The Safe Use and Operation of Bouncy Castles

ISRM

Institute of
Sport & Recreation
Management

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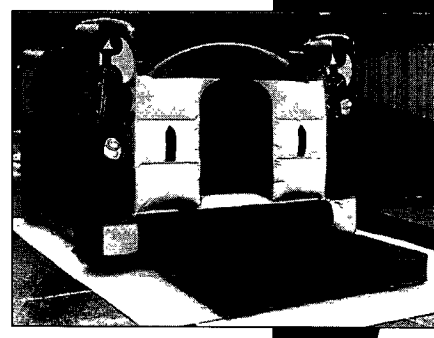
1.0 INTRODUCTION

This publication describes various factors that can contribute to accidents involving bouncy castles and similar bouncing devices and the precautions that should be taken to avoid them. It incorporates aspects of the Health and Safety Executive Document Guidance Note PM 76-Safe operation of passenger carrying amusement devices-inflatable bouncing devices, together with the manufacturing company "Boing's" instructions to users. The ISRM is grateful to these sources for permission to use their original documents.



1.1 SCOPE

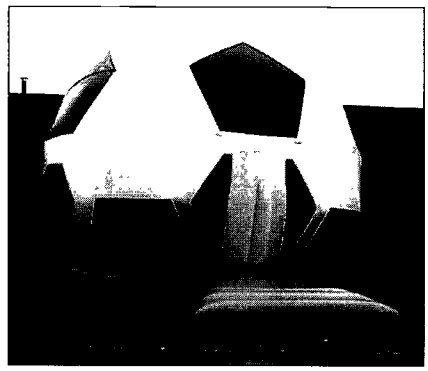
There are three main types of inflatables covered by this guidance namely:

(a) open-sided, often referred to as flat beds;

(b) open-fronted, often referred to as 'castles';

(c) totally enclosed.

The guidance does not cover water-borne inflatables, (these are covered in the ISRM publication 'The use of play equipment and water features in swimming pools') inflatable mazes, and inflatables for therapeutic purposes.



1.2 DESCRIPTION

Bouncy Castles and similar bouncing devices can be used in many locations in and around a sports centre. They are often used freestanding in a sports hall or outdoor location. They can be purpose designed to fit a specific location such as a squash court. They are generally amusement devices manufactured from flexible fabric with one or more blowers connected to them to inflate the structure.

Open sided inflatables (flat beds) are distinguished by their lack of walls. Open fronted inflatables (e.g. castles) have walls on all sides except one. The totally enclosed type of inflatable (e.g. disco inflatables) has all sides enclosed by an inflatable dome. Bouncy Castles is the generic term used in the UK for inflatable play equipment. Inflatables were introduced in the UK in the late 1960s from the USA. They were originally developed for American disabled children as it offered a way that they could play physically without hurting themselves. Early models sold in the UK were Castle shaped, and even today this style is still being produced. They all have the following common traits:

- they are made of a reinforced flexible PVC based fabric;
- they are filled with air when operational;
- when packed away the volume of space they take up is a fraction of their inflated size;
- they can be set up in a matter of minutes, and usually packed away within 15 minutes.

1.3 THE CONTINUOUS FLOW PRINCIPLE - WHY FANS ARE LEFT RUNNING

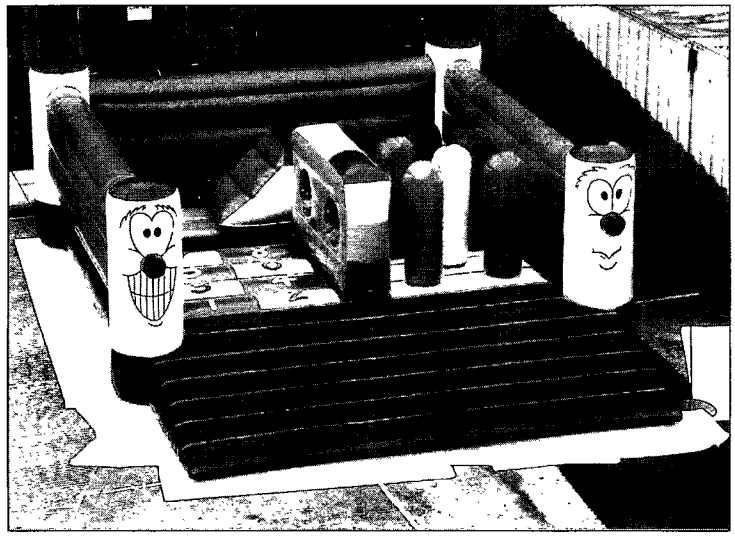
As the structure is held together by stitched seams, air will always escape from the hundreds of perforations produced during stitching. These perforations increase in size during the working life of the unit. Air must be continuously supplied under pressure to keep the unit properly inflated. This is the "continuous flow" principle. Inflatables are usually supplied with one or more electrically powered fans, depending on the size of the unit, but can be powered by a petrol (or propane gas) fan.

