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MANDATE TO CEN AND CENELEC FOR STANDARDIZATION IN THE FIELD OF SAFETY OF EQUIPMENT FOR FAIRGROUNDS AND AMUSEMENT PARKS.

1. Background

The fairground and amusement park industry forms a significant element in the European leisure industry, with approximately 300 amusement parks in operation, and approximately 30 000 temporary events per year, with total annual public attendance of over 1 billion[1].

Some of the amusement parks are very large, catering for up to 10 million visitors per annum. They have strong centralised management structures and important financial resources to buy rides costing several million ECU. A feature of the equipment is the high use rate with rides being fully loaded almost every day of the year;

Temporary events and travelling fairs consist of a small number of attractions to gathering of a thousand. A feature of these is the large number of small owners, the loose infrastructure and itinerant nature of the business. There is a large number of low skilled labour employed to operate the rides. Equipment is erected and dismantled many times in a year but the utilisation factor of individual rides tends to be low; most of the time is spent in travelling.

Over the last 10 years, the nature of fairground rides has changed dramatically. The advent of manufacturers able to construct large fabricated structures and computer aided design and computer controlled systems has enabled designers to produce much larger and more extreme rides. It has also become a feature of industry that the designer and manufacturer exist in separated organisations often in different countries.

The safety aspects related to equipment and structures have led to the development of a corpus of national regulations which manufacturers and operators must apply in order to gain permission to place on the market, install or operate their equipment. This can constitute a barrier to trade since the regulations that apply in one Member State will not

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1 Source: European Showmen's Union (ESU-UFE), 27. 10. 1995

necessarily and of themselves be identical in operation with those of another, with the result that operators or manufacturers from one country must undergo costly and time-consuming safety assessment and certification procedures even if they already have them from other Member States. The need for a common system of assessment is exacerbated by the nature of part of the industry, which comprises itinerant operators that set up their equipment temporarily in one place for use by the public, then demount it for use elsewhere; if their itinerary includes more than one country this may entrain more than one safety assessment and certification procedure for the same basic risks, which can be a barrier to trade and an obstacle to the free movement of goods and services.

A proposal by the Commission for a Directive in this area was drawn up in 1991. However, it was deleted from the European legislative programme**;** the Edinburgh European Council considered that the problem could be dealt with by subsidiarity. A purely national approach can constitute a difficulty for manufacturers and operators, who are often SMEs. In response to this problem, a commonly agreed basis for safety assessment would be a clear and tangible advantage. The use of voluntary instruments at European level, in place of mandatory European legislation, will serve to provide authorities responsible for the assessment and certification with a commonly agreed basis for safety assessment, and will enable manufacturers and operators to offer equipment and services of a known quality. This will not of itself relieve manufacturers and operators of the need for multiple assessment and certification, both of materials and of installation. It will nonetheless serve to reduce the burden of such assessment and certification if the European standards, taking into consideration a number of defined safety concerns, are used as a common basis for assessment. The Member States remain responsible for regulation in this area.

2. Description of the mandated work

CEN and CENELEC are invited to draw up standards covering the safe design, materials, construction (including where appropriate the temporary erection), operation and use of equipment for fairgrounds, amusement parks and similar installations intended to be used by the public, covering both

- rides such as round-a-bouts, swings, roller coasters and cars, where passengers are subject to the force of gravity, and
- covered structures which are erected for a temporary period and dismantled for use elsewhere.

The standards shall cover risks arising from the use of all types of equipment for fairgrounds and amusement parks, whether intended for permanent installation, for example in large-scale amusement parks**,** or intended to be erected for a temporary period and then dismantled for use elsewhere**,** for example travelling fairs; and whether intended to be used under cover or in the open air. They shall cover also dismountable structures. The standards shall provide for a high level of protection.

In particular, the standards shall cover risks from falling, rapid or discontinuous movement, collision, heat, and electrical hazard. They shall cover not only risks to the public arising from normal use but also risks from abnormal use likely to arise in practice (such as members of the public failing to carry out safety instructions). They shall cover

risks likely to be presented to operators from the normal operation, foreseeable abnormal operation, erection and dismounting, loading and transport of equipment. They may include codes of practice for operation, check lists, and quality standards. They shall cover the likelihood of accidents arising out of insufficient familiarity with new equipment, failures in erection or operation, lack of maintenance and inspection, and failure through inappropriate repairing.

