

# **A GUIDE TO SAFE WORKING OPERATIONS IN CIRCUSES**

## **FOREWORD**

Travelling circuses represent a potential risk to health and safety for both workers and members of the public. They involve the regular erection and deconstruction of the big top, sometimes in adverse weather conditions and on unfamiliar sites. They can attract large numbers of members of the public.

Due to the peripatetic nature of the business, consistency of enforcement is particularly difficult: Local Authority Health and Safety (LA H&S) Inspectors may only have the opportunity to inspect a circus once a year so building knowledge of the industry and normal working practices is difficult to achieve. As different inspectors inspect the circus in other authority territories, there is a risk of replication of effort (e.g. every inspector audits the electrical system) or failing to pick up potential defects (e.g. no one audits the electrical system).

The Health and Safety Laboratory (HSL), was commissioned by Crawley Borough Council, under the Science and Technology initiative of the 'Local Authorities (LA) and HSE Working Together Strategic Programme', to develop a circus safety toolkit to assist LAs with consistency of enforcement in this area. The toolkit is intended primarily to assist LA H&S Inspectors in understanding the circus environment so they can work to control the risks to workers and members of the public. The toolkit focuses on ensuring the safety of circus employees involved in the build up process. Therefore, circus performers are included in this remit whilst involved in setting up equipment, but excluded whilst performing. The exception to this is the information on noise and electrical safety, which is also relevant to circus performers whilst performing.

The guidance covers six topic areas, adapted and applied to the circus environment, and including information relating to common hazards and the key tasks involved in the circus build up and pull down. The text is supported by a database, hosted on the HELA Extranet. The database complements the guidance by providing a method to enable sharing of inspection and enforcement information between LA. The database is available to all LAs for storing circus contact details, inspection histories and actions taken by different LAs.

This guide has been written in consultation with Crawley Borough Council, HSE's Services, Transportation and Safety Unit (STSU) and the Association of Circus Proprietors of Great Britain (ACP) and with the co-operation of many other LA H&S Inspectors. The assistance provided is very much appreciated.

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# 1.

## INTRODUCTION

### 1.1. THE TOOLKIT

The Circus Safety Toolkit has been developed as a familiarisation tool, to assist Local Authorities (LAs) in providing a consistent approach to the enforcement of health and safety for the travelling circus industry.

The toolkit consists of health and safety guidance that gives examples of circus environment and circus tasks, supported by a database for the recording and sharing of information.

#### **The guidance**

The guidance is general health and safety guidance specifically adapted to the circus environment, covering six priority health and safety topics:

- Electrical Safety;
- Manual Handling;
- Noise;
- Slips, Trips and Falls;
- Working at Height; and
- Workplace Transport.

There is also a general chapter which outlines the tasks involved in the set-up and pull-down of a circus site and some general information on site management.

#### **The database**

The text is supported by a database, hosted on the HELA Extranet. The database complements the guidance, and is designed to allow the recording and sharing of LA enforcement activity thus facilitating the sharing of circus movement, inspection and enforcement information between LAs.

The database is intended as a comprehensive resource that would be consulted by LA H&S inspectors during the planning of a circus visit or inspection.

Database information can be used to determine:

- Circus contact information;
- Circus tour locations and dates;
- Dates of previous circus inspections and details of what was inspected;
- Actions resulting from LA visits (including any notices issued);
- LA contact information;

The database will also provide a forum for discussing circus safety and includes links to relevant literature and guidance.

Following a circus visit, the database should be used to record:

- Visits undertaken (including circus visited, the inspector and when the visit took place);
- Topics inspected/details of the inspection;
- Actions arising from the inspection;
- Intended future movements of the circus;
- Changes to circus contact information.

In instances where enforcement activities are not carried out, it is nonetheless intended that pertinent information should be recorded in the database, producing a ‘history of communications’ between LAs and circuses, and enabling more ‘intelligent’ use of inspection time.