Caution:

Some inflatables require a high-pressure fan, but most use a low-pressure fan. For safety reasons, it is vital to use the correct fan specified for the inflatable unit. If the unit starts to show signs of a loss of air pressure e.g. the walls start to sag inwards, play should be suspended immediately and the cause of the pressure loss investigated before users are allowed back onto the unit and play is resumed.

1.4 WRITTEN OPERATING PROCEDURES

The operator or manager of a sport and recreation facility considering the introduction of an inflatable device should prepare a written operating procedure for the equipment. The written procedure should cover normal operations and emergencies and should take into account the written instructions from the manufacturer. A Risk Assessment is the basis on which to prepare a written procedure. The following guidance is not intended to replace or provide a written procedure but to help to guide you through some of the factors that you need to consider in establishing your own.



2.0 BASIC OPERATING PROCEDURES

2.1 HANDLING

You have a legal duty to assess and eliminate or reduce the risk of injury to employees that can result from manual handling operations. This applies to all operations involving transporting, loading, unloading, setting up, dismantling, packing, or moving inflatables. Inflatables can be quite heavy, especially if allowed to become wet. It is vital to have enough helpers to carry out loading, unloading, setting up / assembly and dismantling without individuals hurting themselves unintentionally. It is therefore advisable to carry out an assessment of the number of helpers required to handle a particular inflatable prior to purchase. For further information see the HSE Code of Practice entitled: HSE Guidance on Regulations L23 (Manual Handling Operations 1992).

2.2 SITING

The inflatable should always be sited on a flat level surface, with the sides and rear at least two metres away from any walls, vehicles, etc. (the two metre clearance does not however apply to inflatables designed to fit into purpose provided areas e.g. squash courts). The front of the unit should have at least three metres of clear area so that onlookers do not crowd around the entrance and reduce visibility for the attendant.

If the ground surface is abrasive (such as tarmac or concrete), or oily or dirty, a ground sheet should be laid down first to prevent discolouration, scuffing, tearing or wearing out of the base material.

Under no circumstances should any part of the inflatable be sited under any overhead cables or electricity transmission lines, branches or other overhanging structures that might come into contact with either the unit itself or any user.

Basic Security Precautions
The public must be prevented at all times from having access to fans, electricity supply cables and outlets, generators or motorised fans and their fuel, exhausts, air inlet and outlet pipes, safety equipment, anchor ropes and stakes or weights.

For adequate protection it is necessary to have both physical barriers and vigilance by the operator. As for barriers, the areas concerned should at least be roped off and suitable signage used to warn and exclude the public (see 2.7 crowd control).

2.3 ASSEMBLY AND DISMANTLING PROCEDURES

To assemble or dismantle the inflatable the manufacturer's instructions should be followed carefully. However, the following general points are made:

- Ensure that enough fit helpers are available to assemble and dismantle the inflatable.
- It is highly dangerous to stand or sit on the unit during inflation, as it can suddenly move without warning until fully inflated and anchored.
- Before deflating the unit ensure that all users are at least two metres clear from it and that any litter or debris is removed.
- Turn off the fan and take care that no-one comes into contact with the hot parts of the fan. Only pack the fan away when cool to avoid any damage to the fabric of the inflatable.
- Leave the unit for at least ten minutes to deflate (longer if a very large unit).
- Ensure that as much air as possible has escaped before starting to roll and pack the unit.
- It is strongly recommended that the inflatable is only packed when it is completely dry.

Cold hazard
The fabric from which the unit is made can be easily damaged if the unit is unrolled or inflated whilst in a very cold or frozen state. This may occur if the unit is subjected to low or freezing temperatures whilst in storage or transit. The coated fabric used in the unit loses its flexible character at 3°C or below. In that very cold state the fabric may crack during movement or inflation. If the unit is found to be too cold for use it must be allowed to warm up gradually and progressively until the fabric regains its normal flexible character.

2.4 SAFE OPERATION - OUTDOORS

It is essential for the safe operation of an inflatable to ensure that, when it is erected outdoors, all anchorage points provided on the inflatable are used at all times. The inflatable should not be erected or used in high winds, i.e. when the wind speed is in excess of the maximum safe wind speed for the inflatable specified by the designer/ manufacturer. The inflatable should be secured to the ground with anchor stakes, where the ground is suitable. On hard standing some equally effective method, e.g. anchoring to vehicles should be used.

2.5 SAFE OPERATION - INDOORS

It is important to ensure that the device is secured adequately to prevent movement. This may require special floor plate fixing points. The area around the inflatable should be supervised or secured to ensure that users cannot become hidden from view and or trapped between the device and a wall or similar obstruction. Special consideration will need to be given to a safe secure location for the blower(s) to prevent unauthorised access.

The inflatable will usually remain stable indoors under its own weight, however anchoring is still advised on slippery or polished floor finishes. See above.

In all cases the operator should consider whether a groundsheet or other protective underlay should be placed under the inflatable to protect the building's floor finishes (as well as the inflatable itself) against scuffing or other damage.

Petrol powered fans should not be used indoors. Always use electric fans and ensure the fan and its power cable are not accessible to the general public.