The standards shall be limited to safety aspects. They shall cover the safety requirements for the relevant equipment in Annex A which gives an indication of the health and safety requirements that could be covered by the standards. Standards giving requirements unrelated to safety are not covered by this mandate.

Certain European legislation, or standards existing or in preparation under the terms of other mandates, may be relevant to fairground and amusement park equipment or to materials used in its construction. For example, requirements for construction products, cable ways, apparatus for lifting persons, toy safety, personal protective equipment and low-voltage equipment may be relevant. Where such requirements exist, the standards drawn up under the terms of this mandate shall be consistent with European legislation and shall take into account the provisions of standards drawn up under other mandates. In particular, they shall take into account, as appropriate, existing and planned work in support of the Machinery Directive 89/392/EEC. Where such links exist, the standards shall indicate the relationship with the relevant legislation or mandated standards.

Account shall be taken of national rules and specifications in this area, existing or in preparation

3. Bodies to be associated

The standardization work shall be carried out with the co-operation of bodies representing showmen and fairground and amusement park operators; manufacturers of equipment for fairgrounds and amusement parks; regulatory authorities and similar organizations concerned with safety assessment, health and safety of workers, and consumer protection; and bodies concerned with the protection of the public, workers, and the environment.

4. Execution of the mandate

1. CEN and CENELEC shall present a joint and mutually agreed list of draft standards with target dates, in accordance with the terms of 2 above, to the Commission within six months of acceptance of this mandate. It shall present the draft standards listed therein by the target dates specified.

2. The European Standards (EN) shall be adopted by the target dates specified. At these dates, the three linguistic versions (German, English, French) shall be available as well as the correct titles in the other European Union languages, CEN and CENELEC shall notify the Commission of the addition or removal of any standards projects, with their target dates in the case of additions, which it approves for addition to its work programme that may be necessary.

3. The European standards adopted shall be transposed into national standards and differing national standards shall be withdrawn from the catalogues of the national standards organizations in the Member States within six months of their adoption.

4. Acceptance by CEN and CENELEC of this mandate starts the standstill period referred to in Article 7 of Council Directive 83/189/EEC of 28 March 1983 (OJ N° L 109 of 26 April 1983) as last amended by Directive 94/10 of the Council and Parliament (OJ L100 of 19 April 1994, p. 30).

ANNEX A

Safety requirements for equipment for fairgrounds and amusement parks to be covered in the standards.

1. REQUIREMENTS APPLICABLE TO ALL EQUIPMENT

1.1 *Definitions*

For the purpose of this Annex

(1) 'operator' means the person or persons given the task of installing, operating, adjusting, maintaining, cleaning, repairing, assembling, dismantling or transporting a piece of equipment;

(2) 'the public' means persons who use the equipment, either as users or spectators, and who may thereby be placed at risk;

(3) 'exposed person' means any member of the public or operator;

1.2 *Principles of safety integration*

(a) Equipment should be so constructed that it is fitted for its function, and can be adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen by the manufacturer.

The aim of measures taken should be to eliminate any risk of accident throughout the foreseeable lifetime of the equipment, including the phases of assembly and dismantling, even where risks of accident arise from foreseeable abnormal situations.

(b) In selecting the most appropriate methods, the following principles should be applied, in the order given:

- eliminate or reduce risks as far as possible (inherently safe equipment design and construction);
- take the necessary protection measures in relation to risks that cannot be eliminated;
- inform users of the residual risks due to any shortcomings of the protection measures adopted, indicate whether any particular training is required and specify any need to provide personal protection equipment.

(c) When designing and constructing equipment, and when drafting the instructions, not only the normal use of the equipment but also uses which could reasonably be expected should be envisaged.

Equipment should be designed to prevent abnormal use if such use would engender a risk. In other cases instructions should draw the user's attention to ways - which experience has shown might occur - in which the equipment should not be used;

(d) Under the intended conditions of use, the discomfort, fatigue and psychological stress faced by the operator should be reduced to the minimum possible taking ergonomic principles into account.

(e) When designing and constructing the equipment, the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protection equipment (such as footwear, gloves, etc.) should be taken into account.

(f) Equipment should be supplied with all the essential special equipment and accessories to enable it to be assembled, dismantled, transported, adjusted, maintained and used without risk.

