies to the reviewed design.

126 The methods used may be physical and visual assessment and/or by considering quality assurance (QA) documentation from the manufacturing process. Sampling may be appropriate in some cases.

Issuing the report of assessment of conformity to design

127 At the completion of the ACD process, the IB should issue a report of assessment of conformity to design to the person who commissioned the report. The report should clearly specify:

- what has been assessed;
- any parts of the device which do not conform to the specification

Initial test

128 The initial test is the third of the pre-use inspections. The purpose of this inspection is to have an independent and competent IB check that the safety-critical aspects of a device function as intended. An initial test is needed at the following times:

- before first use of any device in Great Britain;
- before reuse after any safety-critical modification, but this may only need to cover the parts affected;
- before first use of any device installed at a fixed site (see Section C, paragraphs 68–71.).

129 The controller of the device is responsible for making sure that the initial test is carried out. It is normally carried out by or on behalf of the designer, manufacturer, importer or supplier in accordance with a prepared schedule, and witnessed and verified by the IB. The IB should ensure that all relevant tests have been carried out satisfactorily before issuing a report of initial test.

130 It may be that more than one IB is involved in the initial test. The person that commissions the initial test should appoint an IB to take overall responsibility for coordinating the process. This IB may subcontract to, and/or collate the reports issued by, other registered IBs where such bodies have been appointed by other parties, eg designer, manufacturer, controller etc.

131 Commissioning tests may not substitute for a properly conducted initial test. However, information from such tests may be submitted to the IB witnessing the test as evidence of the device's performance under particular conditions. The IB will decide whether the evidence is suitable to include as part of the tests required to issue a satisfactory report of initial test.

132 The initial test programme should take into account any recommendations for checks and tests included in the reports of design review and any additional tests or procedures recommended by the IB witnessing the initial test.

133 All documentation supplied for the purposes of the initial test should be in English. It would not be possible to conduct an adequate initial test if the documentation were in a foreign language.

134 The initial test is likely to be made up of a number of different tests that measure and record performance, rather than just checks on the

function of the controls. For example, when a stop control is tested, it may be important to know how long the device takes to stop and that it stops within prescribed limits. This will allow the controller to detect any later deterioration in performance.

135 The device should be tested against the range of foreseeable operating conditions, including maximum weights and speeds. For example, if a device is manufactured with an operational capability of being run by the operator at a rotational speed of 25 rpm, it should be tested at that speed to give a true test of its possible performance.

136 Using documentation relating to tests done by others is acceptable if reasonable steps have been taken to verify that the tests were relevant, the procedures used were appropriate and the results reliable. These reports need to be added to the report of initial test. Where previous tests are accepted, functional testing of the device under both normal and foreseeable emergency conditions still needs to be witnessed by the IB.

Managing initial test

137 The initial test should include, where relevant, but not be limited to:

- an assessment of the stability of the device, including when foreseeably unbalanced;
- checking the safety-critical elements of safety envelopes;
- checks to make sure that switches, valves, variable controllers (eg pressure regulators), overload protection (eg pressure-relief valves) etc are properly set and, where appropriate, locked off and settings recorded;
- observations and measurements of the performance of the device under normal loading and foreseeable unbalanced loading in all the configurations permitted in the operations manual;
- measurements of speeds, accelerations and forces up to the maximum to check the validity of the design calculations;
- tests of the function and performance of all safety-critical systems in normal operation and under foreseeable fault and emergency conditions;
- confirming proper operation of emergency functions and evacuation procedures;
- confirming the availability of an operations manual in the language of the controller.

138 Test loads should be of an appropriate size and shape, for example a sandbag strapped to a seat might be adequate to test structural members supporting a passenger unit, but might not be suitable to test the effectiveness of a passenger restraint.

139 When the initial test is complete, the IB should discuss any unsatisfactory results with the designer, controller and coordinating design review IB and document all results, including damage or failure. The IB should document any repeat testing to be carried out after any required remedial action has been completed.

140 A report of initial test should be issued to the person who has commissioned the report for subsequent inclusion in the operations manual. A report of satisfactory initial test should not be issued unless the AIB has witnessed and verified that, at the time and place of test, the device has performed safely.

Issuing a report of initial test

141 The IB should prepare a report for inclusion in the operations manual. A satisfactory report should be based on the schedule provided by the designer/manufacturer and verified in the design review. The following should be included, where relevant:

- the loads used and results obtained (as the reference for future tests);
- details of the relevant testing done by the manufacturer and the results obtained;
- copies of inspection reports and tests done by others;
- details of the weather conditions at the time of the test, if relevant;
- any limitations as to use identified during the initial test;
- any aspects of performance identified during the initial test that the controller should monitor and details of how that should be done;
- confirmation that an initial test has been witnessed and the device performs according to requirements of the initial test schedule.

Completion of the pre-use inspections and issue of the declaration of operational compliance (DOC)

142 A DOC can be issued by the AIB when the IBs coordinating each of the pre-use inspections have confirmed in writing that those inspections have been satisfactorily completed. The DOC should be issued with an expiry date subject to any conditions imposed as a result of the findings of the pre-use inspections, but in any case for no longer than 12 months.

143 The AIB issuing the DOC should confirm the following:

- that the steps in paragraph 113 have been completed;
- that all relevant component parts (eg mechanical, structural, hydraulic, control system, electrical, electronic, ergonomic, containment etc) of the device have been subjected to design review and ACD by competent IBs and their findings presented;
- where appropriate, results of ACD and initial test have been assessed by the relevant design review AIBs and they have confirmed the findings are acceptable.

In-service annual inspection

144 In-service annual inspection is the fourth of the package of safety inspections for devices operating in Great Britain. Its purpose is for independent and competent IBs to check on the fitness of an amusement

device for further use during its operational life. It is also a check on the safety-critical components of an amusement device to make sure that they have not deteriorated to an extent liable to cause danger.

145 In-service annual inspection will verify whether a device is fit to be used for a specified period. It does not remove the duty on the controller of a device to ensure that the device is adequately maintained, nor does it duplicate the pre-use inspection procedure.

Managing in-service annual inspection

146 The controller of an amusement device should choose an IB to act as the appointed inspection body. It is the role of the AIB to issue the DOC when the inspection has been satisfactorily completed. Where only one IB is involved it will automatically become the AIB.

147 There may be a number of different IBs carrying out inspections and tests of individual subsystems (eg mechanical, hydraulic, electrical etc) covering all the amusement devices.

148 If actions need to be taken before the device can be used again, or within a specified time, the IB should inform the controller in writing of the requirements. A DOC should not be issued or the device used again until all required actions have been completed.

149 The AIB should make sure that all the relevant inspections required to ensure the continuing safety integrity of the amusement device have been completed and a report issued. A report number, completion date and expiry date should be provided for each report. Once these are confirmed and collated the AIB may then issue a DOC to the device controller.

150 Where an IB has completed its inspections, but the final report has not been issued, the AIB may issue a DOC as long as the IB concerned has confirmed in writing that the inspections have been completed and the device has been found to be satisfactory.

151 A registered IB should not work outside its area of competence, ie the categories of work their registration body has deemed them competent to work within.

152 An IB is not responsible for work carried out by other registered IBs. The individual IBs have a duty to ensure their own work is both competent and diligent.

How long is a DOC valid for?

153 The DOC lists the individual inspections that have been done and the date they were completed. These inspections should normally be valid for 12 months from completion, unless a shorter time has been specified. Each of the reports will have an expiry date. The expiry dates of the reports may be different if the individual reports were carried out at different times.

154 The DOC expires on the date that the first individual examination reports listed on the DOC expire. The period of time between in-service annual inspections should not exceed 12 months, but may be a shorter period of time if specified in any of the reports or by the AIB.

Role of the appointed inspection body (AIB)

155 The AIB should:

- confirm that the pre-use inspections (design review, ACD and initial test, or risk assessments if the design is mature (see Appendix 2)), have been carried out and are documented in the operations manual;
- confirm that the relevant in-service inspections are documented in the operations manual;
- make all reasonable enquiries with the controller as to whether any modifications that may affect the safe operation of the device have been made since the previous DOC was issued and that the new design review, ACD and initial test, as required, have been documented in the operations manual;
- confirm that the report of functional test is in the operations manual. The purpose of the functional test is to check that the device operates safely within stated operating conditions.

Preparing for an in-service annual inspection

156 The controller and the relevant IBs should agree how the attraction is to be prepared for inspection and the items to be dismantled. It is recommended that this is done in advance to allow individual parts to be prepared for inspection before the IB arrives. Preparation may include degreasing, removal of rust, removal of paint or other protective finishes. This will normally include the dismantling of complex assemblies to allow access to safety-critical areas.

157 Difficulty of access is not a valid reason for failing to inspect safety-critical components.

158 The schedule specifying the required non-destructive testing, or NDT, will also provide information on any disassembly required. See Appendix 5 for further details.

159 Before starting work, the IBs involved in the inspection should:

- check with the controller and in the operations manual to see whether any safety-critical components have been replaced, modified or repaired since the issue of the previous DOC. If so, there may be a need for further inspection or actions as a result of this work;
- check with the controller for any relevant accident or incident history of the device. This will inform them of necessary further inspection or action that may be required;
- check the operations manual to review the service history, identify the safety-critical components and any recommended inspection methods listed.

Recommended procedure for in-service annual inspection

160 The inspection should include (but should not be limited to), where appropriate:

- visual inspections;
- mechanical tests;
- NDTs;
- pneumatic tests;
- hydraulic tests;
- electrical tests;
- functional tests.

161 An in-service annual inspection should consider all the safety-critical parts of the device and those with the potential to cause danger. This will normally include (but not be limited to) the following, where appropriate:

- the condition of mechanical and structural parts of the device. Examples of this are the load-bearing components including the supporting structure, passenger-carrying units, couplings etc;
- any equipment used for assembling or dismantling, including lifting equipment where it is part of the device;
- the condition and settings of the hydraulic or pneumatic system;
- interlocks, especially those that have a safety function;
- the integrity of the passenger-containment system;
- the integrity of the passenger restraint to make sure that it is in good condition, properly adjustable and functioning correctly. This should include a sample strip-down of passenger restraints unless there is a reason for not doing so documented in the operations manual. Any sampling carried out should follow the guidance in paragraphs 164–165;
- the parts of the device which do not normally bear passenger loads, including lighting fittings, guard rails, canopies etc and other decorative features as well as their supporting members (particularly important where such parts could fall or be projected into the path of moving passenger carriages);
- the integrity of the electrical installation, including generators;
- equipment providing motive power;
- control systems, particularly those systems that have a safety function;
- provision of adequate rails, fences and guards;
- attachments which could affect safe operation, eg theming, lighting supports and access platforms;
- secondary safety equipment which is not designed to function during the normal operation of the device, for example:
  - fall-back arrestors, emergency brakes or other systems providing redundancy and back-up systems;
  - chains and ropes used to retain parts of the device in place in the event of structural failure;
  - integral or device-specific evacuation equipment.

162 IBs should make any recommendations to the ride controller for any other inspection or testing that they feel is necessary to allow them to complete their part of the inspection.

163 An IB should confirm that devices have been upgraded to avoid danger, where information is reasonably available to them and lies within the remit of the inspection they are carrying out. Sources of information would include safety bulletins from manufacturers, the trade associations, ADIPS Ltd or other ride/inspector registration bodies, HSE and information received by the controller.

Sampling

164 If a device has a number of identical components which can be individually identified, the relevant IB may select a proportion of them and examine that sample in detail. If any defects are found in the sampled components they should be assessed by the relevant IB as to their type, severity and significance and, where required, the remainder of the sampled components should be checked.

165 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 similar components have been inspected.

Functional test

166 As part of the in-service annual inspection an IB should observe a satisfactory functional test. This should not be attempted before necessary work on safety-critical components identified as a result of the inspection is complete and the device reassembled. It may require a separate visit.

167 The device should be observed operating normally and at its upper and lower operational limits (with representative loads if necessary) and the effective operation of safety-related controls checked. The load may be provided by passengers if safe to do so.

168 The observations made should be compared with the operating specifications set out in the operations manual. This includes those for speed controls, stopping devices and any interlocks, for example between passenger restraints and the starting device.

169 The integrity and functionality of any device-specific emergency equipment, whether integral or not, eg evacuation platforms, emergency lowering devices etc should be confirmed unless this has been inspected under other statutory requirements.

Written report

170 After completing their inspection, each IB involved should prepare a written report, including a reference number and dates of completion and expiry. The report should identify any faults or any areas which require further inspection or testing. It should clearly state:

- a list of any defects and any timescales for rectification, eg before next use of the device in the case of safety-critical defects;
- the maximum period of time that the device may be operated before reinspection of the full device (or named components);
- if, after remedial maintenance, repair or testing has been completed, further inspection is required.

171 Once the AIB has collated all the individual inspection reports and, by doing so, has confirmed that all the relevant inspections have been satisfactorily completed, they may issue a DOC to the controller. A DOC should not be issued until the AIB is satisfied that all necessary remedial actions outlined in the inspection reports have been addressed and the device is safe for use.

Section E Guidance for organisers

What the law requires

Fairground organisers will normally have duties under the HSW Act and other secondary legislation including the Management of Health and Safety and Work Regulations 1999.

The extent of these duties will vary depending on such things as the level of control they have over the management and organisation of the fair and their contractual arrangements with individual ride controllers, contractors and others.

For example, on a traditional travelling fair, where the customer pays the individual ride controller directly, the organiser will have legal duties to ensure the public areas are safe but will have limited duties concerning the safety of individual devices, unless they are the controller of that device. Where individual device owners are paid by the organiser, and where the customers pay the organiser or their agent on entry or buy a ride bracelet or similar, the contractual arrangements may mean the organiser assumes additional duties for the safety of individual devices.

Role of the organiser

172 Effective organisation of fairs and amusement parks is essential to manage safety properly and to control risks. The organiser should ensure the safe operation of the fair or amusement park by taking overall responsibility for the management of the risks. The organiser will need to:

- identify any control measures needed to avoid or reduce risks to the public and employees;
- have a policy in place for organising, planning, monitoring, controlling and reviewing activities that affect the safety of people on the site.