Use of enclosed inflatables indoors

Caution:

Roofed inflatables should only be used indoors if additional precautions are taken:

To prevent entrapment of users and avoid panic there must be a flap or device in the fan or air inlet pipe to the inflatable which will act as a non-return valve to prevent sudden deflation (and roof collapse onto users), if the fan stops. The operator must check that this device is fitted and test that it works. If not, the unit should not be used indoors without modification.

If the roof of the inflatable is fitted with an eyelet for this purpose, a rope should attach it to an appropriate element of the building itself, e.g. a beam or soffit directly above the inflatable, and any slack taken up once the unit is fully inflated.

2.6 INFLATABLES INCORPORATING SLIDES AND BALL PONDS

Slides

If the inflatable is or includes a slide the attendant must exercise active control over the use of the slide. Free fall slides have been subject to a number of accidents.

- Only one user at a time may be allowed onto the slide, in a central position at the top.
- A feet-first, sitting up or lying down position (on backs only) with elbows tucked in should be insisted on. Waving of arms and legs is potentially unsafe.
- To prevent friction burns on exposed skin users should be fully clothed including socks.
- The bottom of the slide must be kept unobstructed. A landing zone of at least 1.5 metres radius from the bottom must be kept clear. Each user should move quickly away from the bottom of the slide on arrival before the next user slides down.
- The surface of the slide must be kept clean and smooth to allow users to slide freely.
- Ample safety mats should be placed on the ground around the slide.

Ball Ponds

If the inflatable includes a ball pond (also sometimes called a ball pool) the attendant should be alert to the following:

- Children who are unwell or feeling sick or needing to go to the toilet should not be allowed to use the ball pond.
- Children who are submerged under the balls have been known to panic. They will not suffocate, but are at risk because other users might jump or land on top of them while they are submerged and out of sight.
- Balls should be evenly distributed so that the depth of the ball pond is constant. Stray balls should be returned to the ball pond.
- Damaged balls should be removed at once.
- Hygiene is also of paramount importance where ball ponds are concerned.

2.7 CROWD CONTROL

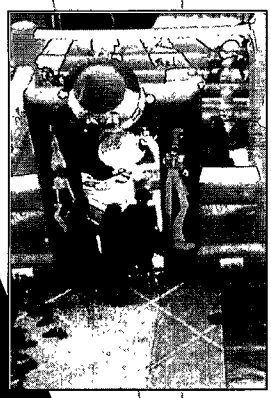
At events where the inflatable is the only or main attraction and where large crowds are expected then a perimeter fence for crowd control should be provided. In these circumstances the crowd control barrier should surround the device. The barriers should be erected at the rear and sides of the unit at least 1.8m away and at least 3.5m away from the front. These dimensions should be regarded as minimum dimensions. The barrier should be at least 1.0m high and capable of withstanding people leaning on it, or being pushed against it.

At events where crowds can be expected but the public does not have access to the sides or rear of the inflatable then a limited crowd control barrier may be provided in place of a full perimeter fence. In all cases the operating area in front of the step/front apron must be kept clear of onlookers so that the operator or attendant has a clear field of vision and can ensure that the children mount and alight safely.

Non inflatable gym mats or equivalent soft landing material of minimum 3 cm (1 in) to maximum 12 cm (5 in) thickness should be provided to cover any hard surfaces adjacent to all open sides and entrances/exits.

2.8 STAFFING

The operator should determine the minimum number of attendants needed to operate the device safely, and ensure that at least this number is on duty when the device is in operation. There should be sufficient attendants to control access and egress of the public to and from the device. It is particularly important that a responsible person, capable of exercising some authority over users especially children, supervises the use of the equipment at all times.



2.9 RULES AND REGULATIONS

Operators are recommended to erect a signboard "rules of play" listing the points below together with any site-specific rules, where they can be seen and understood by all users. Attendants must be conversant and work to the "rules of play".

A safe system of work should ensure that the users are admitted to the inflatable in a controlled and safe manner. The operator should:

(a) ensure that all users remove their footwear (except socks), and any other hard, sharp or dangerous objects from their person, such as buckles, pens, purses, heavy watches, loose necklaces, heavy jewellery, etc. Spectacles are best removed;

(b) not allow anyone to bounce on the step/front apron. The step is to assist the users in getting on and off;

(c) not allow anyone to climb or hang on the outside walls;

(d) not allow users who are taller than the outside walls when standing on the inflated bouncing surface to use the device;

(e) ensure that attendants watch the activity on the inflatable constantly. They should use a whistle or other device and take action at the first sign of any misbehaviour, keeping an eye on the safety and well-being of all the users, particularly children, and especially the smaller, more timid ones. Rough horseplay should not be allowed;

(f) ensure that the equipment is not over-loaded, thereby creating possible danger to the users;

(g) ensure that larger, more boisterous children are segregated from smaller ones. The number of users at any one time should be limited to that figure which allows each user enough room to play safely.

2.10 SAFETY AWARENESS

Be aware of the potential danger that can arise when inflatable equipment is used in ways for which the designer never intended it.