1.3 *Risks due to materials and products*

The materials used for the equipment or products employed during its use should not endanger exposed persons' safety or health.

Where fluids are used, the equipment should be designed and constructed for use without risks due to filling, use, recovery or draining.

1.4 *Risks due to darkness and excessive noise emission*

1.4.1 Internal areas accessible to the public and operators and equipment intended to be used in darkness should be fitted with lighting. They should be supplied with lighting or means for hanging it up, and all necessary information in the instructions should be provided. The lighting should be electric and comply with the provisions of relevant European law. It should be adequate to avoid risks, particularly that of falling.

1.4.2 Lighting of parts of the equipment that are accessible to the public should include emergency lighting of sufficient intensity to permit evacuation.

1.4.3 Exits should be fitted with signs to indicate their location; these signs should in addition be illuminated by the emergency lighting system.

1.4.4 Lighting installations should be out of reach of the public.

1.4.5 Emergency lighting should switch on automatically if the normal lighting fails.

1.4.6 Equipment should not be designed or constructed in such a way as to emit levels of noise liable to damage the hearing of exposed persons.

1.5 *Risks due to lack of strength, motion, and dynamic loading*

1.5.1 Equipment should be designed and built so that its strength and stability are sufficient to withstand the stresses foreseen by the manufacturer including stresses due to motion.

1.5.2 The design strength of components of equipment should take account of forces which might be created, where applicable, by uneven loading.

1.5.3 Surfaces intended to be walked on and to bear the weight of persons should be designed and constructed to ensure proper safety.

The following loads are suggested as an indication:

- 5 kN/m² if the persons are seated;
- 7.5 kN/m² if they are standing.

1.5.4 Equipment shall be designed and built so that stresses due to movement are not liable to harm persons.

1.5.5 Where persons are subject to dynamically induced stresses or risks arising from collision with the ground, parts of equipment or other persons, restraints shall be provided to prevent harm to persons under such circumstances. Such restraints shall

be sufficiently strong to withstand the anticipated risks;

be sufficiently easy to operate that risks from persons being trapped are avoided.

1.6 *Risks due to accidental contact with equipment*

All parts of equipment that might come into contact with exposed persons should be so designed, constructed and maintained that they cannot cause accidents. Such parts should have no sharp angles or edges or rough surfaces likely to cause injury.

1.7 *Risks due to access, circulation and exits*

1.7.1 The public should be protected against slipping, stumbling and loss of balance of any kind. The additional risks due to stairs, ladders, sloping floors, unstable floors, etc., should be taken into consideration in the solutions adopted.

1.7.2 Entrances to equipment should be sufficient in number and size to permit entry and evacuation of the public in a sufficiently short time.

Particular attention should be paid to the risks of panic due to an accident, the start of a fire, etc.

Means of access should be designed and built so as to take account of the physical state of users which might arise from use of the equipment (dizziness, etc.).

Doors should be able to open outwards, except for doors which are intended to remain open whenever there are people inside the equipment.

All doors should be able to be opened from the inside; anti-panic opening devices should be used when more than 200 persons may be assembled in the equipment.

When there is a risk of falling, due in particular to differences in level, equipment should be designed and constructed to prevent this risk, particularly by using guard rails suitably adapted to the level difference.

Internal circulation routes should be designed and built so that there are no cul-de-sacs or bottlenecks in the direction used for leaving the equipment in an emergency.

Stairs and access ramps should be designed and constructed to be sufficiently safe for their length, width, steepness, etc. they should be provided with one or more ramps.

The dimensions of stairs should not vary on the same staircase, and ramps should have a uniform gradient throughout their length.

1.8 Risks due to suffocation

Where the installation includes closed internal areas accessible to exposed persons, air renewal systems should take into account the number of persons who may be in the area in question.

They should operate either by natural ventilation or by forced draught.

1.9 Risks due to fire

Depending on the number of persons who may be in the equipment and the means of evacuation, the characteristics of the materials used should make them difficult or impossible to set alight.

Extinguishers appropriate for the materials used in the equipment should be provided in sufficient number, taking account of its size, and positioned visibly and accessibly. Closed structures designed to hold more than 3000 persons at the same time should be fitted with their own integral fire-fighting system.

1.10 Risks due to handling of the equipment

Equipment or each component part thereof should be capable or being handled safely.