173 The organiser may be an individual, a group of people or a company. In practice, the identity of the organiser will depend on the following:

- for fixed sites, such as amusement parks, the person or company in control of the overall site will usually be responsible;
- for temporary sites the situation may be more complex:
  - where an individual acts as a licensee, that individual is the organiser;
  - where there is no licensee, then an organiser should be chosen and be given the necessary authority by the controllers present;
  - where the fair is part of a larger event, eg a music festival, the overall event promoter will retain the legal duty to make sure the whole site is safe but may engage a separate organiser for the fairground part of the site. The controllers present must cooperate with the organiser.

174 While individual controllers have overall responsibility for the safe operation of their attractions, the organiser needs to make sure that the actions of these controllers do not affect the overall safety of the site. The organiser should ensure that individual controllers have complied with their duties under this guidance to make sure their attractions do not create risks in areas outside their attraction. It is **imperative** that the organiser has the authority to take any necessary action to ensure the safety of the public if it is apparent that a controller is failing to do so.

175 CDM 2015 will apply to all construction projects including those undertaken in the fairground industry and may include the design, manufacture, build-up and strip-down of both fixed and travelling machinery as well as other temporary and fixed structures. For further guidance on CDM see Appendix 1.

Organising

176 As organiser you should:

- appoint responsible people to be on site and on duty while the public is on site and make sure they have been trained in the action to take if there is a fire or other emergency;
- make sure that people with specific responsibilities in emergencies are readily identifiable by conspicuous clothing or marking;
- have a named deputy on site who has the responsibility and authority to act in your place;
- let each controller, operator and attendant know your identity and the names of any deputies, together with all necessary information about the emergency plan, including nearest A&E, site address and any relevant telephone numbers, eg landlord;
- identify and mark escape routes and any assembly points and make these known to staff and to the emergency services and others involved with the fair.

177 Make sure that everyone involved has received relevant training in emergency procedures. This does not necessarily mean that you have to do the training, but you should check that it has been done. The training should include:

- how to spot and prevent potential emergencies;
- what to do on discovering an emergency;
- how to raise the alarm;
- how to use emergency equipment;
- how to help others escape to a safe place.

Planning

178 You should make sure your planning includes liaison with the landlord/overall event organiser and emergency services. In some circumstances a local authority Safety Advisory Group (SAG) may be able to provide advice and information relevant to your planning. Information on event safety is on the HSE website at www.hse.gov.uk.

179 Ensure that risk assessments have been carried out identifying what needs to be done about:

- buried and overhead services;
- the layout and spacing of devices and attractions;
- electrical distribution;
- transport and access, eg for both routine transport movement during set-up and breakdown and for emergency vehicles;
- emergency situations, including evacuation, which could arise from:
  - fire or explosion;
  - major failure of an attraction;
  - severe weather conditions;
  - overcrowding or crowd disturbances;
  - any other reasonably foreseeable emergencies, which will depend on the nature, size and location of the site.

Emergency plan

180 Make sure you have appropriate emergency procedures in place for the duration of the fair. You should have prepared a written emergency plan before the fair starts, or, in the case of a fixed site, before it opens to members of the public. The detail and complexity of any plan will depend on factors such as the size of the fair or fixed site, its location, external factors, duration and the likely number of visitors. You should discuss your plans with the emergency services. The risk assessments for the fair should provide a focus for areas that need to be considered. Where a foreseeable emergency will involve the organiser and a ride controller, eg rescue of members of the public trapped in a high ride, they must liaise to ensure it is safe for the necessary equipment,

for example emergency service vehicles, mobile elevating work platform (MEWP) etc, to access the site of the emergency.

181 The emergency plan should be made available to controllers, the emergency services and the local authority. It should include:

- a list of people with allocated responsibilities and their contact details;
- stewarding arrangements (stewards should not be involved in the operation of amusement devices);
- conditions agreed with the emergency services, such as:
  - liaison arrangements;
  - rendezvous points, entrances and emergency routes;
  - the location of services (eg water, electricity etc);
- site evacuation procedures;
- contact details for the relevant emergency services;
- a layout plan of the site. This should include, where appropriate:
  - device locations;
  - entrances, including access for emergency services;
  - pedestrian and traffic routes;
  - position of control centres;
  - location of services (eg water hydrants, electrical substations etc);
  - assembly positions.

182 Plan the layout of attractions so that:

- risks arising from the site such as uneven or soft ground, wind uplifts or from another structure or overhead power lines, are minimised;
- there are no points where channelling the public could lead to dangerous overcrowding in an emergency. Extra space may be needed around popular attractions;
- there is sufficient space to allow access for emergency vehicles (including access to fire hydrants), at the same time as the public is being evacuated. Don't forget that access routes will need to be able to cope with people with disabilities or families with children and pushchairs;
- there are identified access routes that can take the weight of all vehicles. Remember that emergency vehicles and recovery equipment, eg cranes, may need to access the site;
- the ground or structures used are suitable to take the weight of all anticipated people, plant and vehicles. Many large emergency service vehicles or MEWPs are not suitable for use on grass sites;
- there are safe distances between attractions and perimeter walls, fences etc (this includes any barriers and waiting areas), taking into account:
  - the motion and passenger clearance envelopes of amusement devices;
  - the need for emergency access and egress (pedestrians and vehicles);
  - segregation of the public from dangerous moving parts or areas of danger.

183 For coin-operated passenger-carrying amusement devices, distances between them may vary, as long as any necessary safety envelope is not compromised.

184 Ask advice from the local electricity company to find out if power lines cross over or under sites where attractions will be placed. Make sure controllers are aware of the risks and relevant precautions. Further advice is available in Guidance Note GS6 *Avoiding danger from overhead power lines*.[13]

185 If the fair is likely to disturb the ground or if significant loads are to be placed upon it, you as the organiser should obtain relevant information on underground services from the owner of the land and the local utility suppliers. Pass this on to the controllers and plan the fair to minimise the need for them to place poles or pegs near such services, or to place load-bearing structures where the ground is not suitable, eg above voids. Use cable-locating techniques before any excavating is done. Further information is given in HSG47 *Avoiding danger from underground services*.[14]

186 Some sites, for example those used for street fairs, may have restricted or difficult access. In such cases you may need to liaise with the local authority, police or landlord to plan the times of arrival and departure of the attractions to minimise the risks to members of the public passing through the area during build-up and pull-down. If necessary, seek permission to restrict access by the public during these times.

187 Check before the fair starts that all controllers have current insurance and that for each device there is a current DOC from a registered IB with a relevant set of reports in its operations manual to show that it is fit for use.

188 Employers have duties under the Health and Safety (First-Aid) Regulations 1981 to make first-aid arrangements for their own employees.[15,16] It is strongly recommended that you make arrangements to provide first aid for members of the public. Providing trained first-aiders for the public should be seen as an important part of your emergency planning. More advice in this area can be found at www.hse.gov.uk.

189 If you are planning a firework display on your site you are strongly recommended to use a professional company and consider the guidance in *Working together on firework displays*.[17]

Managing the site

190 To manage the site effectively you need to:

- be available on site, or be represented by an onsite deputy, whenever the site is open to the public;
- establish a means of communicating with controllers, the public and the emergency services;
- identify and mark any areas prohibited to the public;
- make sure fire and other safety checks are carried out each day before the public is admitted, for example that:
  - a system for raising the alarm is in place;
  - fire escape routes are unobstructed and all fire exit signs are clearly visible;
  - there are no obvious hazards (eg deteriorating ground conditions);
  - fire instruction notices are displayed;
  - fire-fighting equipment is available.

Monitoring the site

191 Make sure that safe conditions are maintained in and around the attractions throughout the day by:

- monitoring individual attractions;
- checking for overcrowding and re-routing the public if necessary;
- keeping all routes, including emergency routes, clear and well signposted;
- monitoring the condition of the site, particularly housekeeping and the state of the ground, and that waste paper and other flammable materials are not allowed to accumulate where they may become a source of danger;
- checking that the layout stays as planned;
- ensuring that any accidents/incidents are recorded as necessary and investigated.

Review your procedures

192 For a temporary site, review the effectiveness of your procedures at the end of the fair. For a fixed site, review procedures at regular intervals. Use the findings in future planning. Include a review of effectiveness of the organisation with your own staff, family members and colleagues.

Section F Guidance for controllers

What the law requires

Ride controllers have a general duty under the HSW Act to ensure, so far as reasonably practicable, the health, safety and welfare of their employees and that others including the public are not, so far as reasonably practicable, exposed to risk to their health and safety.

The other principal duties include ensuring that:

- any device they import, buy, sell, hire or otherwise have control of was designed and manufactured in accordance with all the relevant legislation and standards;
- their device can be transported, built up, inspected, operated and dismantled without creating risks to the health or safety of any person;
- all components of their device have been regularly inspected by competent people to make sure it is safe for use;
- the device is routinely examined and maintained so it remains safe for use;
- any staff they engage are trained and competent in their roles and that they work safely;
- the safety and health of the public is protected from the hazards of your device, whether riding or not;
- procedures are in place to deal with any foreseeable emergencies, eg device failing, fire etc;
- accidents are reported, as necessary.

Safe operation

193 The overall objective for controllers is to ensure that the initial integrity of a device is maintained, and that it is operated safely in respect of the risks to employees and the public. This can be achieved through the lifetime of a device from pre-purchase enquiries to eventual sale by:

- following ADIPS for pre-use and in-service inspections (see Section D);
- ensuring the required documentation accompanies the attraction when buying and selling (see paragraphs 195–201 and Section C);

- safely modifying and repairing (see paragraphs 202–207 and Section C);
- carrying out effective maintenance (see paragraphs 212–222);
- using a safe systems of operation (see paragraphs 223–286);
- training operators and attendants (see paragraphs 287–298);
- maintaining the operations manual (see Appendix 3);
- developing and following emergency procedures if necessary (see paragraphs 299–304);
- periodically reviewing the effectiveness of the above.

Responsibilities of controllers

194 You are responsible for the safe operation of all your devices. You may delegate tasks, but overall responsibility remains with you at all times. You must also:

- cooperate with others, for example the organiser, other controllers etc to ensure safety;
- report any injuries when required. By reporting an incident when legally required you are not admitting liability, but if you do not report it, that is a criminal offence under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (see paragraphs 305–309);
- assess the risks on site to identify the control measures required to make sure your devices operate safely.

Buying or selling a device

195 Amusement devices come within the definition of 'work equipment' in PUWER, with the exception of coin-operated devices designed for unattended use. Duties under PUWER apply to all employers and to self-employed people whose activity poses a potential risk to the health and safety of other workers – see *Using work equipment safely*[18] for further guidance.

196 If you directly import fairground equipment you assume the legal duties of the designer, manufacturer and supplier. You may be in breach of the relevant legislation for any failures or injury that result from the design or manufacture of a device unless you have taken reasonable steps to check that it complies with legal requirements. You can do this by following this guidance and using an IB competent to carry out pre-use inspections (design review, ACD and initial test) to confirm that you have satisfactorily addressed these duties (see Section D).

197 You should not use an amusement device unless you have suitable documentation in English to demonstrate that it is safe for such use; either the relevant pre-use inspection reports or a suitable maturity risk assessment (this will depend on the age of the device and the date it was manufactured or imported – see Section D, paragraphs 86–87).

A device should have an operations manual consistent with Appendix 3 of this guidance. This should also be in English. Without this documentation you cannot be certain that everything necessary to make the device safe has been done. In the case of coin-operated amusement devices, an initial test report and instruction manual is sufficient.

198 If you acquire a second-hand device, the current DOC should be reissued by an IB in the name of the new controller. If the device was designed to be permanently installed and has been moved to a new site, this should be considered a safety-critical modification and subject to the relevant pre-use inspections.

199 If you sell, hire or lend out any device, new or second-hand, you become a supplier. You must comply with section 6 of the HSW Act for fairground equipment (see Appendix 1).

200 If you sell a second-hand device you should provide the buyer with the operations manual (see Appendix 3). There will be some older devices for which the operations manual is incomplete. In these cases, as much of the device history as possible should have been gathered to form the manual. For coin-operated amusement devices it is sufficient to have an instruction manual.

201 If you hire or lend out a device you should make sure that it is in a safe condition, and has adequate operating instructions and a current DOC. You should also ensure you have suitable systems in place for inspecting and maintaining it when it is returned and before it is rehired or re-lent out. In the case of inflatable devices, a PIPA certificate or similar issued by a competent IB will also be acceptable.

Modification and repair

202 Before modifying any device, make sure that the proposed modification will be safe.

203 Any safety-critical modification should be subjected to pre-use inspections. This should include (but not be limited to) changes to:

- loading (eg changing seating arrangements, fitting heavier or lighter passenger units);
- speed or operating cycle;
- range (eg height of lift);
- safety envelope;
- safety-critical components, devices or systems;
- structural and mechanical components;
- drive mechanisms;
- control mechanisms (eg brakes, shock absorbers, speed limiters, speed or position sensors);
- electronic control system including hardware and software;
- passenger containment (including fencing and barriers);
- passenger height restrictions.

204 It will also include:

- use of a device outside its specification or the normal environment for which it was designed;
- reinstallation of a fixed device in a different location.

205 If in doubt, it should be assumed that every modification is safety-critical and the advice of a competent person should be sought.

206 Before using any device following a safety-critical modification, you should obtain and enter in the operations manual the following documents relating to the modifications:

- report of design review (see paragraphs 119–121);
- report of ACD (see paragraph 127);
- report of initial test (see paragraph 141).

207 After a repair do not use a device until:

- every repaired part has been checked against the specification and/or procedure. If there are differences you should treat the repair as a modification;
- details of the repair and any relevant tests and inspections are recorded in the operations manual. For coin-operated amusement devices, the details may be recorded in any suitable way.

Converting a mobile amusement device to a static fixed device

208 There are times when a device that was originally designed for mobile use will be used as a fixed structure. The controller should ensure that use of the device in this way does not introduce any new risks, for example deterioration of packing leading to instability over time. If in doubt, the advice of the designer/manufacturer should be sought.

Inspection and test

209 Ensure that all necessary pre-use inspections (or design maturity risk assessment for older rides – see paragraphs 88–93) have been carried out on a device before it is brought into service for the first time. Also make sure that each device is subject to in-service annual inspection and that it has a current DOC. Only use an IB that is competent to carry out pre-use and in-service inspections. See Section D for information on IBs and types of inspections.