Inflatable play equipment for adults is designed with adults in mind. They should not be confused with other inflatable equipment, especially Bouncy Castles, which are not suitable for use by adults. Adults can be at greater risk of serious injury on inflatables that carry little or no risk to children if properly supervised.

No adults or teenagers should be allowed to use inflatable play equipment intended for children, e.g. bouncy castles.

2.11 FINAL ADJUSTMENTS AND CHECKS

When the unit is fully inflated, even a large unit (with help) can be pulled round by its anchorage points to adjust its final position. The ropes to the pegs or other means of anchorage should be loosened off before the unit is pulled round, and then re-adjusted or re-tied accordingly. Make sure that you have enough helpers to pull the unit round without risk of hurting or straining yourself. The fan should be switched off whilst the unit is being turned (stop the motor if a petrol fan). When the unit is in its final position the anchorage points must be pegged or tied down and then re-checked.

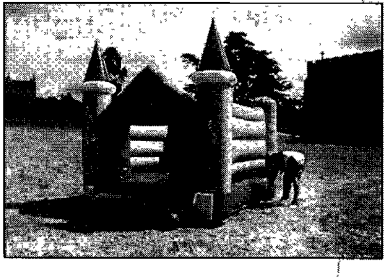
The inlet pipe must also be re-checked to make sure that it is straight and not twisted and that the fan is still upright. The unit can then be checked as detailed in the section on safety, and finally the fan can be switched on again (re-start the motor if a petrol fan).

No one should be allowed to use the inflatable unit before it has been checked and the operator is satisfied that it is safe for public use.

The operator should always check that:

- the anchorage points are secured as recommended;
- there is sufficient air pressure to all parts of the unit (any soft or sagging areas should be investigated further);
- the unit is free from foreign objects and other visible hazards or damage, e.g. tears or split seams which might trap a child's hand or foot.

See the Daily Inspection check list given in section 5.2.



3.0 TRAINING OF OPERATORS AND ATTENDANTS

3.1 OPERATORS

Operators must ensure that they are fully conversant with and competent in the following:

(a) the safe handling and transportation of the device;

(b) the method of operating the device;

(b) safe loading of the device;

(c) the system of work necessary to ensure the safety of users and members of the public;

(d) training needs of attendants;

(e) safe methods of assembling/dismantling, where applicable;

(f) how to make a daily inspection. (Where available, advice from the manufacturers of the device should be incorporated into this instruction). Inspections should be recorded;

(g) operators should also be aware of the requirements relating to the intervals at which thorough examination and testing should be carried out, and the reasoning behind such procedures.

3.2 ATTENDANTS

Each attendant should receive suitable and sufficient training for the type of work they are expected to do. Training should include adequate instruction on:

(a) arrangements for safe anchoring of the inflatable;

(b) locations which require a crowd control enclosure;

(c) arrangements for controlling the public to and from crowd control enclosures;

(d) arrangements for the safe loading of the device;

(e) risks and precautions associated with the work;

(f) procedures for reporting defects or breakdowns;

(g) measures which should be taken in the event of a power failure or other emergency;

(h) what to do in the event of an accident or minor collision;

(i) how to safely erect, manually handle and transport the device;

(j) and generally training as required to meet the requirements detailed in written procedures.

It is advisable that at least one attendant should be qualified in First Aid.

4.0 SAFETY AND EMERGENCY PROCEDURES

4.1 HAZARDS

Hazards to users of inflatables can be broken down into two parts, hazards relating to the equipment itself, and, hazards relating to the operation of the equipment.

A summary of the main hazards is shown below:

(a) blowing over or away of the whole structure by the wind when located outdoors;

(b) failure of the seams;

(c) accidental spilling of users;

(d) injury to the users caused either by themselves or other users;

(e) overcrowding;

(f) injury to the users when getting on or off the inflatable;

(g) large users disregarding little ones; incompatibility of users;

(h) air loss due to blower disconnection, blower failure, or power supply interruption;

(i) zip failure;

(j) inadequate means of escape in case of fire;

(k) dangerous siting of equipment, including siting near overhead power lines, low beams, ceilings or light fittings;

(l) users gaining access to the sides or the underside of the inflatable;

(m) children becoming exhausted.

4.2 HAZARDS RELATING TO EQUIPMENT

Electrically powered fans
Use of portable electrical equipment involves a potential risk of electric shock, burns or fire. A major cause of accidents is failure to maintain equipment. The risk can be managed effectively if sensible and appropriate rules for use and maintenance are applied.

The electric fan supplied for the unit should only be used with the electricity supply specified for that fan. Connecting the fan to a non-specified electricity supply is very dangerous. Each fan is fitted with a motor that operates at mains electricity voltage.

Some fans where specified can operate at lower voltages. Check the right voltage is used.

Using electrical equipment in wet or damp conditions can be dangerous. If an electrically powered fan is to be used outdoors an RCD (Residual Current Device) adaptor or plug should be used. An RCD, by redirecting electrical current through the main's earth, helps to prevent electric shock to the person if there is an electrical fault. Before each use you should check that the RCD device is actually working, using the test button provided.