Where the weight, size or shape of equipment or its various component parts prevents them from being moved by hand, the equipment or each component part should:

- either be fitted with attachments for lifting gear,

or

- be designed so that it can be fitted with such attachments (e.g. threaded holes), or
- be shaped in such a way that standard lifting gear can easily be attached.

Where equipment or one of its component parts is to be moved by hand, it should:

- either be easily movable, or
- be equipped for picking up (e.g. hand-grips, etc.) and moving in complete safety.

Particular attention should be paid to the risks de to handling when the equipment is intended to be assembled and dismantled very frequently.

1.11 Risks due to errors of fitting

Errors likely to be made when fitting certain parts which could be a source of risk should be made impossible by the design of such parts or, failing this, by information given on the parts themselves. Further information that may be necessary should be given in the instructions.

1.12 Risks due to lack of stability

Equipment and components should be so designed and constructed that they are stable enough, under the foreseen operating conditions (if necessary taking climatic conditions into account), for use without risk or overturning, falling or unexpected movement.

If the shape of the equipment itself or its intended installation does not offer sufficient stability, appropriate means of anchorage should be incorporated and indicated in the instructions.

1.13 Risk of breakage during operation

The various parts of equipment and their linkages should be able to withstand the stresses to which they are subject when used as foreseen by the manufacturer.

The durability of the materials used should be adequate for the nature of the work place foreseen by the manufacturer, in particular as regards the phenomena of fatigue, ageing and corrosion.

The manufacturer should indicate in the instructions the type and frequency of inspection and maintenance required for safety reasons. Where appropriate, there should be an indication of the parts subject to wear and the criteria for replacement.

1.14 Risks due to electricity

Where equipment is powered by electricity it should be designed, constructed and equipped so that all hazards of an electrical nature are or can be prevented.

1.15 Maintenance

1.15.1 *Equipment maintenance*

It should be possible to carry out adjustment, maintenance, repair, cleaning and servicing operations without risk.

1.15.2 *Access to operating position or servicing points.*

Equipment should be designed, constructed or fitted with means of access making it possible to reach in safety the areas used for maintenance operations and for the operators normal working activities.

1.15.3 *Isolation of power sources*

Equipment should be fitted with means to isolate it from all power sources. Such isolators should be lockable if reconnection could endanger exposed persons.

1.16 Marking

All equipment, or each component part thereof in the case of modular equipment, should be marked legibly and indelibly with the appropriate particulars, e.g.:

- name and address of the manufacturer;
- where appropriate, names and addresses of authorized representatives;
- year of construction;
- where appropriate, serial and model number;
- where appropriate, a serial or identification number.

1.17 Instructions and log book

(a) All equipment should be accompanied by instructions including at least the following:

- a repeat of the information with which the equipment is marked, together with any appropriate additional information to facilitate maintenance (e.g. addresses of importers, repairers, etc.);
- foreseen use of the equipment;
- instructions for safe:
- putting into service,
  - use,
  - handling (giving the weight of the equipment and its various parts where they are regularly to be transported);
  - installation,
  - assembly and dismantling, including the use of lifting gear when necessary,
  - adjustment,
  - maintenance (servicing and repair),
  - where necessary, training instructions.

Where necessary training instructions should draw attention to ways in which the equipment should not be used.

(b) The instructions should be drawn up in one of the Community languages. The owner of the equipment should receive a translation of the instructions in the language of the country in which the equipment is to be used, together with the original instructions.

In the case of equipment that can be dismantled and may be assembled in a different language area, the instructions should be supplied in the language of the country where the owner has his had office; this should be the language normally used by his staff.

(c) The instructions should contain the drawings and diagrams necessary for putting into service, maintenance, inspection, checking of correct operation and, where appropriate, repair of the equipment, and all useful instructions in particular with regard to safety.

(d) Any sales literature describing the machinery should not contradict the instructions as regards safety aspects.

(e) Where necessary, the instructions should give the requirements relating to installation and assembly for reducing noise or vibration (e.g. use of dampers, type and mass of foundation block, etc.)

(f) Instructions for use should include a requirement to keep a log book listing

Details of installations, options etc., relating to the particular item of equipment;
Details of any accidents, breakdowns or mechanical failures;
Details of any maintenance carried out, either routine or after failure.