## **1.2 WHY IS THIS TOOLKIT NEEDED?**

This guidance applies existing HSE guidance and other information to the specific circus context. There are a number of unique aspects of the circus environment:

- The frequent build up and pull down of the Circus site across many LA areas, (which may increase the chance of poor practice continuing unnoticed, and inconsistent enforcement);
- The requirement to build up and pull down the Circus site irrespective of the weather conditions or time of day. This is especially relevant due to the tight scheduling of performances and associated advertising, which reduces the flexibility the circus has regarding when it can build up.
- The variable size, layout and location of the different circus sites;
- The abundant use of seasonal or migrant workers (whose first language may not be English);

The circus environment also provides the opportunity for increased risks, resulting from combinations of hazards e.g. activities involving the risk of manual handling or workplace transport injuries taking place in diminished light.

The guidance was developed following observations of a limited sample of circuses, and consultation with industry, and provides a central resource of information, addressing the issues that are specific to the circus industry.

It should be noted that the varying amount of information provided regarding each of the topics is, in part, a reflection of the information currently available, and applicable to the circus specific context. (It is *not* necessarily a reflection of the severity of the hazardous situations or behaviours observed).

### **1.3 THE AIM OF THE TOOLKIT**

It is intended that the guidance will facilitate a more consistent approach to inspection and enforcement of circuses by streamlining the areas and hazards considered during a circus inspection. The guidance is intended to be used in conjunction with the complementary database, and it is therefore hoped the toolkit will minimise replication of inspection efforts across different LAs, improving both enforcement and recording of circus visits.

The guidance is intended as a tool that would be consulted by LA H&S inspectors during the planning of a circus visit or inspection.

### **1.4 SCOPE AND TARGET AUDIENCE**

This guidance has been written for LA H&S inspectors who are trained in, and work in, the field of health and safety. The guidance therefore assumes a background knowledge of the key health and safety topics.

The information is presented as a guide to some of the pertinent issues that should be considered before and during a circus visit or inspection.

The guidance addresses the key issues for ensuring both worker and public safety within the circus environment, under a series of topics. The information is intended as a guide to aid LA H&S Inspectors, not as a prescriptive set of instructions. The LA H&S inspector will still need to exercise his or her professional judgement when inspecting and assessing circuses.

The scope of the guidance varies according to the specific topic area, and the enforcement remit of LAs. An explanation of the hazards and remits considered is given at the start of each topic section of the guidance.

## **2. GENERAL INFORMATION**

### **2.1 SCOPE**

This topic gives some information about the general issues around the planning, layout, set-up and pull-down of the circus site.

Site management, specifically the planning stage, is critical to effective management of health and safety, where many hazards can be either eliminated or reduced with good planning. If site management is not carried out effectively there could be hazards that affect members of the public visiting the circus, circus workers and others outside the circus site.

### **2.2 SITE SUITABILITY**

The site should be suitable for its intended use. Consideration should be given to:

- Public access by foot and by car;
- Possibility of underground cabling and how to identify where it lies;
- Flooding of site e.g. nearby watercourses and flood drains.

Consideration should be given to the potential for the site to get waterlogged as a result of heavy rainfall.

### **2.3 PLANNING OF SITE LAYOUT**

Typically, circuses will know where they are travelling to many weeks in advance. The circus site manager will usually make contact with the next site landlord in advance of arrival.

Usually, a circus representative will visit the site a day or so before arrival and will plan the site layout then. This is done by marking out the site with spray paint so that when the circus arrives it is clear where everything will go. This is done by:

1. Considering where the front of the tent should be, to allow public access and visibility of the site.
2. Marking the centre point of the circus tent.
3. Working out where the king poles will be positioned.
4. From this, marking the perimeter of the tent – tapes are used to measure the distance. Where the tent poles will go can then be planned and marked.
5. From this, marking out where tent pegs and guy rope pegs will go.
6. Once the positioning of the tent is clear; the positioning of all other vehicles and trailers follows. Generally the circus will have a very similar layout at every site visited, unless there are constraints to prevent this (e.g. a long, narrow site).