If an extension lead is to be used, then ensure that it is capable of carrying 13 amps. Cables should not be in a position where people can trip over them. The blower should be inspected every day it is in use to ensure that there are no exposed wires or loose bolts, screws, etc. and the mesh guards over the air inlet and outlet are secure and not damaged. Electric cables should be checked to see if they are worn or chafed and that the plugs, sockets and switches are not damaged. Under no circumstances should damaged equipment be used.

There are legal requirements covering the use and maintenance of portable and transportable electrical equipment. See "Maintaining portable and transportable electrical equipment" HSE (G) 107 (1994). The unit should be PAT tested (Portable Appliance Testing) every year by a qualified electrician.

Always store electrical equipment in a dry place.

Petrol powered fans
Petrol is extremely hazardous. Ensure that petrol fans are always upright even if empty particularly whilst transporting, no one should smoke nearby whilst fuelling, and always make sure that any spillages are dried up. The fuel should always be stored in a suitable container and the storage container kept secure when operating the inflatable. Never use a petrol fan indoors. The fan should be stored in a dry place and the engine serviced regularly according to the manufacturers' instructions supplied with the unit. Refuel only when switched off.

The blower should be inspected every day it is in use to ensure that there are no loose bolts, screws, etc. and the mesh guards over the air inlet and outlet are secure and not damaged.

The inflatable
The inflatable itself is not hazardous as long as the unit is maintained regularly and repaired if damage occurs. However, risks can occur whilst moving the unit around particularly if it is a large one, and care must be taken to prevent injury to the mover and any bystanders as a 20ft x 25ft unit can weigh over 200 kilos. A suitable trolley should be used whenever possible and the unit should be rolled tightly into a manageable shape.

The inflatable should always be inspected before use and at least once in every 14 months by an appointed person. The manufacturers of the equipment can normally provide information on persons who can carry out a thorough examination. Following the inspection, a test certificate will be issued.

Fire precautions
Inflatables must be constructed from flame and smoke retardant fabric, see section 6.0 on Design and Manufacture. Nevertheless, operators must observe some fire precautions, more especially indoors.

Any indoor area where the inflatable is to be sited must comply fully with any regulatory requirements including fire regulations. If it is not your own building then a copy of the fire safety instructions that apply to the building should be obtained by the operator, who should brief attendants and users as necessary.

It is the responsibility of the operator to check that these requirements are met. If in doubt, seek advice from the official Fire Officer for the area. The requirements will usually cover the maximum number of persons allowed in the area at any one time, the available fire exits and escape routes, assembly areas, signage, fire alarms, emergency lighting and sprinkler systems (if applicable), and fire fighting equipment such as portable extinguishers.

Alarms
As soon as the Fire Alarm sounds, get all users off the inflatable in an orderly manner, switch off all fans, and lead everyone by the appropriate escape route to a safe assembly area. Check that all users are present. Notify the proper authorities if this has not already been done.

Means of escape - exits - assembly areas
The operator is responsible for ensuring that there is an adequate means of escape, sufficient exits, assembly areas and proper signage, for the safety of all employees and users.

The effectiveness with which all persons are evacuated to a place of safety is the most important factor in preventing casualties in the event of a fire. Under no circumstances should the attendant waste valuable time and put lives at risk, including his own, by attempting to fight the fire, or save the inflatable or any personal possessions.

The operator must ensure that no part of the inflatable or its ancillary equipment obstructs any means of escape in case of fire. The unit should be sited so that its exit(s) correspond(s) with the shortest route to the building's own exit(s).

Emergency lighting
All buildings intended for public access are normally required to have emergency lighting systems as well as fire exits. Nevertheless it is advisable for the operator or attendant to keep handy at all times a powerful torch. The use of such a torch will help to guide users off the unit and towards the nearest emergency exit in a calm and orderly manner.

4.3 ACCIDENT PROCEDURES

The operator should include in Written Procedures what to do in the event of an accident. It is advisable that at least one attendant should be qualified in First Aid. If there should be an accident involving injury to a child or adult, and if there is any doubt concerning the seriousness of the injury or the treatment given then an ambulance or paramedic unit should be summoned as soon as possible. Where child users are involved, the parent or responsible adult who accompanied the child to the event should be contacted at once.

The operator is also responsible for ensuring that the injured user and other users are comforted and kept calm while the accident is being dealt with.

Either at the time, or as soon after the accident as possible, a full note should be made of the circumstances of the accident and the names and addresses and telephone numbers of any independent witnesses should be taken. Photographs can be useful as well. All this information should be written down in the Site Accident Book where this is appropriate. The incident should also be notified to insurers in writing at the earliest opportunity. You will usually be sent a report form to complete. In the UK, under RIDDOR some serious accidents are notifiable to the Health and Safety Executive.

Accidents should be monitored for their frequency and nature to ascertain any underlying trend.