210 In some cases more frequent inspections may be required. Other types of examination may also be necessary (eg statutory examinations such as for pressure systems, lifting equipment etc).

211 The controller should keep reports of in-service annual inspections for at least 10 years (indefinitely if possible) to provide a history of the device.

Maintenance

212 The process of pre-use and in-service inspection is important as part of the system to make sure a device is safe. However, these inspections are not enough to ensure that a device is adequately maintained in a safe condition. You are responsible for making sure that additional periodic checks, inspections and maintenance are done so that a device remains in a safe condition during the period it is being operated.

213 It is good practice to keep records of all maintenance work carried out.

Daily check

214 Paragraphs 215–216 may not be relevant to coin-operated amusement devices, but those responsible for such equipment are strongly recommended to check daily for damage and to make sure that the device is working properly.

215 Make sure that each device has a daily check before the public uses it. For an amusement device the daily check should be in writing, filed in the operations manual and:

- take account of any instructions from designers, manufacturers, importers, suppliers and IBs;
- list all parts and other matters which need daily checking to ensure safety and describe how they should be checked;
- include, where appropriate, details of the extent of acceptable variations, eg out-of-level, air pressures, torque settings, wear;
- check that safety controls, brakes and other safety devices, including communication systems, operate effectively (these should be done daily unless it can be shown that a longer periodic inspection is appropriate);
- include checks to make sure that barriers, fences, guards, walkways, locking devices and securing pins etc are in place and in good condition;
- make sure that cabinets, boxes, enclosures etc containing hazardous equipment and/or substances are suitably secured;
- for a ride, require at least one complete operating cycle.

216 You must make sure the person doing the daily check is competent to do it properly. It is good practice to keep records of any relevant training provided. Keep records of daily checks and of any remedial action taken, if possible for at least three years and in such a way that the records can be examined if needed.

217 You should not open a device to the public unless a satisfactory daily check has been carried out.

Periodic maintenance

218 You must properly maintain and service work equipment, which includes amusement devices. You should ensure that maintenance work is done:

- by people trained or experienced in the procedures appropriate for that equipment;
- taking account of the manufacturer's instructions and maintenance schedules. Where they are not specified, seek the advice of a competent person.

219 It is good practice to keep a supply of common components (eg springs, catches etc) and to have a programme of planned preventive maintenance aimed at replacing components before they reach the end of their useful lives. An important part of maintenance is condition monitoring, ie the recording of the condition of components and performance of systems at regular intervals so that gradual changes can be detected. For example, on a ride:

- Is the travel on a control lever increasing?
- Is the device taking longer to stop?
- Are the readings on pressure gauges changing?

220 Welding or other hot work may be needed as part of maintenance. It is possible that by doing welding, you may be making a safety-critical modification. If so, it will require a design review, an ACD and/or an initial test. You should take advice from a competent IB before doing any welding or hot work on your device.

221 Do not repair cracks in any device without consulting the manufacturer or a competent person. The manufacturer needs to know if there is a problem so that causes can be investigated and remedied. The manufacturer may then want to make recommendations about the repairs and/or safe operating conditions. If any welding is done, make sure that the correct materials and techniques have been used so that the integrity of the device is not affected.

222 Before operating a device following maintenance make sure that any protective devices, eg guards, fences, doors, interlocks etc which may have been removed, are replaced, secured and are operational.

Safe systems of operation

223 Paragraphs 223–286 give practical guidance on how safe systems of working can be adopted by controllers.

224 Never operate a device without a valid DOC.

Siting of amusement devices

225 You must cooperate with the organiser in assessing any site risks as they may apply to your device (see Section E).

226 Make sure that each device is erected on ground or a structure which:

- can safely bear the load;
- is stable and suitable for the device to be built up and used safely.

227 Take account of any manufacturers' instructions relating to operating conditions such as wind speed and make sure that adequate anchoring points have been used.

Transporting, assembling and dismantling devices

228 CDM 2015 will apply to all construction projects including those undertaken in the fairground industry and may include the design, manufacture, build-up and strip-down of both fixed and travelling machinery as well as other temporary and fixed structures. For further guidance on CDM see Appendix 1.

229 When transporting, assembling or dismantling:

- move devices in a way that minimises the risk of damage to safety-critical components. Make sure that all loads are properly secured during transit;
- take care when moving vehicles on site. Carry out vehicle movements in accordance with any instructions from the organiser;
- avoid moving vehicles if there are members of the public, for example young children, in the area;
- avoid reversing where possible and where it is unavoidable take reasonable precautions, such as using a banksman;
- assemble and dismantle each device in accordance with the manufacturer's instructions using trained personnel or people under supervision.

230 During assembly and dismantling, use any temporary guys, stays, supports and fixings needed to prevent danger from the overstressing or collapse of any part of the device. Provide enough lighting for it to be done safely and take all reasonable steps to exclude the public and others who are not involved in carrying out the work.

231 Lifting equipment falls under the requirement of LOLER and should be thoroughly examined, tested and inspected (see Appendix 1) either:

- in accordance with legal requirements; or
- if it is a part of the device required to allow it to operate as an amusement device, to the same standard as required for the remainder of the device.

Assembling component parts

232 Have procedures to make sure that safety-related components are:

- individually identifiable if they look the same but are not interchangeable;
- stored to minimise the risk of deterioration and contamination;
- examined for signs of wear, deformation and damage when being assembled;
- cleaned and lubricated as necessary before being incorporated into the structure;
- carefully assembled so they are not damaged, for example they should be correctly aligned and not bent, distorted or unduly forced;
- assembled using appropriate fastening and securing components which are properly used and correctly adjusted. In particular:
  - 'R' clips should be the right size, in good condition and correctly fitted;
  - split pins should be spread effectively;
  - self-locking nuts should not be used more times than recommended by the manufacturer;
  - recommended torque settings should be applied;
- not thrown or dropped where this is likely to injure people or damage equipment.

233 Replace components that are damaged or have excessive wear before you use the device again.

234 If you find repeated or unusual damage to safety-critical components, seek specialist advice as it could indicate a fault developing on the device.

Operational stability and safety

235 Travelling amusement devices can be assembled and dismantled several times over the course of a season and even fixed devices may be moved on occasion. The assembly process should take into account the following to make sure they are stable and secure before they are put into service:

- Check that all the structural members needed for stability and safety are correctly used and that appropriate packing is provided.
- Level and pack each device according to the operations manual, making sure that loads are adequately distributed and firmly

supported. Where practicable, place the packing directly beneath the load points. If you cannot do this, use a supporting structure suitable for transmitting the loads safely through the packing to the ground.

- Use only suitable packing materials and place them to prevent slipping or sinking. Keep the number of packing pieces to the minimum consistent with safe operation. Never rely on hydraulic jacks to support a device. Check packing regularly.
- Check the ground regularly after a device has been built up and during periods of bad weather to confirm that its load-bearing capacity has not deteriorated.
- For a device with rail tracks, lay them so that the passenger-carrying units run safely and smoothly over them. Where required, clearly mark pedestrian crossing places and make sure the surfaces are level enough to prevent trips and falls.

Preventing access to dangerous moving parts and areas

236 A major risk is that of people coming into contact with dangerous moving parts of devices. Your risk assessment (see Section B) should identify appropriate control measures such as:

- barriers, railings, fencing and guarding;
- interlocks or locking-off points and procedures;
- platforms;
- steps;
- marking danger zones;
- notices;
- staff training;
- supervision.

237 In many cases you will need to use more than one control measure. Where your control measures include supervision, operators and attendants will need appropriate training. You have responsibility to ensure the safety of your staff as well as the public. You must make sure a person cannot be struck by the moving parts of a device.

Barriers, railings, fencing and guarding

238 Providing a suitable barrier is often the most effective way of preventing access to danger areas or dangerous parts. If the barrier protects an edge from which somebody could be injured if they fell, the barrier should comply with relevant standards and should be designed both to prevent people from becoming trapped in or falling through them and to discourage attempts to climb, eg by using vertical rails.

239 Barriers and fences must be arranged and fixed so that there are no gaps underneath or between individual parts that people, including young children, could get through and put themselves into a position of danger. Special care should be taken with this on sites with uneven ground or where the public may be moving around the entire device.

240 Keep access points between barriers to the minimum size and number needed for safe loading and unloading as identified by your risk assessment. Do not have more access points than necessary for the safe operation of the device (normally no more than four), nor make them so wide as to defeat the point of having barriers, or make effective supervision of the gap impracticable. Some devices supplied with 'open fronts' may need additional barriers.

241 While the device is in motion, prevent people from passing through gaps in barriers unintentionally by:

- placing an attendant at a safe position at each access point or effectively barring the access gaps;
- providing the access points with offset barriers/and or steps.

242 All barriers need to keep people outside the safety envelope of the device. If parts swing out over public areas, these areas may need to be enclosed where any moving part of the device or a passenger will be less than 2.5 m above the ground.

243 Periodically check and inspect barriers to make sure they remain effective. This is particularly important at temporary barriers which may be displaced over the time of the fair.

244 In some circumstances, it may not be possible or necessary to use a barrier. In these cases the platform of the device may provide a sufficient barrier where it can be justified by risk assessment, based on factors such as the height of the platform, the projection of moving parts of the device outside the limit of the platform, entrapment risks and its speed.

245 Coin-operated amusement devices may not require barriers unless the motion presents a significant risk.

Access to danger areas

246 On some devices with raised platforms, there may be a danger area underneath the platform. Take care to prevent access to such areas, particularly if building up a device on sloping ground.

247 Highlight danger areas by notices, painted lines etc. Provide sufficient supervision to make sure that people do not stray into danger areas. Although supervision is important, it should not be a substitute for physical measures.

248 Where appropriate, provide a safe area for waiting members of the public and make any arrangements necessary to control them. These may include providing additional supervision and/or features such as queuing rails and gates.

249 On dark rides, provide emergency exit routes which are well-lit and signed when required. Control risks to prevent tripping or falling, particularly where the routes cross or run alongside rail tracks.

250 Before putting any device in motion securely fasten any covers or

barriers over openings to prevent access to dangerous parts of machinery.

Electrical safety

251 Electricity can kill or cause severe injury or damage to property.

252 The main hazards of working with electricity are:

- electric shock and burns from contact with live parts;
- exposure to arcing;
- fire from faulty equipment or installations.

253 You must ensure that the electrical installation or equipment such as generators, lighting sets, cables and blowers are safe, suitable for the location where they are to be used, and are properly installed and maintained. Equipment used outdoors should comply with the relevant IP rating.

254 Damaged or faulty equipment must be immediately taken out of use and repaired or replaced.

255 Be aware of the dangers from:

- working near or under overhead power lines as electricity can flash over from, even though machinery or equipment may not actually touch them;
- digging near underground services – these are not always identified on plans and can explode if damaged.

256 The in-service annual inspection is not a substitute for effective maintenance and periodic checks for safety. Any work carried out on electrical parts of amusement devices must be carried out by competent people.

Working at height

257 Amusement devices normally require assembly and dismantling, inspection and maintenance, which may all involve people working at height. Working at height remains one of the biggest causes of work-related fatalities and major injuries.

258 Make sure that all work at height is properly planned, supervised and carried out by competent people. This includes using the right type of access equipment for the job.

259 The following hierarchy of control measures should be followed systematically:

- Avoid work at height where you can.
- Use equipment to prevent falls where work at height cannot be avoided.
- Use equipment to minimise the distance and consequences of a fall where the risk cannot be eliminated.

- Use collective protection measures (eg scaffolds, nets, soft landing systems) over individual protection (eg a harness).

260 Here are some key points to consider:

- Equipment should be stable and strong enough for the job.
- Do not overload or overreach when using ladders.
- Do as much work as possible from the ground.
- Take precautions when working on or near fragile surfaces.
- Make sure workers can get safely to and from where they work at height.
- Plan for emergency evacuation and rescue procedures.
- Provide protection from falling objects.
- Make sure equipment is maintained and inspected regularly.

261 Employees must be competent in the work they are to do, know the procedures for working at height and for using the personal protective equipment (eg fall-prevention, fall-arrest and work-positioning equipment) which you must provide and ensure they use. It is very important where work at height is carried out that you have an emergency rescue procedure in place to recover someone who cannot recover themselves (eg through illness, suspension from a lanyard or inertia reel and harness system). There is a serious risk from suspension trauma if the person is not rescued within a short space of time. See Appendix 4 for details of how to carry out a work at height risk assessment.

Water quality

262 For attractions where people are deliberately or incidentally brought into contact with water, including the inhalation of water aerosols, suitable and sufficient treatment/dosing and testing arrangements should be provided to make sure that the quality of the water does not present a risk to health from bacteria such as legionella. More advice on the control of legionella is on HSE's website: www.hse.gov.uk/legionnaires.

Noise at work

263 Loud noises on fairgrounds and amusement parks can damage hearing. Controllers must take steps to protect workers from dangerous noise levels (see Appendix 1). There are many practical, cost-effective ways that this can be done. For example, where possible:

- remove the source of the noise, eg replace worn, noisy chains and bearings;
- use quieter equipment or a different, quieter process, eg turn down the music;
- put in place engineering/technical controls at source, eg attenuate the exhaust from pneumatics;
- use screens, barriers or enclosures, eg soundproof the pay box;
- limit the time people spend in noisy areas, eg by rotating staff.

264 Hearing protection should not be used as an alternative to controlling noise. However, you should issue it to employees for short-term protection, or where extra protection is needed above what has been achieved using noise reduction measures. You should train employees on how, when and where to use hearing protection and ensure they use it correctly.

265 If the noise risk assessment indicates that there is a risk to health for employees exposed to noise, they should be placed under suitable health surveillance (regular hearing checks).

Ride operator/attendant welfare

266 For outdoor devices, operators and attendants should be protected from excessive exposure to poor weather conditions, eg rain or sun. This can be achieved with suitable clothing, sun screens, shelters etc.

267 An operator's workstation/controls should be designed to facilitate good ergonomics and to prevent any reflections or glare being generated that obstructs their view of the device or any controls. All ride operator/attendant positions should be suitably lit and ventilated.

268 Ride platform-based attendants and operators should be within line of sight of one another and be able to easily communicate by voice and/or hand signal.

Maintenance access/facilities

269 Suitable maintenance facilities should be provided which are safely accessible (eg without the need to cross tracks or enter operational areas).