2. REQUIREMENTS FOR NON-PERMANENT STRUCTURES

In addition to the requirements set out in 1 above, non-permanent structures should be so designed and constructed as to meet the following requirements:

2.1 Risks due to overloading of the structure

In order to avoid the risks due to overloading of structures, the number of persons permitted to be inside or on the structure should be clearly indicated at all the entrances.

2.2 Risks due to supports of the structure itself or of some of its parts

Components used for fixing in position the structure or some of its parts, such as those used to bear the weight of attractions, safety nets, etc., should be so designed and constructed as to have a load factor providing an adequate safety level.

In particular, cables should have no knots or splices other than at their ends; the fixing systems for components bearing the weight of an audience should be so designed and constructed as to be incapable of slackening accidentally.

2.3 Risks affecting audiences

In addition to the requirements set out in 1.7 above, where structures are fitted with seats the following should be ensured:

(1) If the seats are movable and arranged in rows, they should be so designed and constructed that they can be joined together;

(2) The distance between two successive rows should be sufficient to allow easy access to the seats;

(3) The number of seats that a spectator should pass on leaving his seat should be as small as possible taking into account the distance between rows. The distance between each spectator position and the nearest exit should be as direct and short as possible; this route should be obvious or, if not, it should be clearly indicated.

2.4 Risks due to the presence of dangerous animals in the structure

Where the structure is intended for displaying dangerous animals, they should be kept in enclosures designed and constructed to keep them entirely safe even if they become enraged (strong cages with high walls fitted with means to prevent jumping over, etc.).

2.5 Risks associated with shooting galleries

Where the structure is intended to be used as a shooting gallery, either for firearms or equivalent weapons (pistols, airguns), or for archery, the following conditions should be met:

- the shooting gallery should be so designed and constructed that stray projectiles cannot ricochet out of it or pass through the walls or ceiling;

- to prevent anyone from accidentally entering the field of fire, the gallery should be so designed and constructed that the only possible access is from the shooting area.

If the firearms and other arms are used in the same shooting gallery, there should be a clear separation between the area used for firearms and the area used for the other arms.

2.6 Special fire risks

Subsidiary installations contiguous to non-permanent structures which present a greater fire risk (e.g. kitchens, ventilation plant, heating installations, etc.) should be designed and constructed taking into account this risk and the risk of the fire spreading to the structure itself. If necessary they should be sufficiently far away from the structure to eliminate this risk.

2.7 Risks due to tent cloths catching fire

Cloth used for roofs, walls, flysheets and trim is to be classified taking account of the properties of the cloth in regard to its reaction to fire, particularly including:

- the speed at which the flame spreads,
- the quantity of toxic fumes released,
- the amount falling as drops of hot material,
- the stability of the cloth as it burns.

Cloth should be chosen from one or more of the clauses defined taking account of the various factor affecting fire risk (total capacity, number and size of exits, distance between spectator positions and exits, distance between rows of seats, width of aisles, etc.) and the harmonized standards that can be used for determining these factors.

2.8 Marking

In addition to the requirements of 1.16, the fire resistance class of the cloth used in non-permanent structures should be identifiable:

- either by indelible and unfalsifiable marking (e.g. clear-text indication of the class, marking by coloured threads in the fabric, etc.),
- or by identification of each separate piece of cloth, in which case a summary document listing all the pieces should accompany the structure, indicating the class of each constituent piece.

2.9 Instructions and log book

In addition to what is provided for in 1.17, instructions should include the following:

- the summary document provided for in 2.8;
- the various seating arrangements proposed for the structure and the number of seats in each arrangement;
- the ground loading per cm² for each support created by the structure when all the persons, equipment and animals it can contain are in it (the instructions should give adequate means for spreading the load if the soil is not capable of supporting it).
  That the log book provided for in 1.17 (f) should contain a record of each temporary installation and de-installation.

3. REQUIREMENTS FOR SPECIFIC EQUIPMENT FOR FAIRGROUNDS AND AMUSEMENT PARKS

In addition to the requirements set out in 1 and, where appropriate, in 2 above, specific equipment for fairgrounds and amusement parks should be so designed and constructed as to meet the following requirements.

Preliminary comments

The public's use of certain equipment subjects it to unusual stresses (e.g. centrifugal force, powerful acceleration, etc.); the equipment should be so designed and constructed that these stresses cannot have irreversible consequences on health and safety.