5.0 EXAMINATION, INSPECTION AND MAINTENANCE

5.1 EXAMINATION

Each inflatable should be thoroughly examined at least once in every 14 months by an appointed person. The manufacturers of the equipment can normally provide information on persons who can carry out a thorough examination. In the case of equipment used on a seasonal basis, the thorough examination should be carried out where practicable before the commencement of each season, but, in any case, within three months of its commencement. The examination should be recorded.

The thorough examination should include the following:

Blower

(a) provision of secure fencing or indoors possibly a secure location for dangerous moving parts in particular guarding for the air inlet and outlet;

(b) security of the impeller fixing and examination for cracks;

(c) integrity of electrical wiring. Use of RCDs, chafed leads, integrity of plugs and switches, presence of water etc;

(d) provision of suitable fire fighting equipment.

Inflatable

(a) checks of the anchorage system for wear, rips or chafing. Checks of the structure for wear, or rips in the fabric, particularly on the main bouncing surface, between the walls and towers, walls and the bouncing surface, and the surface of the step/ front apron;

(b) checks that the walls and towers when fitted are firm and upright when inflated, and that the pressure in the bouncing area and step/front apron is sufficient to give a reliable and firm footing. If possible an inspection of the internal ties should be carried out from inside the structure. They should be checked for wear or tears, particularly at their loose or exposed ends. Checks of the security of bedseams, and wall to bed seams from inside should also be made.

Electrical installation

The complete installation should be checked for compliance with the Electricity at Work Regulations 1989 and the Electrical Equipment (Safety) Regulations 1994. The above list is not exhaustive, and the examination should include any part which may affect the safe operation of the device.

5.2 DAILY INSPECTION

An inspection should be carried out before first use on any day. Where available, advice provided by the manufacturer should be taken into account. The inspection should be recorded.

The inspection should include checking to ensure that:

(a) all anchor points are intact and not damaged;

(b) anchor ropes are not worn or chafed;

(c) anchor fixings and their location remain sound for continued use;

(d) the wall-to-tower fixings are not torn;

(e) there are no holes or rips in the surface or seams of the bed and step/front apron;

(f) when fully inflated, all walls and towers (when fitted) are firm and upright, and the pressure in the bed and step/front apron are sufficient to give a reliable and firm footing;

(g) the blower is in a safe, secure area and has no exposed wires or loose bolts, screws, etc, and that the mesh guards over the air inlet and outlet are secure and intact;

(h) electric cables are not worn or chafed, do not cause a tripping hazard and cannot be tampered with. That plugs, sockets and switches are not damaged and are not accessible to the public;

(i) the blower/inflation tube connection is good;

(j) that plugs, sockets and cables are suitably protected and not exposed to water or wet conditions.

The inflatable should not be used by the public until any adjustments or repairs, judged to be necessary as a result of the inspection, have been satisfactorily carried out.

5.3 RECORDS

Records of all examinations, and records of daily inspections, should be kept readily available.

5.4 MAINTENANCE

The inflatable should be properly maintained. Where manufacturers' guidance and schedules are available, these should be followed. Where schedules are not available, the controller should specify the procedures in the light of experience and any advice received.

5.5 CLEANING

General

It is vital that children's play equipment should be cleaned thoroughly at regular intervals and that the highest standards of hygiene are maintained.

You should clean the PVC surface as necessary with a non-corrosive antibacterial cleaning solution, or as a temporary measure, a suitable non abrasive household cleaner.

An anti-static silicone polish can also be applied when the PVC surface is clean. This should be applied to slides to maintain a slippery surface, but not to places where firm footing is desirable, e.g. platforms, climbers, entrances and exits.

Vacuuming will remove dust and litter from the recesses, seams and corners of the unit.

Care should be taken when cleaning applied artwork as the paint may be damaged if rubbed hard or if chemically aggressive cleaning agents are used on painted areas.

You should take account of the requirements of the Control of Substances Hazardous to Health Regulations 1994 ("COSHH") when selecting cleaning agents, for foreseeable risks to users and employees.

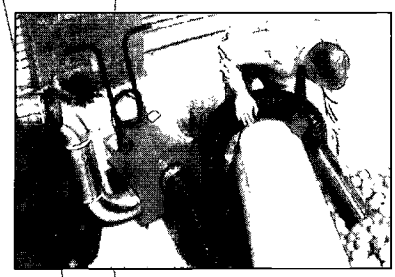
Ball ponds - ball cleaning equipment and procedures
Additional considerations apply to ball ponds. They present a higher risk of developing into an unhygienic condition!

Immediate cleaning will be required after urination, defecation, vomiting or blood spillage.

You should have available additional equipment suitable for cleaning the balls themselves. The basic requirements include: Plastic buckets or scoops for removing the balls, a large bath or similar container (an inflatable paddling pool is sometimes used for this) to contain an antibacterial cleaning solution, and bags made from netting.

The balls themselves must be removed completely when the unit is dismantled and the balls should be checked. Any damaged balls must be discarded.

Bagged balls should be totally immersed in the cleaning solution for enough time for the antibacterial effect to be complete. The ball bags can be hung up to drain and allow the balls to be air dried. Alternatively, you can buy or hire a ball cleaning machine.