Safe systems for operating devices

270 The information in Section G on safe operation of devices by operators and attendants is also relevant to controllers but is not repeated here.

271 Keep records of what you and others have done to ensure safety. You may be asked for documents by organisers, lessors, HSE, trade associations or others seeking evidence that your device is being operated safely. Depending on the type of device, these may include:

- significant findings of risk assessments;
- maintenance, modification and inspection records;
- instructions for operators and attendants;
- training records.

272 Have a system for securing devices and immobilising devices not open to the public and take reasonable steps to prevent public access at these times.

273 When a device is open to the public (except those designed for unattended use) ensure that:

- it is in the immediate charge of an operator;
- the operator is in control of the device throughout the cycle;
- no operator is in charge of more than one operating device at any time;
- no device is used outside the operating conditions specified in the operations manual or any other condition specified by an IB;
- no unauthorised person interferes with it except to use an emergency stop which, if appropriate, is readily identifiable to the public;
- safety netting or other control measures are in place to protect against falling objects (eg mobile phones, camera etc) while in motion. This may be particularly relevant where device tracks pass over public occupied areas (including queue lines) or where passenger units swing out above public areas.

274 You must make sure that non-users are not put at risk. Examples of how you can achieve this include, but are not restricted to:

- not allowing the public access to danger areas;
- providing enough attendants to control access points and, where appropriate, queuing areas. The number of attendants will depend on the size of the crowd;
- making sure that waiting or loading areas are not overcrowded or overloaded;
- not allowing a device to be started until it has been confirmed that it is safe to do so;
- providing notices or using a public address system to give information to the public and help attendants enforce your rules;
- making sure that all staff are readily identifiable.

275 The operator should wherever possible have an unobstructed sight line of the whole device from the normal operating position and particularly the loading/unloading area (including ride attendant positions). Where this is not possible, alternative measures such as CCTV may be used which can be viewed from the ride operator's position. As an alternative, for load/unload areas it may be possible to devise a clear system of signals for checking with attendants that it is safe to start. Make sure every person using the system is instructed how to use it and display a copy of the signal code in appropriate positions.

276 All staff access points to ride areas should be gated or otherwise secured while the device is in motion.

277 You must assess how weather conditions can affect the safety of your device and control any risks created, for example:

- conduct additional inspection of packing and anchors;
- identify the wind speed above which you must close the device,

remove lighting or backdrops or provide additional anchorage. This should be in the operations manual;
- identify which parts become slippery or less effective (steps/ handrails etc) when wet and modify them or provide alternatives;
- make sure the ride is suitable for operation in low temperatures or electrical storms.

Passenger containment

278 The main risks to passengers on a device are:

- ejection due to the device's motion;
- falls from the device;
- injury arising from the forces imposed by the motion of the device, including during emergency stops;
- passenger misuse of safety equipment.

279 You should have detailed knowledge of how the designer intended the passenger containment to be used, particularly the use of passenger restraints. Always follow instructions given by the designer on passenger containment, eg physical restrictions and the physical ability to remain stable within the device.

280 Do not add parts to the device (eg theming) that could adversely affect the clearance between passenger-carrying units and other parts of the device. Any alterations that may affect safety clearance distances will require pre-use inspection by a competent IB.

281 Check that all components of the passenger-containment system, including seats, bars, belts, harnesses, handholds, footrests, locks, catches, hinges and other attachment points, are properly maintained and correctly adjusted so they will be secure and minimise injury due to the motion of the device. Do not use any part of a device where the passenger-containment system is defective.

282 Staff should be aware that certain groups of people may be at risk to their health and safety if allowed to use the device. They should be able to identify and have the authority to exclude people in these groups who may, depending upon the individual device, include those who:

- are too small to be safely contained;
- are too large to be safely contained;
- either declare or have an obvious disability or other condition, eg back or neck injury, heart condition, or are pregnant;
- are behaving inappropriately;
- are obviously under the influence of drugs or alcohol.

283 Like all service providers, you must consider what you need to do to comply with the Equality Act 2010.[19] This law gives disabled people rights to access your devices and you may have to make 'reasonable adjustments' to help. For more details see Appendix 1, paragraphs 35–39.

284 Size limits and physical/body mass requirements of passengers should be specified in the operations manual and followed by controllers. If passengers within the size limits cannot reach the main components of the containment system or otherwise ride safely they may not be suitable to ride on the device. Where this situation arises frequently, you should seek further advice on passenger containment from a person competent in the design of passenger-containment systems. Treat any proposed change of size limits as a safety-critical modification.

285 Help operators and attendants enforce any passenger exclusions by having prominent notices or pictograms which clearly set out any restrictions specified by the designer, or design review body. Where appropriate, use the public address system to reinforce the need for passengers to follow safe riding procedures. Make sure that:

- the operator and attendants give clear and appropriate instructions to passengers on their conduct and that they physically check all restraints before the device starts;
- if passengers can be stranded away from their normal unloading point they can be moved to a place of safety without risk or undue delay, preferably in the unit in which they are travelling. Operator and attendants should understand the procedures suitable for everyone using the device.

286 Train, instruct and require operators and attendants to take reasonable steps, including stopping the device if necessary, to prevent passengers:

- intentionally misusing equipment provided for their safety;
- behaving recklessly and putting themselves or others at risk;
- disregarding clear and reasonable instructions regarding their safety or that of others.

Selecting and training staff

287 Controllers must be competent to carry out safety-related tasks, or ensure the competence of others who carry out such work for them. Key safety-related tasks in relation to amusement devices are daily checks, inspection, repair, maintenance, supervision, operation and evacuation.

288 Make sure employees are competent in the work they are expected to do. This will involve careful selection, training and supervision. The levels of training and competence required by operators or attendants will depend on the nature of their work.

289 You should monitor and supervise your staff to ensure that they work safely and in accordance with your policies and instructions. Try to choose staff who have the maturity to:

- make sure safe systems of work are followed at all times;
- be reliable and have the necessary authority;
- give confidence to the public, particularly on children's and family devices.

290 Do not allow anybody under the age of 18 to operate the following:

- a ride (except simple slow-moving devices designed for use by children);
- a shooting gallery where hazardous projectiles are used;
- an enclosed structure which holds more than 30 people or is intended primarily for the amusement of children.

291 Operators of other devices should be least 16 years old. Every attendant who performs a safety-related function should be at least 16 years old. All work relating to the containment of passengers should be considered as safety-related.

Information, training and supervision

292 You must provide adequate information, training and supervision to all employees. Information, training and supervision must be appropriate to the risks and given in a way that people can understand. You may need to liaise with others to help, for example, with fire precautions training.

293 General information and training for all employees involved in the operation of a device should cover at least the following areas:

- general health and safety requirements relating to the device;
- safety of the device to be used;
- the importance of daily checks, maintenance and inspection programmes and the need for competence in the work to be done;
- general health and safety requirements relating to the fairground or amusement park;
- dealing with problems, to include:
  - procedures for managing people who misbehave/are distressed etc;
  - how to deal with defects and malfunctions;
  - reporting procedures for accidents/incidents;
  - emergency procedures;
  - adverse weather conditions.

294 It is good practice to keep a record of any training given and the results of any tests of how well the employees understand it.

295 Operators and attendants of devices will need specific information and training on:

- systems of work for operating a device safely;
- safe loading/unloading of the device;
- details of any passenger restrictions, for example height, weight or medical conditions;
- safe waiting/viewing places for waiting passengers and spectators;
- using the passenger-containment system, including physically checking closure of passenger restraints.

296 You must provide appropriate supervision and refresher training to your staff, especially after changes caused by a safety-related modification (see paragraphs 202–207), changes to your procedures or a change in the way you manage the public.

297 You should also have a system for supervising staff to check that they are following your instructions.

298 Further information on training is available at www.hse.gov.uk.

Emergency procedures

299 Emergencies at fairgrounds and amusement parks can arise from:

- fire;
- major failure of a device;
- severe weather;
- serious criminal activity;
- other factors, eg public misbehaviour.

300 You must have procedures in place to deal with foreseeable emergencies that may affect the site or individual devices.

301 If the emergency involves your device, you may have different groups of people to consider, for example:

- passengers who may be young, old or have disabilities;
- other spectators (some of whom might be relations of passengers and therefore distressed);
- employees;
- members of the public and employees on nearby attractions.

302 You must be able to evacuate people from your device in all foreseeable circumstances. This includes circumstances where the device has stopped in an abnormal position, including at height.

303 The following should be taken into consideration when developing a plan and procedures for evacuation from a device:

- the means to bring the device to a safe state and position;
- the need for on-site emergency rescue equipment;

- availability, capability and response times of the emergency services;
- suitability of the ground for rescue equipment;
- the need to rescue children, elderly people or people with disabilities;
- liaison arrangements with the emergency services;
- training of ride operators.

304 You must make sure your employees know what to do if there is an emergency. This should include taking reasonable steps to test your emergency procedures to ensure they are effective.

Accidents and incidents

305 Instruct your staff to report to you, as soon as possible, any accident, incident or near miss which causes or could have caused injury or damage, including threats or acts of violence. Keep records of all incidents and the action taken as you may need to:

- give details to the police, HSE or the appropriate local authority, your trade association, insurers, the designer, manufacturer or supplier;
- discuss the safety implications with an IB;
- provide a detailed operational history of the device, for example for a buyer.

306 You must report certain work-related accidents and cases of ill health involving employees to the appropriate enforcing authority. Accidents to members of the public caused by your work activities are also reportable; if the injured person is taken directly to hospital and receives medical treatment beyond diagnostic tests.

307 Responsibility for reporting rests with the 'responsible person'. This person is likely to be:

- the controller if the incident occurs at a device; or
- the organiser if it occurred elsewhere on the fairground/amusement park.

308 Further information is given in *Reporting accidents and incidents at work. A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)*.[20]

309 If a defect on a device could lead to danger, do not allow the public to use it until you are satisfied that the cause has been identified and remedied. This may include checking all similar components in addition to the one giving rise to the fault. If you have any doubt about the continued safety of a device, do not allow it to be used until a competent person, eg an IB, has confirmed that it is safe to do so.

Review

310 Review your safety arrangements regularly and make any changes necessary to ensure their continued suitability.

Section G Guidance for operators and attendants

What the law requires

The ride operator and/or attendant may also be the controller so the duties outlined in Section F may also apply.

As a ride operator or attendant you have duties under the HSW Act to ensure:

- you take reasonable care for the health and safety of yourself and of other people who may be affected by what you do or fail to do at work;
- you cooperate with your employer or anyone else that has duties under the law to make sure they can comply with their duties, eg use the provided safety harnesses, follow instructions etc.

Safe attraction

311 Operators and attendants must do everything reasonably practicable to make sure employees and others in areas under their control are safe. You should make every effort to understand the nature of the device you are responsible for, including the operating instructions and any other information provided by the ride controller. You can make sure an attraction is safe by:

- understanding and thoroughly carrying out your general responsibilities (paragraphs 312–313);
- diligently carrying out daily checks (paragraph 314);
- operating the devices safely (paragraphs 315–320);
- supervising those you are responsible for to ensure they work safely (paragraphs 321–328).

General responsibilities

You as operators and attendants must:

- follow your employer's instructions relating to safety;
- take reasonable care of yourself and other people;
- report incidents and hazards immediately;
- not misuse anything provided for health and safety.

313 The dangers of deliberate misuse are obvious, but you should also make sure that you do not alter things without authorisation. For example, making an unauthorised adjustment to the catch of a lap bar to make it easier to use might be misuse if it reduces its safety.

Daily check

314 Before a device is opened to the public, you should make sure a daily check has been carried out, including a successful trial run. Check that everything is working properly and report anything unusual, any faults or repairs that need to be addressed, to the controller to ensure safe operation (see paragraphs 214–217).

Safe operation by operators

315 Make sure when the device is open to the public that:

- you don't operate a device unless you have been trained or are under direct supervision;
- you are in immediate control at all times;
- the minimum number of operators/attendants needed for safe operation are on duty and present at the device;
- no one other than yourself, an attendant, or a trainee under direct supervision interferes with the operation of the device, except to use an emergency stop in an emergency situation;
- your full attention is given to safe operation – do not operate more than one device at a time;
- you operate the device in accordance with the operating instructions issued by the controller;
- you wear any distinguishing clothing given to you by the controller;
- you report matters affecting the safety of the ride to the controller without undue delay.

316 Do not operate the device outside the conditions specified in the operations manual, or any other condition that has been set by the controller.

317 Make sure that you load the device to accommodate all users safely. This may include:

- making sure that people for whom the device may be unsuitable are excluded, eg heavily pregnant women or people suffering from certain injuries;
- taking all reasonable steps to exclude those whose behaviour suggests that they may not be able to use the device safely (see paragraph 270);
- on a ride:
  - make sure you load cars in accordance with any specific instructions, for example the largest/smallest passengers in the correct position;

- correctly balancing the cars and the device;
- do not allow passengers to use any part of the device where the passenger-containment system is defective;
- make sure passengers secure or stow all loose items which may become projectiles or interfere with the operation of the restraint/containment system;
- make sure that all passengers are safely contained. Physically check restraints;
- make sure long hair or trailing items cannot become entangled in moving parts of the device;
- check that operators, attendants and others are in safe places before starting the device;
- advise passengers where to place hands, feet etc, particularly where passengers need to brace themselves against the forces they will experience.

318 Remain aware at all times of the factors which may affect the safety of the device and be prepared to stop it and take whatever action is necessary to ensure it's safe before using it again. Such factors may include:

- bad weather conditions, for example:
  - strong and gusting winds;
  - heavy rain which may make the ground soft;
  - lightning;
- changes in the way the device is running, eg noise or vibration;
- attendants deviating from operating procedures;
- unsafe behaviour by operators/attendants, including horseplay and the effects of taking drink or drugs;
- overloading or congestion of loading platforms or access points;
- unsafe behaviour by users or spectators.

319 Make sure you follow the controller's instructions when dealing with problems. This might include stopping the device.

320 You should have a clear view of all the loading and unloading points and all passengers. Where this is not possible you should use positive signals to check with attendants that it is safe to start. Make sure that every person using the signalling system clearly understands each signal. Do not start the device unless you have positive confirmation that it is safe to do so.