During the design of the site layout, consideration should be given to:

- Suitability of the venue and any local knowledge provided by landlords, local authorities or other bodies.
- Traffic and pedestrian routes, including emergency access and exits. The provision of suitable access (entrance and exit points) for members of the public, and private transport, as well as



movement around the site, means of emergency escape and geographical location of the transport, parking and road network.

- The young, elderly and those with special needs who are particularly vulnerable.
- Holidays or other special events that may result in increased numbers of visitors to the site or near the site (e.g. park adjoining site).
- Positioning of emergency equipment (e.g. fire extinguishers).
- Ground conditions. Attempts should be made to avoid or minimise set-ups on uneven or inclined ground.
- Proximity of noise sensitive areas (i.e. residential areas).
- Positioning of the main tent to minimise noise nuisance.
- The provision of signage (where appropriate) to guide members of the public to the safest entrance and exits (including evacuation routes).
- The provision of barriers/ signage to prevent/ discourage public access to some parts of the site.
- Requirements and organisation of cabling and rigging (i.e. where ‘contact’ with the public can be avoided).
- External lighting requirements – for the public when leaving the site when dark/dusk.

## **Controls**

- Staff training and experience would increase the ability for staff to judge the crowd, identifying potentially dangerous situations and prevent incidents developing early.
- Emergency procedures should be drawn up internally, and communicated to the emergency services.
- Ensure cabling does not present a trip hazard for pedestrians (either through laying of cables out of pedestrian routes, or by raising them off the ground in addition to ensuring such areas are well lit).
- Where possible, natural features (i.e. trees or inclines in the ground) should be utilised to minimise potential noise exposure to neighbours.

## **2.4 PLANNING OF TASKS**

Generally the staff of a circus will have at least some changes from one season to the next. Typically, during the first few build-up and pull-downs the team is forming and people are working out their allocated tasks. As the season progresses and staff get more experienced; they come to understand what they must do and in what sequence. However, appropriate intervention from the site manager is still an important function in allocating the right number of people to tasks, and people with the correct skills for the tasks. As staff get more practised, new and better methods of doing things may come to light.

## **2.5 KEY STEPS IN THE CIRCUS PULL-DOWN AND SET-UP**

Once the site is packed up, the circus will usually drive to their next site that evening. Depending on distance, weather, daylight hours and other factors, set-up of the next site may begin that night or may begin early the next morning. A LA inspector wishing to observe the set-up of a site would be advised

to arrive early the next morning. Again, depending on factors such as weather, the site may be set-up by lunchtime.

The set up and pull down of the circus site is largely influenced by the size of the site and the type of tent used. For pulling down the big tops, tasks are carried out in approximately the following order.

Pull down:

1. Remove tent sides;
2. Remove seating, stage, rigging, lighting, PA system;
3. Remove tent poles;
4. Undo guy ropes;
5. Undo lacing of tent roof;
6. Lower big top;
7. Fold/ roll tent material;
8. Lower king poles;

When the tent is constructed, tasks are reversed.

It was observed that the taking down of the site generally started during the last performance or before. Some things such as advertisements and banners were taken down before the start of the last performance. After the interval of the last performance, the café and catering vans/trailers would be dismantled. Some tent pegs were removed before or during the last performance (though it was reported that this was dependent on weather conditions; if it was very windy, this would not happen). After all the public have left after the last performance, pull down generally starts in earnest.

Once the site is clear of members of the public, lorries will typically reverse/park right outside the tent doorways, and the stage and seating will be loaded straight into the lorries. At the three circuses observed, pull down of the site was well organised, with staff working in small teams, each knowing their tasks and how it fitted in with other teams.