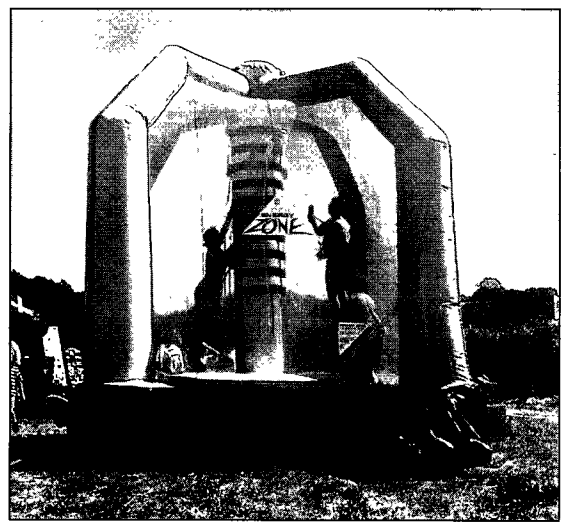


5.6 MODIFICATIONS

Where changes are planned which may affect the integrity of a device, the modifications should be designed in accordance with either the manufacturer and designer's instructions, or with a plan and specification drawn up by a designer competent to prepare such instructions. The modifications should be submitted before implementation to either the manufacturer or an independent consulting engineer, to establish that the modification is sound and that any calculations are correct.

Any such modifications to a device should incorporate only compatible materials, and should be carried out in accordance with the revised design specification and/or the manufacturer's instructions, if available by a competent person.

Subsequent to any modification as in the paragraph above, a further thorough examination and test (if appropriate) is required before first use of the device.



6.0 THE DESIGN AND MANUFACTURE OF INFLATABLES

6.1 GENERAL RECOMMENDATIONS

It is important that operators are aware of the design and manufacture requirements particularly when purchasing a tailor made inflatable.

Access/egress
On any open side the maximum fall-off height should be no greater than 75 cm (30 in). The design should be compatible with the use of non-inflatable gym mats or equivalent soft landing materials minimum 3 cm (1 in) to maximum 12 cm (5 in) to cover any hard surfaces adjacent to all open sides and entrances/exits. The soft landing material should be of sufficient width to protect any users falling from any open side of the inflatable. The designer should specify the width of soft landing material required for the inflatable. Gym mats are usually 2m x 1m, or 6ft x 4ft and should be configured and suitably fixed to provide the protected area specified.

Anchorage
Structures must be provided with an adequate anchorage and/or ballast system. The size, number and strength of anchorage points on the structure should be adequate for the size/height of the structure, taking into account the likely wind loading when used outdoors. The designer / manufacturer should carry out, or arrange for any research to be carried out, to discover the environmental limitations, i.e. the conditions of maximum wind speed under which an inflatable can safely be operated. These maximum safe wind speeds should be specified for each structure and the type of anchoring arrangement with which it is fitted.

On open sides (e.g. flatbeds) or when, for security, it is necessary to have anchorage points near to an entrance / exit, they should be connected in such a way as to minimise the danger of tripping.

Inflatable structure
The structure should be so designed that users cannot contact the blower unit. This may be achieved by ensuring the length of any inflation tube is at least 1m (39 in) when positioned on a walled side, and at least 2.5m (8 ft) when positioned on an open side.

There should not be any sharp exterior angles or edges where people may be injured.

The outside walls of an inflatable should be high enough and of adequate strength to prevent users from spilling out of the device in normal use. The height of people using an inflatable should not exceed the height of the outside walls when the person stands on the bouncing surface. However inflatables with outside walls of 1.8m (6ft) or higher may be used by persons of any height. The height of the wall is measured from the highest point of the bouncing surface to the top of the wall.

Internal ties (for shape formation) should be of adequate strength to maintain the shape of the structure during specified conditions of use.

There should be no places where users can be trapped between adjacent surfaces, e.g. walls and towers, walls and the bed or the trough between adjacent bed panels.

Materials
The following recommendations are made for the standard of materials used in the manufacture of bouncing devices:

(a) conventional fabric materials should conform to a British or future European (CEN) Standard for testing of coated fabrics;

(b) alternatively, where conventional fabric materials are not used, the designer should ensure that the material specified provides sufficient leaking strength, tear strength and bursting strength to ensure safe and durable performance of the bouncing device in operation;

(c) any materials used should not readily support combustion. They should conform to British Standard 54382 or future European (CEN) Standard for methods of test for flammability of textile fabrics;

(d) all netting should be suitable for its use and should conform to a British or future European (CEN) Standard;

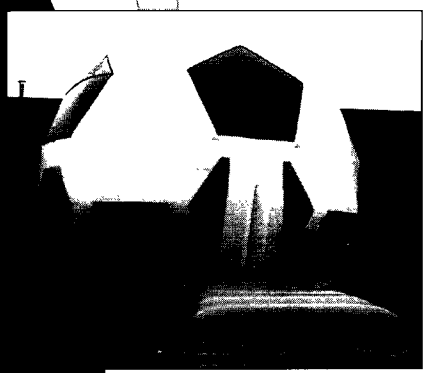
(e) adhesives should provide a bond of equivalent strength to the strength of the material being bonded;

(f) zips should be strong enough to withstand the air pressure within the structure. Those used for emergency exits should be easy to use from both sides;

(g) paint and other decorative substances should meet with regulations on the lead content of paint for play equipment and should be non-toxic in the finished state;

(h) anchorages, eg stakes, ropes etc, should be of sufficient number, strength, and size to maintain stability of the device for the maximum wind speed specified by the manufacturer for any particular device.