Details should be included in the instructions details necessary for the protection of the public, e.g. minimum age or size, prohibition on use by pregnant women, etc.

3.1 Risks due to access and circulation by users

3.1.1 Equipment should be so designed, constructed and installed that persons moving between items of equipment, users of the equipment or future users are protected against risks which may arise from the movements of the equipment by using visible separations (e.g. different levels), railings, etc.

3.1.2 Equipment should be so designed, constructed and installed that users gaining access to or leaving the places they will occupy during its operation (e.g. in mobile cars) do not have to negotiate a difference in level that jeopardizes their safety. If this difference in level is necessary, safe means of access between the two levels should be provided.

3.2 Risks that may arise while the equipment is in use

3.2.1 In their places, users should not be able to make any inadvertent contact with fixed parts of the equipment or with users who are not in the same car.

3.2.2 Places provided for users (e.g. in cars) should be of sufficient size and, where appropriate, fitted with suitable means for users to hold themselves steady.

3.2.3 Where there is a risk of falling dangerously from cars, they should be so designed and constructed that the user cannot leave them while they are in motion, save where the user is securely held in place;

3.2.4 Equipment should be so designed and constructed that users can use it without assistance, save where the owner's staff have to take action to ensure safety, for example by locking the safety catches;

3.2.5 Where cars are likely to be subject to sudden declarations (shocks) in normal operation, they should be so designed and constructed that these declarations cannot subject users to risks.

3.2.6 Where leaving moving cars might cause a risk, the cars of equipment which may be occupied by children unaccompanied by an adult should be fitted with closures which can be operated only from outside. If necessary they should be lockable.

3.3 Risks due to controls

3.3.1 Safety and reliability of control systems

Control systems should be designed and constructed so that they are safe and reliable, in a way that will prevent a dangerous situation arising; computer control systems should be similarly designed, both in relation to hardware and software (programmes); above all, all control systems, including computer control systems, should be designed, constructed and, where applicable, programmed in such a way that:

- they can withstand the rigours of normal use and external factors;
- errors in logic do not lead to dangerous situations.

3.3.2 *Control devices*

Control devices should be:

- clearly visible and identifiable and appropriately marked where necessary,
- positioned for safe operation without hesitation or loss of time, and without ambiguity,
- designed so that the movement of the control is consistent with its effect,
- located outside the danger zones, except for certain emergency stop devices where necessary,
- positioned so that their operation cannot cause additional risk,
- designed or protected so that the desired effect, where a risk is involved, cannot occur without an intentional operation,
- made so as to withstand foreseeable strain; particular attention should be paid to emergency stop devices liable to be subjected to considerable strain.

Where a control is designed and constructed to perform several different actions, namely where there is no one-to-one correspondence (e.g. keyboards, etc.), the action to be performed should be clearly displayed and subject to confirmation where necessary.

Controls should be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles. Constraints due to the necessary or foreseeable use of personal protective equipment (such as footwear, gloves, etc.) should be taken into account.

Equipment should be fitted with indicators (dials, signals, etc.) as required for safe operation. The operator should be able to read them from the control position.

From the main control position the operator should be able to ensure, either directly or by means of auxiliary equipment, that there are no exposed persons present in any of the areas of the equipment where there is a risk.

The control system should, wherever necessary, be designed and constructed so that each start-up is preceded by an audible and/or visual warning signal which allows the user to leave the danger zone or possibly to prevent starting either by operating stop controls himself or by having a member of the owner's staff operate them.

3.3.3 *Starting*

It should be possible to start equipment only by voluntary actuation of a control provided for the purpose. There should be only one control for each piece of equipment.

The same requirement applies when restarting after a stoppage, whatever the cause.

3.3.4 *Stopping device*

Normal stopping

Each piece of equipment should be fitted with a control whereby it can be brought safely to a complete stop.

Emergency stop

Each piece of equipment should be fitted with one or more emergency stop devices to enable actual or impending danger to be averted. This does not apply to:

- equipment in which an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would not enable the special measures required to deal with the risk to be taken; in this case stopping can be effected by a judicious arrangement of normal stopping devices.

This device should:

- have clearly identificable, clearly visible and quickly accessible controls,
- stop the dangerous process as quickly as possible, without creating additional hazards,
- where necessary, trigger or permit the triggering of certain safeguard movements.