Other site-specific hazards may be identified at individual circuses. In such cases it is advised that the HSE's 'Five Steps To Risk Assessment' approach be utilised in order to reduce the risks appropriately. For more information on Risk Assessments see HSE Leaflet INDG163 (rev 2), or view the internet version through the HSE website:

<http://www.hse.gov.uk/pubns/indg163.pdf#search=%25%20steps%20to%20risk%20assessment%22>

## **2.6 DESIGN, TESTING AND MAINTENANCE OF EQUIPMENT**

Many circuses make a variety of equipment from apparatus to support circus acts, to decorations for trailers and the outside of the tent. In the three visits carried out, many examples were seen including:

- A variety of equipment for circus acts;
- A "bandstand" which the band performed from; it was raised so that performers entered the circus ring through it;
- Café trailers which were adapted lorry trailers, sometimes with folding out floors and awnings;
- Box office – decorated lorry trailers or caravans.

Mostly, such equipment is well designed, with the need for frequent assembly and disassembly well considered. Staff were generally practised and skilled at assembly and disassembly.

It should be noted that bespoke equipment like this will not be CE marked.

### **3. WORKING AT HEIGHT**

#### **3.1 SCOPE OF THE WORKING AT HEIGHT GUIDANCE**

The guidance covers the hazards and controls relating to working at height, including all aspects of the build up and pull down activities, and set up of performance equipment. Working at height hazards are considered in relation to the risks to circus employees. Working at height during performances, (and any associated risks to members of the public) were outside the scope of this toolkit, so are not considered in this section.

#### **3.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR WORKING AT HEIGHT**

The Work at Height Regulations 2005, as amended, are intended to put in place a legal framework to prevent the deaths and injuries caused each year by falls at work, the single largest cause of fatalities in the workplace. The Regulations define working at height as ‘if...a person could be injured falling from it, even if it is at or below ground level’.

Most circuses have a variety of physical levels, and it is common for work to be carried out on multiple levels simultaneously, particularly during a performance, build up or pull down. (e.g. light fixtures being secured at height, whilst the stage area is laid).

There are three recognised hazards associated with working at height:

1. Falls from height;
2. Falling objects; and
3. Falls from (accidentally) collapsing structures.

All three hazards are relevant in the circus environment.

A general approach to preventing or reducing the hazards associated with falling from a height takes into account the hierarchy of controls:

- Avoid working at height where possible;
- Prevent falls from height; and finally
- Reduce the consequence of a fall.

Where possible, the risk of a fall from height should be reduced during the site planning stage. For more information on working at height or the prevention of falls from height, see INDG 401 (rev1) “Working at Height Regulations 2005: A brief guide” (available to view at <http://www.hse.gov.uk/pubns/indg401.pdf>)

A ‘Falls from Height’ Topic inspection pack is also available on the HSE website: <http://www.hse.gov.uk/foi/internalops/fod/inspect/falls.pdf>

Useful guidance is also available from the Work at Height Safety Association (WAHSA) to download or view. For general information: [www.wahsa.org.uk](http://www.wahsa.org.uk) with general information for working at height:

### 3.3 RELEVANT CIRCUS TASKS

Within the circus environment the following working at height hazards are of particular relevance:

#### 3.3.1 Moving around at height (on top of tent)

The Work at Height Regulations 2005, as amended, define ‘work’ as including movement around a place of work. Some of the activities during the circus pull down (i.e. unlacing of the big tent, and general associated movement on top of the tent, including getting up and down) require movement at height.

Official HSE guidance states that ‘precautions are needed where there is a risk of injury from a fall irrespective of fall height’.

#### ***Who could be affected?***

Primarily the circus employee involved in carrying out work on the outside of the tent is at risk from being injured in a fall, however other employees working at lower levels could also be at risk from injuries resulting from falling tools, equipment or people.

#### ***Controls***

Some circus employees were seen using improvised ‘harnesses’ to secure themselves to the tent, or hooking their feet into the tent lacing to ensure a ‘hold’ on the tent surface. In this situation, use of a full body harness, twin leg lanyard (*not* energy absorbing), and suitable connectors or karabiners (to allow for ease of fastening onto rope etc) would be recommended. (Approximate cost: £100 per person).

In the lacing situation of the circus setting, an energy absorbing lanyard is not necessarily the most appropriate choice, as the sloping sides of the tent may result in a slower fall, the energy generated by this being insufficient to deploy the lanyard. Although it is not *unsafe* to use an energy absorbing lanyard, it may be unnecessarily expensive, unless it is intended for use in other activities (e.g. climbing the king pole).