Manufacture
Membrane joints should be formed by sewing, welding, use of adhesive or other tested methods.



Totally enclosed structures
In totally enclosed structures the following additional requirements should be satisfied:

(a) a closing arrangement should be fitted to the dome air feed tube;

(b) structures designed to accommodate more than 15 people should have more than one exit. The travel distance to the nearest exit should not be more than 24 m. For smaller structures where only one exit is necessary the travel distance to the exit should not be more than 6.5 m;

(c) simple signs should indicate the position of exits;

(d) an independent support system should be provided for any lighting and loudspeaker systems;

(e) the electrical installation should comply with the requirements of the electrical regulations given earlier.

(f) any metal supports for the device within reach of the users should be electrically insulated from any other exposed metalwork associated with the electrical installation. BS 2754:1976 Memorandum - Construction of Electrical Equipment for Protection against Electric Shock gives further guidance;

(g) no electrical equipment should be within reach of users of the device;

(h) when a lighting system is installed an emergency lighting system should be provided as a back up. The discharge period for the emergency system following supply failure should be a minimum of one hour. Such emergency systems should be fully charged prior to the inflatable device being put into use each day;

(i) any electrical cables should be kept away from any users or spectators and should be secured by loops to the envelope of the device or to an equivalent standard;

(j) electrical equipment exposed to the weather should be protected to a standard of at least IP54 (BS 5490 Protection of Classification of Degrees of Protection by Enclosures) or located inside.

The operation of the lighting should be proved each day before the totally enclosed inflatable is put into use. This instruction should be included in the written instructions on the setting up operation and maintenance of the equipment provided by the manufacturer with each device.

Test certification
A certificate of initial test of the bouncing device should be issued to the purchaser by the manufacturer prior to or on delivery.

Provision of information
The manufacturer should provide with each inflatable, written instructions on the "setting up", operation and maintenance of the equipment and the name and address of the manufacturer or supplier should be clearly marked on the inflatable. The instructions should refer users to the HSE Guidance Note PM76.

7.0 REFERENCES

1 Code of safe practice at fairs* HSE. ISBN 07176 01951

2 BS 5438 : 1989 Methods of test for flammability of vertically oriented textile fabrics and fabric assemblies subjected to a small igniting flame

3 Technical annex to code of safe practice at fairs HSE ISBN 07176 03016

4 BS 2754 :1976 Memorandum - Construction of Electrical Equipment for Protection Against Electric Shock

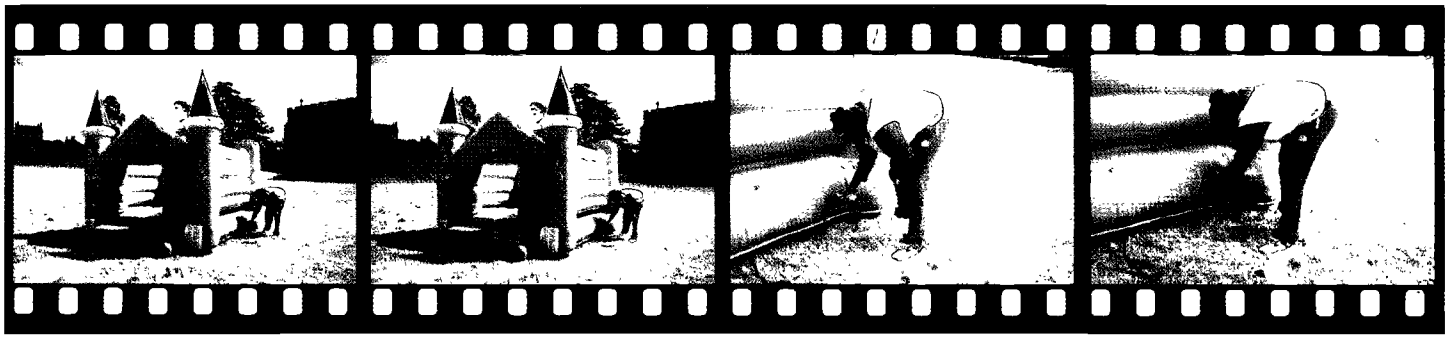
5 BS 5490 : 1977 Specification for Classification of Degrees of Protection by provided Enclosures

6 The use of play equipment and water features in swimming pools, available from ISRM

7 The Manual Handling at Work Regulations 1992

8 Landbased Inflatable Operating Manual, available from Boing Ltd.

* Available from HSE Sales Point, R414 St Hugh's House, Trinity Road, Bootle, Merseyside, L20 3QY



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