After it has been actuated, the emergency stop control should remain engaged so that it stays operative until disengaged, the device should not be able to engage without triggering the stopping function; it should not be possible to disengage the device other than by the appropriate action and disengagement should not restart the equipment but only permit restarting.

3.3.5 *Control by users*

Where users are able to control certain movements of the equipment and this might put them or others at risk, the operating personnel should have an override control system enabling them reliably to regain control.

3.4 Risks due to failure of the control circuit

A fault in the control circuit logic, or failure of or damage to the control circuit, should not lead to dangerous situations.

In particular:

- the equipment should not start unexpectedly,
- the equipment should not be prevented from stopping if the command has already been given,
- no moving part of the equipment should fall,
- automatic or manual stopping of any of the moving parts should be unimpeded,
- the protection devices should remain fully effective.

3.5 Risks due to failure of the power supply

The interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply to the equipment should not lead to a dangerous situation.

In particular,

- the equipment should not start unexpectedly,
- the equipment should not be prevented from stopping if the command has already been given,
- no moving part of the equipment should fall,
- automatic or manual stopping of any of the moving parts should be unimpeded,
- the protection devices should remain fully effective.

3.6 Risks due to uneven loading

If the conditions for loading the equipment may cause excessive stresses in certain of its parts or hazardous operating conditions, the equipment should be designed and built so that a device is installed to detect excessive stresses and stop the equipment operating before a dangerous point is reached.

3.7 Risks due to power supplies other than electrical

Where equipment is run by means of power other than electrical (e.g. hydraulic, pneumatic or thermal), it should be so designed, constructed and equipped as to avoid all possible risks from these types of power.

3.7.1 Hydraulic and pneumatic components should be so designed and constructed as to have a load factor chosen by the manufacturer to provide adequate safety.

Hydraulic and pneumatic components should remain effective even if there is a drop in pressure; the value of this pressure drop should be chosen by the manufacturer to ensure adequate safety.

3.7.2 Hydraulic or pneumatic power circuits should be protected by safety valves which shall be calibrated at values, chosen by the manufacturer, providing adequate safety.

3.7.3 In the event of breakage of those connections, enclosures containing passengers should either beheld in position, or brought down at a speed slow enough not to be dangerous.

3.8 Risks due to unexpected movements

When the nature of the equipment is such that there is a foreseeable risk of injury to passengers either by ejection due to the movement of the equipment, or by falling, or by sudden movements in the equipment, the equipment should be so designed and constructed that the passengers are adequately and securely held.

3.9 Specific risks due to equipment comprising vehicles on rails:

- vehicles accommodating users should be fitted with an anti-rollback device, unless reversing is a normal operational function of the equipment;
- if several vehicles without brakes move on the same structure, it is mandatory to have a device enabling all the vehicles to be stopped without risk to the users; this device should be designed and built to operate automatically if the distance between two vehicles is or becomes too short.

3.10 Specific risks due to equipment with free-moving vehicles

(a) Each vehicle should remain immobile unless subject to an intentional action by a user.

(b) All vehicles moving inside the same item of equipment should be identical as regards size and operation.

(c) Vehicles should be completely surrounded by appropriate fittings to cushion impacts between vehicles or between vehicles and the perimeter of the equipment. These fittings should be the same height and arranged at the same distance from the floor; they should be sufficiently thick to prevent the hands of users being crushed against the side of the vehicle on impact.

(d) Vehicles should be fitted with safety-belts which adjust automatically to the girth of users.

(e) If vehicles are moved by a source of electricity external to them, the maximum voltage chosen by the manufacturer should not create major risks for the public; in the case of direct current, the polarity of the terminals should present the least possible risk; particular attention is to be given to safety gaps for preventing accidental short-circuits.

3.11 Specific risks due to motor-powered swings:

(a) Swings should be fitted with a brake.

(b) Swings capable of making a full rotation should be designed and constructed to prevent users from falling if the device holding them in their seats fails.

3.12 Marking

In addition to the particulars required by 1.16, the equipment should be marked with the following information:

- the main characteristics of the power supply, and particularly the earthing characteristics in the case of electric power;
- the maximum number of places in the equipment and/or the maximum weight that can be transported.

3.13 Instructions

In addition to the particulars required by 1.17, the instructions should give the following information:

- a repeat, in detail if necessary, of the marking provided for in 3.12.