Supervision by operators

321 It is important that operators closely watch the behaviour of attendants and members of the public. They should take immediate action, including stopping the device when necessary to ensure safety if attendants or members of the public behave in an unsafe way or fail to follow instructions, are distracted, or set a bad example. If attendant misbehaviour is serious or repeated, tell the controller. Set a good example yourself.

322 Do not operate any device unless all passengers:

- have been safely loaded;
- are safely contained in the correct position with any passenger restraint or other device physically checked to make sure it is correctly fitted and adjusted properly. Physical checks are essential because of limitations in automatic systems;
- have been told anything they need to know for them to ride safely. Where necessary, remind them over the public address system before starting the device.

323 When operating a device, keep watching to make sure that passengers remain safely contained and that nobody is moving into places of danger. Where appropriate, use the public address system to give any necessary warnings or instructions. If you see anyone who appears to be distressed or at risk during the ride cycle, stop the device as soon as possible.

324 Any device or part of it (eg an individual car) taken out of service for any reason needs to be readily identifiable to the operators and attendants and, where possible, the controls locked so it cannot be used.

Attendants

325 Follow the instructions given to you by the controller and/or operator. Give your full attention to the safe operation of the device. Constantly watch out for the safety of the public and the people you work with. In particular, make sure you follow the operator's and/or controller's instructions about loading passenger cars and controlling spectators, for example:

- load cars in any necessary pattern with largest/smallest passengers in the correct position, where applicable;
- correctly balance the device, where applicable;
- exclude passengers who may be physically unsuitable and take all reasonable measures to exclude also those whose behaviour suggests they may not be able to ride safely;
- do not allow passengers to use any part of a device where the passenger-containment system is defective and may put passengers at risk;
- make sure all passengers are safely and correctly contained and that no spectators are in places of danger;
- indicate to the operator by a positive signal that the device is ready to start;
- report matters affecting the safety of the ride to the controller without undue delay.

326 Make sure you remain able to communicate effectively with the operator. Make sure that passengers stay safely inside the device and

that nobody is moving into places of danger, for example walking into the active device safety envelope. Where appropriate, give verbal warnings. If you see any person who is distressed or at risk, tell or signal the operator immediately.

327 Make sure people are unloaded and leave safely when the ride finishes.

328 Do not:

- ride in an unsafe way or position if you are required to ride;
- jump on or off a device if it could be dangerous;
- encourage or allow passengers to adopt unsafe positions or practices;
- be distracted while the device is operating;
- tell or signal the operator to start a device until:
  - you have physically confirmed that all passengers are safely contained with any passenger restraint or other device correctly fitted and properly adjusted;
  - passengers have been given any information needed for them to ride safely;
  - operators, attendants and spectators are in a safe place.

Appendix 1 Relevant legislation

1 Sections A to G in this book provide the practical information to enable dutyholders to comply with health and safety legislation. There are a number of different pieces of legislation, and at first glance these can appear daunting. However, the basic requirement is the same:

- identify and assess the risks;
- take action to manage those risks;
- monitor to ensure action takes place;
- check that it is effective.

2 Further information on all health and safety legislation and guidance on its application is at www.hse.gov.uk.

3 It is also worth remembering that where a piece of legislation requires a risk assessment that has already been carried out under other legislation, it need not be repeated.

4 The main legislation covering the various hazards and work activities found within fairgrounds and amusement parks is listed, followed by a brief outline of the duties imposed:

- Health and Safety at Work etc Act 1974 (the HSW Act) (1974 c37)
- Management of Health and Safety at Work Regulations 1999 (the Management Regulations (SI 1999/3242)
- Provision and Use of Work Equipment Regulations 1998 (PUWER) (SI 1998/2306)
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) (SI 1998/2307)
- Work at Height Regulations 2005 (SI 2005/735)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) (SI 2013/1471)
- Control of Noise at Work Regulations 2005 (SI 2005/1643)
- Electricity at Work Regulations 1989 (SI 1989/635)
- Health and Safety (Enforcing Authority) Regulations 1998 (SI 1998/494)
- Equality Act 2010 (c15)
- Construction (Design and Management) Regulations 2015 (CDM 2015) (SI 2015/51)

Health and Safety at Work etc Act 1974

5 This is the primary Act governing health and safety in the fairground and amusement park industry. It applies to all employers and self-employed people whose work activity poses a potential risk to the health and safety of other workers or members of the public. The Act protects not only people at work but also members of the public and volunteers who may be affected by a work activity.

Duties of employers to employees

6 All employers have a duty under section 2 of the HSW Act to ensure that the health, safety and welfare of their employees are protected when they are at work, so far as reasonably practicable. In practical terms, fairground and theme park controllers must ensure they provide a place of work that is safe and without risk. They must make sure that:

- safe working practices are set and followed;
- machinery and equipment is properly maintained and safe to use;
- equipment and harmful substances are used properly and stored safely;
- employees have healthy working conditions.

Duties of the self-employed

7 Self-employed workers whose work activity poses a potential risk to the health and safety of other workers or members of the public have similar duties to those placed upon employers. The operation of fairground equipment poses a risk to the health and safety of workers and members of the public so health and safety law will apply to self-employed people in control of or working on fairground equipment. Self-employed workers should not create risks to themselves or other people.

8 Under section 3 of the HSW Act, fairground and theme park controllers have a responsibility for the health and safety of non-employees, eg:

- members of the public;
- self-employed workers or contractors;
- volunteer workers;
- others who may be involved in the activities of the fairground or theme park.

9 Information may need to be provided to members of these groups in the form of training, signs or briefings, as appropriate, to ensure they are not put at risk.

Duties of employees

10 While at work, employees have a legal duty under section 7 of the HSW Act to take reasonable care of themselves and other people. Employees must cooperate with their employer where safety is concerned.

Duties of people in control of premises or equipment

11 Many fairgrounds and theme parks have equipment or substances that they provide for people to use on site, eg lifting equipment, chemicals etc. Under section 4 of the HSW Act, each person who has any control of premises or equipment must take reasonable precautions to make sure that the location and equipment to be used there is safe and without risks to health. Also, where people come into the fairground or theme park to use it as a place of work, eg contractors, the people in control of the site must make sure, so far as reasonably practicable, that it is safe and does not present a health risk.

Duties of designers, manufacturers, importers or suppliers of fairground equipment

12 Section 6 of the HSW Act places duties on designers, manufacturers, importers and suppliers of fairground equipment. These duties include taking reasonable steps to ensure:

- fairground equipment is designed and manufactured to be safe when it is being built up and dismantled, operated and maintained;
- suitable tests and checks have been carried out to prove this is the case;
- there is adequate information provided with fairground equipment to allow a controller to build it, dismantle it, maintain it, inspect it and operate it safely;
- they have a system for passing on safety updates on fairground equipment to people who have been supplied with it.

13 Anyone who wishes to design or manufacture a piece of fairground equipment should take reasonable steps to research and eliminate any risks to health and safety which the completed fairground equipment might pose, eg carry out research on the health effects of acceleration forces to make sure the device operates within an acceptable limit.

14 If, as a designer, manufacturer, supplier or importer, you install and/or erect a piece of fairground equipment, you need to take reasonable steps to ensure that it can then be used safely (including during maintenance, inspection and operation).

15 The duties under section 6 only apply where there is a trade, business or other undertaking (for profit or not). They would not, for example, apply to a householder who lends out a bouncy castle to a next-door neighbour.

16 A piece of fairground equipment may be designed, manufactured, imported or supplied to, or for, someone else with a written agreement that this other person will take specified steps to make sure that the fairground equipment will be safe. The agreement ‘shall have the effect of relieving the first mentioned person from the duty imposed to such extent as is reasonable having regard to the terms of the undertaking’ (section 6(8)). It should not, however, be assumed that all duties can be

delegated to others. This exemption is a qualified one, and should be approached with caution and a clear understanding of what everyone involved has to do to ensure that the finished piece of fairground equipment is safe and without risks to health.

Duty not to misuse anything provided for the purposes of health and safety

17 Section 8 of the HSW Act places a duty on anyone who is at a fairground or theme park (including employees and members of the public) not to misuse or recklessly interfere with safety precautions. For example, this would include the duty on passengers on an amusement device not to interfere with ride restraints, and on operators and attendants not to misuse safety interlocking on devices.

Management of Health and Safety at Work Regulations 1999

18 The Management of Health and Safety at Work Regulations require employers and the self-employed whose work activity poses a potential risk to the health and safety of other workers or members of the public to assess the risks arising from work activities. This means they must identify the control measures which need to be taken to comply with relevant health and safety legislation, eliminate risks where possible and reduce risk from the activities which remain. If a young person is employed then the assessment must examine a specific list of risks in light of the young person's inexperience and immaturity.

19 The Regulations also require that employees must be given information about the risks to their health and safety identified by the assessment and the protective and preventative measures that should be taken. This information must also identify emergency procedures in case of imminent danger and the people nominated to implement those procedures. If the employer employs someone on a temporary contract, they must provide that person (and any employment agency who supplies such workers) with information on any special qualifications required for the worker to carry out the job safely.

20 Regulation 11 requires that where two or more employers share a workplace they should:

- cooperate with each other to enable them to comply with statutory provisions;
- take reasonable steps to coordinate measures taken to comply with statutory provisions;
- take reasonable steps to inform each other of the risks to health and safety arising out of their work.

21 Regulation 12 requires employers to provide information to the employers of other people who are working in their undertaking. This information concerns:

- the risk to those people arising out of the undertaking;
- the measures taken to comply with the law.

Provision and Use of Work Equipment Regulations 1998

22 PUWER[3,21] expands on the general duties of the HSW Act and requires that work equipment supplied to employees is suitable, correctly installed (if applicable), safe to use and used only by people who have received adequate training. Work equipment should be regularly maintained and, if necessary, inspected by a competent person to ensure that it remains safe to use. Work equipment, regardless of its age, should not cause a risk to health and safety.

23 PUWER makes more explicit the general duties already placed on an employer, self-employed person whose work activity poses a potential risk to the health and safety of other workers, or members of the public or someone with control to any extent of plant and operations. They must provide safe plant and equipment and make sure employees are adequately trained in its use.

24 While the system for safety of attractions outlined in this guidance will generally be sufficient to allow ride controllers to comply with their duty to have their devices adequately inspected, it is important for them to consider the other duties imposed by PUWER, for example the duty to:

- ensure competent inspection and maintenance;
- maintain a device in a safe condition;
- ensure the safety of dangerous parts of the device and its machinery;
- provide information, instruction and training to employees and others who may be expected to use work equipment.

25 These duties apply to all equipment provided for use at work (within the scope of the Regulations) and not just to amusement devices.

Lifting Operations and Lifting Equipment Regulations 1998

26 It is the responsibility of dutyholders to ensure that any lifting operations they carry out, and any lifting equipment they operate, or provide for others to operate at work, is both suitable and safe. All lifting operations should be properly planned, supervised and carried out safely.

27 In the fairground industry many devices require the use of lifting equipment for assembly and dismantling (eg trailer-mounted cranes). Dutyholders are expected to have these thoroughly examined and inspected at intervals provided for in LOLER, or in accordance with an

examination scheme. This examination is over and above any examinations and tests required to be carried out on fairground equipment under the system for safety of attractions.

28 LOLER is unlikely to apply to a device itself, even those that have been described as 'having a lifting element', for example big wheels or drop towers or to the rams and pulley systems used to position a device from the horizontal travelling position to its working position. LOLER may apply to parts of the device used, for example, to lift carriages vertically from maintenance or storage areas (as seen with some larger fixed rollercoasters).

Work at Height Regulations 2005

29 The Work at Height Regulations[22] apply to all work at height (including work below ground) where there is a risk of a fall liable to cause personal injury. They impose duties relating to the organising and planning of work at height. See Appendix 4 for more information.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013

30 RIDDOR requires the responsible person to report certain specified accidents and cases of ill health arising out of or in connection with work, to the relevant enforcing authority. This includes accidents involving the death of any person and accidents to employees who sustain a specified major injury or who are incapacitated for work for seven consecutive days. Accidents involving members of the public must be reported if they arise out of or in connection with a work activity, are taken directly from the scene to hospital and receive medical treatment beyond diagnostic tests (for example a member of the public injured on a fairground device).

31 The fact that there is an accident at work premises does not, in itself, mean that the accident is work-related – the work activity itself must contribute to the accident. An accident is work-related if any of the following played a significant role:

- the way the work was carried out;
- machinery, plant, substances or equipment used for work was involved;
- the condition of the site or premises where the accident happened was a factor.

Further information is available at www.hse.gov.uk/riddor.

Control of Noise at Work Regulations 2005

32 The Control of Noise at Work Regulations 2005[23,24] require employers to prevent or reduce the risks to health and safety from exposure to noise at work. They require you as an employer to:

- assess the risks to employees from exposure to noise at work;
- take action to reduce the noise exposures that produce those risks;
- put in place specific measures at the specified action levels in the legislation and make sure the limits for noise exposure are not exceeded;
- provide employees with hearing protection if you cannot reduce the noise exposure enough by using other methods;
- provide your employees with information, instruction and training;
- carry out health surveillance where there is a risk to health.

Electricity at Work Regulations 1989

33 The Electricity at Work Regulations[25] impose detailed requirements on employers in control of an electrical system to ensure that the system is safe. The regulations also require all electrical systems to be maintained to prevent, so far as reasonably practicable, any danger.

34 People working on electrical systems where danger may arise are to be competent or to be supervised. Helpful advice on safe systems of work on electrical systems is published in HSE's guidance *Electricity at work: Safe working practices*.[26]

Equality Act 2010

35 The Equality Act 2010 combined a number of pieces of legislation (Sex Discrimination Act 1975, Race Relations Act 1976, Disability Discrimination Act 1995) to reduce confusion. It makes it illegal to treat a person differently based on their race, gender or disability.

36 This Act gives disabled people rights to access your devices and you may have to make 'reasonable adjustments' to help. You should know what safety precautions are needed to allow the public to use your device safely (use of restraints, hand and foot bracing points, information and instructions etc) and, where you think a disabled person may have problems complying, consider whether there are any adjustments that you can make to enable them to use the device safely.

37 You may, however, be able to justify less favourable treatment of a disabled person, or not making an adjustment for a disabled person, but only if this is necessary to protect people's health and safety, eg other customers, the disabled person themselves or the operator. You will need to consider the unique nature of your amusement park or fairground and the individual circumstances of your client. You are likely to discriminate if you have a 'blanket' rule that treats disabled people differently, eg if you ban all disabled people from your devices.

38 Avoid making assumptions and seek to involve, where you can, disabled customers or those supporting them. They are likely to have thought about the suitability of devices beforehand and together you can make an informed decision.

Example

39 A fairground operator refuses to allow a person with multiple sclerosis onto a physically demanding, high-speed ride. Because of her disability, the disabled person uses walking sticks and cannot stand without help. The device requires users to brace themselves using the strength in their legs. The refusal is based on real concerns for the health and safety of the disabled person and other riders. This is likely to be justified.

Health and Safety (Enforcing Authority) Regulations 1998

40 The Health and Safety (Enforcing Authority) Regulations[27] allocate premises to either the local authority or HSE for the purposes of enforcing relevant health and safety legislation. In general, this means that travelling fairgrounds and theme parks will fall to HSE, and inflatable devices, bungees and go-karts will normally fall to the local authority for the purposes of inspection (HSE will always be the enforcing authority for section 6 of the HSW Act). Where inflatable devices and go-karts are found within a theme park or travelling fair, HSE will normally be the enforcing authority.

41 The Regulations allow for arrangements between dutyholders, so that HSE and a local authority can agree to the transfer of enforcement responsibility from one authority to the other.

Construction (Design and Management) Regulations 2015

42 CDM 2015 came into force on 6 April 2015, replacing CDM 2007. They apply to all construction projects, including those undertaken in the fairground industry. A project includes all the planning, design and management tasks associated with construction work, for example the build-up and take-down of both temporary and fixed structures at fairgrounds and theme parks, including marquees and similar tented structures. For further guidance on CDM 2015 see *Managing health and safety in construction*.[2]

Appendix 2 Risk assessments to establish maturity of design for fairground devices

1 The concession which resulted in the creation of maturity risk assessments has expired and no new assessments will be accepted. The following is for information only for those older rides still operating under such an assessment.

2 This information was intended to help with preparing a suitable maturity risk assessment and checking that existing ones are suitable. It included advice on when an assessment would be appropriate and how it could be carried out.

3 Section 6 of the HSW Act (as amended) puts very specific responsibilities on the designers, manufacturers, importers and suppliers of fairground equipment to ensure that devices are designed and constructed to be safe as far as reasonably practicable.

4 The series of pre-use inspections (design review, ACD and initial test) described in this guidance, if completed diligently, will allow for compliance with the duties imposed by section 6 of the HSW Act. These pre-use inspections form part of the Amusement Device Inspection Procedures Scheme (ADIPS).

5 When ADIPS was introduced in October 1997, it was recognised that there would be a significant number of devices which had not been subjected to the initial pre-use inspections, but which were well-designed and constructed. In these cases the manufacturer may have complied with section 6 of the HSW Act in a different way and it was clear that interim arrangements would be required to allow the ADIPS scheme to function and to allow declarations of operational compliance to be issued in the absence of information on initial inspection.

6 These interim arrangements only applied to devices that existed in the UK before October 1997. They introduced the concept of a device that was of a mature design. This means there is sufficient relevant information available to determine that the design has a history of safe operation and has therefore stood the test of time.

Maturity risk assessment

7 The responsibility for producing a maturity risk assessment lay with the controller of a device. Controllers could not claim maturity for an older device by right. Just because a device was old, it did not automatically follow that it was mature. When a device had been declared mature, this had to be justified by a risk assessment supporting that conclusion.

8 Ride controllers could establish that a device was well-designed and constructed in the absence of pre-use inspection information by undertaking a maturity risk assessment. Such an assessment was in addition to, and separate from, the operational risk assessment required for all devices. Ride controllers could use others to help with this process, eg IBs often helped in areas where specific competencies, such as mechanical, structural or electrical aspects were required.

9 While the history of other devices was useful supporting evidence, controllers were told to be wary of placing too much emphasis on such information unless they were certain that those other devices were identical in design and manufacture. In theory it was possible to build a new device to an established design and then claim maturity for the device. However, unless it could be demonstrated that the design and manufacture were identical, it could not be declared as mature.

When was a maturity risk assessment appropriate?

10 The following issues should have been considered:

- If the device had a relevant design review and initial inspections it did not need a maturity assessment.
- If the device was not in existence in the UK before October 1997 it could not be considered mature.
- In order to carry out a satisfactory maturity risk assessment a controller needed at least five years of relevant history for the device that was under consideration (the required history is described below). Although the figure of five years was given as guidance and would have been considered in the context of the risk assessment, it is unlikely that a device with less than five years' history would have been declared mature.
- A device which had very little use over the preceding five years may have required more than five years' history to demonstrate that it was capable of operating safely over a sustained period.
- A device's history should have been presented in written form.
- A controller must have known whether the device or any part of it had been modified. If any of the safety-critical parts of the device had been modified since October 1997, a partial design review covering the modified part (and any consequences it may have on the safe operation of the device as a whole) was required.
- Any modifications that took place before October 1997 may have had sufficient history of safe operation to be considered mature. The

period of five years was given as a guide. If the rest of the device was unmodified it could have been the subject of a maturity risk assessment as long as the other criteria were met.

- If the whole device had been modified, a complete design review was required and maturity assessment was not appropriate.

Documents required for a maturity risk assessment

11 Before a controller undertook a maturity risk assessment they needed the following documents and information:

- HSG175 (this book);
- the accident history for the particular device and the class of similar devices (as far as possible), detailing accidents arising from the design (for a five-year period). Accident history for classes of device may sometimes be difficult to obtain, however IBs, trade organisations etc may be able to help;
- details of modifications to safety-critical parts;
- the operational risk assessment;
- maintenance records (including repairs) and records of previous inspections, including non-destructive testing over a five-year period. These were important because they may have indicated areas of concern with the design. They were also important because they indicated the parameters within which the device should work and which will have contributed to its record of safe operation;
- details of ease of accessibility and frequency of testing and inspection of safety-critical parts. If safety-critical parts were inaccessible it may not have been possible to spot emerging problems at an early stage and it may be that they had not been inspected thoroughly over the years. Under those circumstances it is likely that a partial design review would have been a more appropriate method to decide that these parts were safe;
- other information, eg HSE guidance, National Association for Leisure Industry Certification (NAFLIC) bulletins, manufacturers' information etc relating to the class of device and any problems with design;
- an operations manual. This was an essential aid to the maturity assessment. It is unlikely that maturity could have been established without one, as all the evidence required to support the conclusions of the assessment should have been contained within such a manual. Further information on operations manuals is in Appendix 3.

Content of a maturity risk assessment

12 Controllers should have identified:

- hazards due to the failure of a safety-critical part as a result of poor design;
- the people at risk, eg riders, operators or bystanders;
- that, for the purposes of assessment, the integrity of the design and construction, reduced risks to health and safety to an acceptable level. Also that the evidence that the design was adequate was based

on a number of years of safe operation and that it was contained in the documents listed above;
- that the design and construction were capable of withstanding all types of failure including corrosion, wear and fatigue and the evidence for each was considered;
- that the ability of the design to withstand deterioration was dependent on the correct operation of the device coupled with adequate maintenance and inspection.

13 The findings of the assessment should have been recorded in a form suitable to allow controllers to support the conclusion that a device was mature. The maturity assessment should be appended to the operations manual.

14 If it could not be established that the device was mature, the necessary design review(s) should have been completed by March 2004.

Checklist for controllers

15 These questions should have helped controllers assess whether or not a maturity risk assessment was appropriate for their device, and whether they had adequate information to complete it satisfactorily:

- Did the device have evidence of initial inspections?
- Was the device in the UK before October 1997?
- Did they identify the safety-critical parts with the help of an IB?
- Had any safety-critical parts of the device been modified since 1997? (If yes, they should have conducted a partial design review of the new parts and considered maturity for older parts.)
- Had the device been used continuously and did they have at least five years' history of operation (in the operations manual)?
- Did the history they had indicate that the device operated safely for at least five years prior to the assessment?
- Did they have maintenance records, details of repairs and details of past examinations for at least five years?
- Did those records indicate that the design of any part of the device may have been a cause for concern, taking into account foreseeable modes of failure and the existing control measures (including inspection and maintenance)?
- Were all of the safety-critical parts of the device accessible? (If no, what measures had been taken to ensure the continuing integrity of these safety-related parts?)
- Did they have the accident history for this class of device?
- Did it indicate that there might be a problem which might affect your device?
- Did they have access to HSG175 (this book), other relevant HSE guidance and industry guidance such as NAFLIC bulletins for this type of device?
- Did those documents indicate that there might be a problem which might affect your device?

- Did the operations manual contain other details required in Appendix 3 of this book?
- Did these documents indicate how the device should be operated, inspected and maintained?

16 Did the above information, when considered as a whole, demonstrate that the device had an adequate history of safe operation which indicated that the risk of injury arising from a failure of design was at an acceptable level?

Appendix 3 The operations manual and other information for the safe operation of an amusement device

Information requirements

1 The successful operation, maintenance and inspection of any amusement device will require access to information by different individuals at different times, for example:

- operators need information about the safe way to operate the device's emergency procedures and the periodic checks required before operating the device;
- maintenance fitters need information about inspection schedules to allow them to carry out safety checks;
- IBs need access to design review information and previous in-service inspections;
- regulatory inspectors (eg from HSE) can request sight of training and scheduled inspection records.

2 The controller must ensure that each amusement device has adequate information available to allow it to be safely operated, maintained and inspected.

3 Some of this information should be kept with the device for ease of reference. Other sources of information may be complex and bulky and do not have to be kept with the device, but in a location where they can be retrieved easily when required.

4 The types of information likely to be complex and bulky are the records of design and manufacture, and the details of pre-use inspections. This information should be readily available to the controller when required, eg when needed by an IB.

5 The documents and information that should accompany any amusement device should be kept in an operations manual and be with the device when it is operational. This is to include all the necessary documentation relating to the operation, maintenance and in-service inspection of the device.

6 Examples of documents that should normally be kept with the device include:

- the declaration of operational compliance;
- all the necessary risk assessments;
- operator instructions, including emergency procedures;
- records of attendants who are allowed to operate the device

(including training records);
- details of the daily and periodic inspections;
- schedules for the in-service inspection, including schedules for the mechanical, hydraulic, electrical, pneumatic and non-destructive testing of the device, as required;
- details of safety-critical modifications. This should include the following:
  - details from the design review of all safety-critical modifications which have caused the device to differ from the original specification;
  - details of ACD of all safety-critical modifications, as above;
  - details of initial test of safety-critical modifications, as above;
  - confirmation of witnessing and verification by IBs of initial tests of the above safety-critical modifications.

7 The extent of this information will depend on the nature of the device, and the nature of the modification carried out.

Information on transport, installation, erection and dismantling

8 The operations manual should contain information on transport, installation, erection and dismantling, including:

- diagrams to show the correct assembly of the component parts;
- a key to the identification of non-interchangeable parts;
- information on the correct use of any special equipment required for assembly;
- details of the weight distribution and recommended packing points, together with the maximum applied load at each point and any foundations required;
- diagrams and drawings of the safe means of erecting and dismantling the device, along with any required clearance distances necessary for safe operation;
- procedures for setting up and dismantling the device correctly including, where relevant, details of:
  - any safe systems of work required, along with details of personal protective equipment needed;
  - emergency rescue plans (eg for working at height);
  - advice on ground or foundation preparation;
  - order of assembly/disassembly of component parts;
  - any temporary measures needed to support a partially completed device;
  - torque settings essential to the safety of screws or bolts;
  - any procedures needed to prevent or relieve stress concentration during assembly/dismantling;
  - jacking and packing points and procedures, including selection of materials, load spreading and ballasting where relevant;
  - levelling and out-of-level tolerances;

  - barriers, fencing etc;
  - mechanical and electrical power requirements;
  - correct methods for connecting electrical equipment to the power supply;
  - grounding for lightning protection;
- any checks or testing needed to make sure the device has been assembled correctly and is functioning in the intended manner.

Information on safe use

9 The manual should contain information on safe use, including but not restricted to:

- a description of the normal functioning of the device (including the function and motion of the major components);
- the normal safe operating procedure (including the functions and responsibilities of the operator and attendants);
- details of operating speeds. The maximum or limiting speed should not be based solely on the forces that the device can withstand but should also take account of the need to prevent injury to users;
- information on loading which should specify:
  - the maximum working loads;
  - maximum passenger numbers;
  - permissible out-of-balance loading;
  - order of passenger loading;
- limitations to use, eg passenger dimension (size, weight), medical condition, adverse environmental conditions (especially wind speed);
- details of any passenger-containment system and guidance on its use;
- information on relative positioning of passengers in the same car;
- potentially dangerous passenger behaviour;
- detailed explanation of the controls and their function;
- safe passenger access;
- limitations required to prevent static overload in waiting areas;
- safe and unsafe operating practices;
- faults and fault finding, including indications of malfunction and the action to be taken;
- emergency procedures, including evacuation.

Instructions and guidance on any maintenance and inspection

10 The information should cover:

- components which require regular lubrication, including information on suitable lubricants and the frequency required;
- components which require regular replacement and the period between replacement;
- components which require inspection for wear, correct setting etc together with details of the correct settings and allowable tolerances;

- electrical equipment together with any checks to be done by the user and details of safe isolation procedures;
- maintenance and testing of controls and interlocks.

10 The controller should add any other relevant information gained from operating the device.

12 The manual should be in the controller's first language. The controller should also take into account the needs of any foreign workers employed and make sure they are provided with sufficient information to allow them to work safely. It is important that the manual is 'user-friendly' and gives clear information on how the device can be used safely. The manual should be used as part of any training for the ride operator and ride assistants.

Appendix 4 Working at height

Work at Height Regulations 2005

1 The Work at Height Regulations 2005 apply to all work at height where there is a risk of a fall liable to cause personal injury. They place duties on employers, the self-employed whose work activity poses a potential risk to the health and safety of other workers or members of the public, and any person who controls the work of others, eg a ride controller who may contract someone to work at height.

2 As a dutyholder you must ensure:

- all work at height is properly planned and organised;
- those involved in work at height are competent;
- the risks from work at height are assessed and appropriate work equipment is selected and used;
- the risks from fragile surfaces are properly controlled;
- equipment for work at height is properly inspected and maintained.

3 The following hierarchy of control measures must be followed systematically:

- Avoid work at height where you can.
- Use equipment to prevent falls where work at height cannot be avoided.
- Use equipment to minimise the distance and consequences of a fall where the risk cannot be eliminated.
- Use collective protection measures (eg scaffolds, nets, soft landing systems) over individual protection (eg a harness).

4 There are occasions when work at height is required in the fairground industry, for example during:

- assembly and dismantling of devices;
- commissioning;
- maintenance;
- inspection;
- breakdown repair;
- emergency evacuation.

5 Further guidance on how the law applies to working at height is in *Working at height: A brief guide*.[22]

Appendix 5 Non-destructive testing

General principles

1 Non-destructive testing (NDT) is the testing of materials, for surface or internal flaws or metallurgical condition, without interfering in any way with the integrity of the material or its suitability for service. It can be performed during manufacture as part of quality assurance procedures to make sure that a structure or component is fit for use, free of significant defects and conforms to the design specification. It is also used by IBs as part of in-service annual inspection to determine whether structures or components continue to be fit for service.

Written schedule of NDT

2 The controller of a device should have available a written schedule of inspection for NDT which specifies the frequency of in-service NDT required (this can be measured in either time and/or ride cycles as appropriate), the type of NDT to be used, the location, and the defect acceptance criteria. It should have been drawn up by a suitably qualified mechanical/structural engineer along with a person qualified in the NDT techniques to be used.

3 The mechanical/structural engineer should identify the parts of the device that require testing, the frequency of inspection and the extent of dismantling required to gain access to them.

4 The NDT practitioner should specify the appropriate test methods and techniques to be used. These must be reliable and repeatable so that results can, if necessary, be compared to previous results.

5 The types, size, locations and orientations of defect indications should be referred to the relevant IB for a decision on the action to be taken, eg repair, replace or allow continued use.

Report of NDT

6 In this document the NDT practitioner provides a record for the IB and controller of the parts tested and the results obtained. The IB will need to assess these results when preparing the report of in-service annual inspection. An NDT report should include:

- confirmation that the inspection has followed the written schedule and any further tests carried out;
- the date of inspection;
- the inspector's name and their qualifications relevant to the type of inspection;
- the parts or elements examined which form any sample;
- details of the NDT methods, techniques and procedures used;
- the results of inspection.

7 The controllers should keep copies of NDT reports for the life of the device.

8 When assessing the reports, the IB should:

- be competent to distinguish between original manufacturing flaws and flaws which have developed during use. Having the results of previous NDT in the operations manual can be a valuable reference;
- be competent to distinguish between significant and insignificant indications. This will require, for example, a sufficient understanding of:
  - the manufacturing methods used and the types of flaws likely to be introduced during manufacture;
  - the significance of the type, size and orientation of the flaw with regard to the geometry, material and loading of the component;
  - the purpose and limitations of the NDT method used.

9 The IB may need to seek specialist advice if necessary.

Qualifications and competence

10 Every NDT practitioner must be competent to do the test and to accurately report the results.

11 There are three main qualifications commonly used in this country: ASNT (American Society for Non-destructive Testing); PCN (Personal Certification in Non-destructive Testing) and welding inspector.

12 A person qualified under ASNT is able to carry out a certain type of inspection which is specified in a written procedure. They are not normally qualified outside that procedure. Before a person claiming compliance with ASNT is engaged to do NDT work, enquiries should be made about the scheme and syllabus of that person's training and whether it is within the scope required to inspect an amusement device. This can be done on the ASNT website.

13 The PCN scheme is an international programme for the certification of competence of NDT personnel and is a recognised world-wide scheme. A certificate issued under the scheme is valid for a maximum of five years and may be withdrawn at any time by the issuing authority. The scheme has three levels of competence:

- Level 1: an inspector requires 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 write and validate NDT procedures; usually needs five years' experience.

14 A welding inspector is qualified to inspect the welding process as well as the finished weld. A person holding this qualification can test existing welds and inspect any remedial work in progress as well as the finished result. However, in the absence of other qualifications a welding inspector may not be competent to undertake other forms of NDT.

Typical defects

15 Typical defects encountered in testing of amusement devices are:

- in-service-induced fatigue cracking;
- corrosion;
- manufacturing-induced defects.

Typical test areas

16 Typical test areas are:

- safety-critical welds;
- weld repairs;
- axles;
- bolts and fixings;
- glass-reinforced plastic (GRP) laminates.

Typical NDT techniques used to test amusement devices

Visual and optical inspection

17 Visual inspection involves looking for defects. Special tools such as magnifying glasses, mirrors, or borescopes can be used to enable access and inspect in greater detail the subject area. This technique can be useful as part of an overall mechanical inspection of an amusement device, but will not normally be sufficient to complete an adequate NDT inspection of most amusement devices.

Dye penetrant

18 Dye penetrant requires careful preparation and pre-cleaning to ensure that there are no contaminants in the crack that would prevent the penetrant being drawn into it. The parts of the device to be examined are painted or sprayed with a visible or fluorescent dye solution and left for a period of time (normally around 15 minutes). The excess is removed and a developer agent (frequently white chalk) is applied. This acts as a 'blotter' and draws the trapped penetrant out of defects that are open to the surface. With visible dyes, vivid colour contrasts are used between the penetrant and developer to make the defect easy to see. With fluorescent dyes, ultraviolet light is used to make the defect visible.

19 It is relatively simple to carry out and it is useful in detecting surface-breaking defects in non-ferromagnetic parts which cannot be tested using magnetic particle inspection (MPI). A disadvantage is that it is restricted to surface-breaking cracks, and the presence of paint on the test piece can adversely affect detection of defects.

Magnetic particle inspection

20 MPI is a method used for defect detection of surface or near-surface-breaking defects. These distort the magnetic field and concentrate iron particles near imperfections, giving a visual indication of the flaw. This test is carried out by inducing a magnetic field in a ferromagnetic material and then dusting the surface with iron particles (either dry or in suspension). The technique is used widely in weld testing and inspection.

21 It is important to remember that the component being inspected must be made of a ferromagnetic material such as iron, nickel, cobalt, or some of their alloys. This is because the component must be capable of being magnetised to a level that will allow the inspection to be effective.

22 With MPI, the flaw indications generally look like the actual flaw. Cracks on the surface of the part appear as sharp lines that follow the path of the crack. It is another relatively simple process, but with the disadvantages that it can only detect surface or near-surface defects and can only be used on ferromagnetic material. Unbroken, tightly-adherent paint layers up to about 0.05 mm (50 microns) do not normally impair detection sensitivity. See BS EN ISO 9934-1[28] for further details.

Eddy current

23 Eddy current (EC) is used for the detection of surface or subsurface flaws – the paint does not need to be removed. It can only detect cracks up to 2 mm deep. ECs can be produced in any electrically conducting material that is subjected to an alternating magnetic field. The field is generated by passing an alternating current through a coil, which is wrapped round a ferrite rod and placed on the surface to be examined. When a crack, for example, occurs in the product surface, the ECs must travel further around the crack and this is detected by a change in the impedance measured in the coil.

Ultrasonic (UT)

24 High-frequency sound waves are passed into the test object and reflections (echoes) are returned to a receiver from internal imperfections or from the part's geometrical surfaces. This technique is widely used in the fairground industry and when used correctly can be a highly efficient method of detecting subsurface imperfections. It is important that the interpretation of results is carried out thoroughly. As with all other test techniques it has limitations, for example:

- if the test area is rough, irregular in shape or small, it can be difficult to detect defects;
- cast iron and other coarse-grained materials are difficult to inspect due to low sound transmission and high signal noise;
- linear defects oriented parallel to the sound beam may go undetected.

Radiography

25 Radiographic testing (RT) is used to detect internal defects in metals. X-rays or gamma rays are transmitted through the material and are differentially absorbed by the material through which they pass. An image is produced on a photographic film placed on the opposite side. It requires access to both sides of the weld. It is not suitable for surface-breaking defect detection and does not give an indication of the depth of a defect from the surface. While it has been shown that radiography can be used successfully by suitably trained operatives on certain parts of amusement devices (for example welds that are hidden underneath strengthening plates and cannot be examined using UT) the expense and detailed procedures that are required mean that it is not commonly used.

Appendix 6 Fire precautions

Fire risk assessments

1 If you are a person in charge of premises such as fairgrounds or amusement parks, or you operate fairground equipment, you must carry out and regularly review a fire risk assessment of those premises. This will identify what you must do to prevent fire and keep people safe.

You must keep a written record of your fire risk assessment if your business has five or more people.

Carrying out the assessment

2 The assessment should have five main aims:

- Identify the fire hazards, eg flammable materials, ignition sources.
- Identify people at risk, eg people who cannot quickly, safely and easily get to a place of safety.
- Evaluate, remove or reduce the risks, eg use other processes/ substances that do not create fire hazards.
- Record your findings, prepare an emergency plan and provide training.
- Review and update the fire risk assessment regularly.

3 You will find more detailed advice and information about these steps in the fire safety risk assessments section on GOV.UK: www.gov.uk.

4 You'll need to consider:

- emergency routes and exits – consider general access areas and structures as well as machinery and enclosed devices;
- fire detection and warning systems – these will vary dependent on the circumstances. Ensure you use the right ones for your circumstances;
- fire-fighting equipment – ensure you have the correct equipment, eg water should not be used on electrical fires;
- the removal or safe storage of dangerous substances – keep only the minimum amount of petrol needed close to hand. The rest should be stored away in an approved storage unit;
- an emergency fire evacuation plan – consider how the emergency services will get to the scene;
- the needs of vulnerable people, eg the elderly, young children or those with disabilities;
- providing information to employees and others on the premises;
- staff fire safety training.

Gas safety

5 Attractions can be supplied with gas from the mains, or liquefied petroleum gas (LPG) from fixed tanks or transportable cylinders. The main risks from the use of gas are:

- accidental release which can lead to fire, explosion, or asphyxiation;
- build-up of fume or poisonous combustion products, particularly carbon monoxide.

6 Appliances, including items such as catering equipment and gas-powered generators, must only be installed and maintained by Gas Safe-registered gas fitters. To find a Gas Safe-registered installer in your area contact Gas Safe on 0800 408 5500 or email: enquiries@gassaferegister.co.uk.

7 Every gas installation used in an enclosed area must be properly installed and regularly maintained so that:

- gas is efficiently burned to prevent the production of carbon monoxide;
- there is good general and fixed ventilation for the appliance;
- combustion products are safely dispersed to the open air;
- flues are properly installed and free from leaks and obstructions.

Storing LPG

8 Arrange your LPG storage to prevent two main risks:

- Leakage followed by ignition. Leaks could arise from damage to the vessel or its associated pipework.
- Direct heat on a vessel. The most likely source is a fire close to the vessel, so it is very important to keep other combustible materials well away.

Fixed LPG installations

9 UKLPG produces a broad range of codes of practice and advice guidance covering the use of LPG, with several relating to bulk or cylinder storage. These are available from UKLPG, Camden House, Warwick Road, Kenilworth, Warwickshire CV8 1TH (www.uklpg.org).

10 Further guidance on the storage and use of LPG is contained in the UKLPG Code of Practice No 24, particularly part 4 *Use of LPG cylinders: The use of LPG for catering at outdoor functions* (March 1999).[29]

Preventing other risks

11 Flammable gas should not be used to fill balloons or similar items.

References and further reading

References

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2 *Managing health and safety in construction. Construction (Design and Management) Regulations 2015. Guidance on regulations* L153 HSE 2015 www.hse.gov.uk/pubns/books/l153.htm

3 *Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22* (Fourth edition) HSE 2014 www.hse.gov.uk/pubns/books/l22.htm

4 *Safe use of lifting equipment. Lifting Operations and Lifting Equipment Regulations 1998. Approved Code of Practice and guidance* L113 (Second edition) HSE 2014 www.hse.gov.uk/pubns/books/l113.htm

5 *Cableway Installations Regulations 2004* SI 2004/129 The Stationery Office www.legislation.gov.uk

6 BS EN 14960:2013 *Inflatable play equipment. Safety requirements and test methods* British Standards Institution

7 Memorandum of understanding between HSE and the Office of Rail and Road (ORR) www.hse.gov.uk/aboutus/howwework/framework/mou/orrmou.pdf

8 *Managing for health and safety* HSG65 (Third edition) HSE 2013 www.hse.gov.uk/pubns/books/hsg65.htm

9 *Consulting employees on health and safety: A brief guide to the law* INDG232(rev2) HSE 2013 www.hse.gov.uk/pubns/indg232.htm

10 BS EN 13814:2004 *Fairground and amusement park machinery and structures.* Safety British Standards Institution

11 *Safety of amusement devices: Design* (Second edition) Amusement Device Safety Council 2006 ISBN 978 0 9554117 1 7

12 BS EN ISO/IEC 17020:2012 *Conformity assessment. Requirements for the operation of various types of bodies performing inspection* British Standards Institution

13 *Avoiding danger from overhead power lines* GS6 (Fourth edition) HSE 2013 www.hse.gov.uk/pubns/gs6.htm

14 *Avoiding danger from underground services* HSG47 (Third edition) HSE 2014 www.hse.gov.uk/pubns/hsg47.htm

15 *First aid at work. The Health and Safety (First-Aid) Regulations 1981. Guidance on Regulations* L74 (Third edition) HSE 2013 www.hse.gov.uk/pubns/books/l74.htm

16 *First aid at work: Your questions answered* INDG214(rev2) HSE 2015 www.hse.gov.uk/pubns/indg214.htm

17 *Working together on firework displays: A guide to safety for firework display organisers and operators* HSG123 (Third edition) HSE 2006 www.hse.gov.uk/pubns/books/hsg123.htm

18 *Using work equipment safely* INDG229(rev2) HSE 2012 www.hse.gov.uk/pubns/indg229.htm

19 *Equality Act 2010* The Stationery Office www.legislation.gov.uk

20 *Reporting accidents and incidents at work: A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)* INDG453(rev1) HSE 2013 www.hse.gov.uk/pubns/indg453.htm

21 *Providing and using work equipment safely: A brief guide* INDG291(rev1) HSE 2013 www.hse.gov.uk/pubns/indg291.htm

22 *Working at height: A brief guide* INDG401(rev2) HSE 2014 www.hse.gov.uk/pubns/indg401.htm

23 *Controlling noise at work. The Control of Noise at Work Regulations 2005. Guidance on Regulations* L108 (Second edition) HSE 2005 www.hse.gov.uk/pubns/books/l108.htm

24 *Noise at work: A brief guide to controlling the risks* INDG362(rev2) HSE 2012 www.hse.gov.uk/pubns/indg362.htm

25 *The Electricity at Work Regulations 1989. Guidance* HSR25 (Third edition) HSE 2015 www.hse.gov.uk/pubns/books/hsr25.htm

26 *Electricity at work: Safe working practices* HSG85 (Third edition) HSE 2013 www.hse.gov.uk/pubns/books/hsg85.htm

27 *The Health and Safety (Enforcing Authority) Regulations 1998* SI 1998/494 The Stationery Office www.legislation.gov.uk

28 BS EN ISO 9934-1:2016 *Non-destructive testing. Magnetic particle testing. General principles* British Standards Institution

29 *Use of LPG cylinders: The use of LPG for catering at outdoor functions* Code of Practice 24: Part 4 UKLPG 1999 www.uklpg.org/shops/codes-of-practice

30 BS 4778-3.1:1991 *Quality vocabulary. Availability, reliability and maintainability terms. Guide to concepts and related definitions* British Standards Institution

Further reading

Consulting workers on health and safety. Safety Representatives and Safety Committees Regulations 1977 (as amended) and Health and Safety (Consultation with Employees) Regulations 1996 (as amended). Approved Code of Practice and guidance L146 (Second edition with amendments) HSE 2014 www.hse.gov.uk/pubns/books/l146.htm

Control of substances hazardous to health (Sixth edition). The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5 (Sixth edition) HSE 2013 www.hse.gov.uk/pubns/books/l5.htm

Fire safety risk assessment. Open-air events and venues 2007 Communities and Local Government Publications 2007 www.gov.uk

Fire safety risk assessment. Small and medium places of assembly Communities and Local Government Publications 2006 www.gov.uk

Lifting equipment at work: A brief guide INDG474 HSE 2017 www.hse.gov.uk/pubns/indg474.htm

Making the best use of lifting and handling aids: A brief guide INDG398(rev1) HSE 2013 www.hse.gov.uk/pubns/indg398.htm

Manual handling at work: A brief guide INDG143(rev3) HSE 2012 www.hse.gov.uk/pubns/indg143.htm

Manual handling. Manual Handling Operations Regulations 1992. Guidance on Regulations L23 (Third edition) HSE 2016 www.hse.gov.uk/pubns/books/l23.htm

Personal protective equipment at work. Personal Protective Equipment at Work Regulations 1992. Guidance on Regulations L25 (Second edition) HSE 2015 www.hse.gov.uk/pubns/books/l25.htm

Risk assessment. A brief guide to controlling risks in the workplace INDG163(rev4) HSE 2014 www.hse.gov.uk/pubns/indg163.htm

Safety of pressure systems. Pressure Systems Safety Regulations 2000. Approved Code of Practice and Guidance on Regulations L122 (Second edition) HSE 2014 www.hse.gov.uk/pubns/books/l122.htm

Safety signs and signals. The Health and Safety (Safety Signs and Signals) Regulations 1996. Guidance on Regulations (Third edition) L64 HSE 2015 www.hse.gov.uk/pubns/books/l64.htm

Safe use of propane and butane cylinders and cartridges UIS028 UKLPG 2014 www.uklpg.org/advice-and-information/useful-information

Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice and guidance L24 (Second edition) HSE 2013 www.hse.gov.uk/pubns/books/l24.htm

BS EN ISO 13857:2008 *Safety of machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs* British Standards Institution

BS ISO 17842-1 *Safety of amusement rides and amusement devices. Design and manufacture* British Standards Institution

BS 7671:2008+A3:2015 *Requirements for electrical installations. IET Wiring Regulations* British Standards Institution

Glossary

Amusement device (often shortened to 'device') This includes rides, transportable structures entered by the public (eg haunted houses, arcades, tents and booths) and shooting galleries where hazardous projectiles are fired

Amusement industry The collective term for the fairgrounds and amusement parks industry. It includes the people who design, manufacture, supply, control, operate, attend, maintain and carry out inspection of articles of fairground equipment and other attractions at fairgrounds and amusement parks

Amusement park Fixed site where fairground equipment is provided for the entertainment of the public

Appointed inspection body (AIB) The registered inspection body (IB) that has overall control of the in-service annual inspection of an amusement device and the responsibility for issuing the declaration of operational compliance (DOC). The IB also has the overall responsibility for confirming that pre-use inspections have been completed and for issuing the DOC

Arcade A transportable structure housing games, stalls or other attractions at a fairground or amusement park. It does not include buildings housing such attractions

Article of fairground equipment Any fairground equipment or any article designed for use as a component in any such equipment (definition from Health and Safety at Work etc Act 1974, section 53)

Assessment of conformity to design (ACD) The procedures and investigations necessary to confirm that a piece of equipment or a part of it has been manufactured in conformity with a particular reviewed design specification (see also design review)

Attendant Any person appointed to work under the control and direction of an operator to assist in the operation of an amusement device

Attraction Anything provided for the entertainment of the public at a fairground or amusement park, including rides, games and catering stalls

Coin-operated amusement devices Arcade simulators, kiddie cars, kiddie rides and similar. These devices may be inspected by a competent IB

Coin-operated arcade simulator An amusement device designed to enhance the visual effects of a game or video display with a simple non-violent motion. It is mounted on a stationary base incorporating measures designed to 'fail safe' in the event of a structural, electro/hydraulic or pneumatic failure. The seat height should not exceed 1.5 m from the ground. The device is operated by coins or tokens etc and is designed for the unattended use of no more than two people

Coin-operated kiddie car A battery-powered vehicle with a maximum speed consistent with that laid down in BS EN 13814[10] and operated by coins or tokens etc. Designed for the unattended use of children between 3 and 10 years within the strict confines of a specially designed track

Coin-operated kiddie ride A slow-moving device fitted on a stationary base operated by coins or tokens etc primarily designed for the unattended use of one or two children between 3 and 10 years

Although a ride is designed primarily for the use of children between 3 and 10 years, this does not mean that a parent or guardian cannot accompany the child if the ride is suitable. In certain circumstances the ride may seat more than two people, in which case special conditions should be applied. Rides with more than two seats should be designed (ie slow or gentle movement or other safety measures) to make sure a child will not sustain injury if boarding or alighting when the ride is enabled. The ride should have a sign advising that the passengers should be seated before a coin is inserted and other measures considered such as 'soft start'

Commissioning tests Tests designed to compare the performance of a new or modified piece of equipment against its specification

Controller The person or organisation having overall control of an amusement device (including maintenance and safe use). This may be either an individual or corporate body owning an amusement device or the concessionaire or lessee who has been granted control of the device, by the owner, for a specified time

Coordinating inspection body The inspection body that has the overall responsibility for confirming that a pre-use inspection/inspections (design review, ACD and/or initial test) has/have been completed

Daily check An operational check carried out before an attraction is made available to the public, to determine whether or not an amusement device is in such a condition that it may continue to be operated safely. The controller or a person nominated by the controller should conduct it. The check should identify any defects and indicate what replacement, repair or adjustment is needed before the attraction can be used. For an amusement device, it should also include a trial run with a functional check of any safety-related systems to make sure that they are properly adjusted and work in accordance with the operations manual

Declaration of operational compliance (DOC) The safety certificate issued by an IB after the satisfactory completion of all the relevant pre-use and in-service annual inspections on an amusement device. It is used to certify that the device is safe to operate for a period of no longer than 12 months, or less if specified by the IB

Design review The procedures and investigations necessary to confirm that the safety-critical aspects of the design of a passenger-carrying amusement device are sound in concept and that the calculations are satisfactory

Design risk assessment The process of assessing the hazards that the design of a piece of fairground equipment may pose, the likelihood of those hazards posing a risk and the control measures that are necessary to adequately control those risks. Designers should assess the significant risks that arise from its subsequent assembly/dismantling, transport, inspection, maintenance and operation

Design specification documents Drawings, software etc which together make up the descriptions of function, operation, construction, workmanship and materials

Device Abbreviation for the term 'amusement device'

Dutyholder Any person who has duties imposed on them by any relevant statutory legislation

Fair An event at which fairground equipment is used for entertaining the public

Fairground Any part of premises which is for the time being used wholly or mainly for the operation of any fairground equipment other than a coin-operated ride or non-powered children's playground equipment. It includes both fixed amusement parks and temporary sites

Fairground equipment Any fairground ride – or any similar plant designed to be in motion for entertainment purposes – with members of the public on or inside it, or any plant which is designed to be used by members of the public for entertainment purposes either as a slide or for bouncing on, including swings, dodgems and other plant designed to be in motion wholly or partly under the control of, or to be put in motion by, a member of the public. This definition was inserted in the Health and Safety at Work etc Act 1974, section 53, by an amendment enacted by the Consumer Protection Act 1987. The definition is held to include coin-operated children's rides, but not non-powered children's playground equipment

Functional test A test or combination of tests designed to investigate whether an amusement device continues to carry out its safety-critical functions. The tests may need to include measures of both function and performance using conditions and loading appropriate to those likely to occur in use

Hazardous projectiles Mechanically-fired projectiles which could cause personal injury, including live ammunition; other metal projectiles designed to be fired by compressed air, eg pellets, darts and balls; crossbow bolts; and any targets which are projectiles, eg clays. It does not include hand-thrown projectiles

Initial test Tests required to confirm that a newly constructed, imported or modified amusement device operates in accordance with a specification which has been the subject of a successful independent design review. Commissioning tests are not a substitute for an initial test, but an IB may take account of relevant data from such tests as evidence of performance of a device under particular conditions as part of the overall initial test

In-service annual inspection The procedures, tests and investigations necessary for an AIB to decide whether an amusement device may continue to be operated safely, or that it requires defects to be remedied either immediately or in a specified time before the device may be operated over a specified period of time.

Inspection Examination of a product design, product, service, process or plant, and determination of their conformity with specific requirements or, on the basis of professional judgement, general requirements

Maturity design Evidence from past experience that a design or a component of a design has a history of safe functioning. Such evidence needs to be scrutinised carefully to make sure that it is wholly relevant to any importance that is to be placed on it

Non-violent movement Movement unlikely to cause a user to be dislodged or fall over resulting in an injury, eg to cause people to strike their head etc on the sides of the seats. A ‘fail safe’ measure is one that will not cause a risk to the safety of a passenger or the public, or others, if it fails. If any doubts exist, a full inspection procedure, including design review and conformity should be carried out by a competent IB

Operational limits The limits recorded in the operations manual within which an amusement device should be used

Operations manual Full instructions for safe use compiled by the designer, manufacturer, importer or supplier (updated by the user) and containing documentary proof of all inspection reports and records of any modifications and repairs, as well as other records previously kept in the log book. Records of daily checks should be kept in the operations manual

Operator The person appointed by the controller to be in charge of the immediate operation of an attraction at any time it is intended to be available for public use

Organiser The person who has overall control of a fairground or amusement park. This may be an individual or a corporate body. The organiser may, for example, own the site; be a concessionaire or lessee who has been granted control of the site for a specific period; or have

been appointed or elected to coordinate the activities of a number of individual employers or self-employed people working at the site

Packing material Used between the stationary framework and the ground/foundations to make adjustments for variations in levels

Passenger containment system A system comprising one or more components, eg seating, foot wells, handrails and passenger restraints designed to prevent passengers moving outside a predefined area on a ride, either as a result of the ride forces or the behaviour of the passenger

Passenger restraint A particular part of the passenger-containment system moved into position and used to hold a passenger in one place or prevent movement of all or particular parts of their body, eg lap bars and seat belts

Repair Restoration of safety-critical components or safety-critical assemblies to an acceptable condition by mending of worn, damaged or decayed parts, which does not result in a deviation from the design specification

Ride A fairground ride. This has the same meaning as the legal definition of 'fairground equipment', found in section 53 of the HSW Act

Safety The freedom from unacceptable risks of personal harm (BS 4778-3.1[30])

Safety-critical component Any type of component on an amusement device on which the safety of the passengers (or others who may be affected) is dependent

Safety-critical modification Any alteration to the hardware and/or software of a piece of equipment, including the introduction of a safety-critical component which results in a deviation from the original design specification

Safety envelope The minimum space around the moving part of a ride necessary to make sure that passengers or other people such as spectators cannot be injured through contact with either static or moving parts. Calculations of the safety envelope should take account of the maximum foreseeable size of people who could be at risk, and dynamic as well as static reaches

Stall Any other attraction, for example hoopla, catering trailer etc

Trial run Proving run of an amusement device during which no passengers are carried

Useful contacts

ACES (via email) a.c.e.s@hotmail.co.uk

ADIPS Ltd, North East BIC, Enterprise Park East, Wearfield, Sunderland SR5 2TA Tel: 0191 516 6381 www.adips.co.uk

AIS (via email) ais.sect@yahoo.co.uk

ALES, 73 Zig Zag Road, West Derby, Liverpool L12 9EQ

BACTA, 134 Buckingham Palace Road, London SW1W 9SA Tel: 020 7730 6444 www.bacta.org.uk

BALPPA, Queens House, 55–56 Lincoln's Inn Fields, London WC2A 3BH Tel: 020 7403 4455 www.balppa.org

NAFLIC, (via email) www.naflic.co.uk/contact.html

PIPA, 10B Red Ouse Yard, Gislingham Road, Thornham Magna, Suffolk, IP23 8HH Tel: 01379 788673 www.pipa.org.uk

Showmen's Guild of Great Britain (SGGB), Guild House, 41 Clarence Street, Staines, Middlesex TW18 4SY Tel: 01784 461805 www.showmensguild.co.uk

Society of Independent Roundabout Proprietors (via email) sec@sirp.org.uk

Further information

For information about health and safety visit - https://books.hse.gov.uk or http://www.hse.gov.uk. - You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops. -

To report inconsistencies or inaccuracies in this guidance email: commissioning@wlt.com. -

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Statutory Instruments can be viewed free of charge at www.legislation.gov.uk where you can also search for changes to legislation. -