Lanyards should be an appropriate length i.e. as short as possible whilst still enabling the employee to carry out their tasks unhindered. They should be attached above the user’s head, where possible, to minimise the potential fall distance. Good practice would involve circus employees utilising the full body harness system (outlined above) and securing themselves to the tent above the work area, using the lanyards.

Additional lanyards, cords, tool belts or pouches should be used to secure all tools and equipment (including protective equipment) to the employee to prevent injuries caused by falling objects (i.e. hard hats worn whilst working at height should be secured using a basic chin strap, otherwise the use of a climbing helmet to protect the head would be advisable).

Where harnesses and lanyard equipment is employed users should receive full training in the correct use, storage and checking of the equipment. Equipment should also be checked regularly and well maintained.

#### 3.3.2 Getting down from top of tent

Following work carried out at height (on the tent top) it is necessary for circus employees to get back down to ground level.

•

### **Who could be affected?**

Circus staff getting down from the tent are most likely to be affected. Other circus staff working below are also at risk due to those descending having little view of staff or events occurring below.

### **Controls**

A supported ladder should be placed at the point where the worker descends from the top/side of the tent. This removes the need for a worker to walk round the top of the tent or to jump/swing down tent poles. It also removes the risk for those working below.

### **3.3.3 King Poles**

The main structure of the circus tent consists of two or four king poles that form the basis of the tent supporting structure, as well as the foundation for internal rigging, props and equipment.

### **Who could be affected?**

Primarily, it is the member of the circus team involved in fixing or releasing the lighting structures or tent material who is at most risk from sustaining an injury as a result of working at height on the king poles. There is also potential for workers carrying out tasks below the king poles to be injured by falling equipment or debris.

### **Controls**

Tasks involving working at height should be considered at the 'Site Planning' stage in order to eliminate or substitute tasks for less hazardous alternatives.

Good practice would involve segregating the areas below the king poles to minimise the risk of injury from falling objects (e.g. tools), and prevent the king pole and its anchorages from being disturbed. Additionally, tools should be attached to the person working at height using a suitable chord or lanyard.

Where such tasks are impossible to eliminate or change, appropriate personal protective equipment should be used.

- A circus employee was observed climbing up the pole, to tent height in order to unfasten and lower a lighting rig. The task required the employee to be in position for several minutes, loosening fittings before attaching a rope and pulley system to allow the rig to be lowered to the ground.

Similar situations were observed in reverse during build up.

A full body harness with an energy absorbing twin leg lanyard and scaffold hook connectors could be used in this situation. A work positioning belt attached to the harness, along with a work positioning lanyard would allow the worker to safely use both hands for the task whilst at the top of the pole. (Approximate cost: £150 per person).

This type of lanyard would be suitable for using on a king pole (vertical work) but not on the outside of a tent (a non-vertical fall might not be sudden enough to engage the lanyard).

Any personal protective equipment should be checked regularly, and users should be trained fully by a recognised trainer in the correct use of such equipment. For further information regarding the standards for fall arrest equipment, including general requirements for instructions of use, maintenance, periodic examination, repair, marking and packaging see BS EN 365:2004 "Personal protective equipment against falls from a height".

### **3.3.4 Falling Tools or Equipment**

One of the hazards resulting from work being carried out at height is the likelihood of tools, or pieces of equipment (i.e. lighting or speakers) and the associated rigging falling on workers or members of the public below.

#### ***Who could be affected?***

Circus workers could suffer an injury from falling tools or equipment during the build up or pull down activities of the circus.

#### ***Controls***

The need for working at height should be reduced as far as is reasonably practicable during the 'Site Planning' stages.

Where necessary for work to be carried out at height, it is recommended that hand tools and other portable equipment should be carried in suitable tool pouches or belts, and secured to the user's harness by a suitable lanyard (accessory cord, webbing with karabiners, rope etc) in order to prevent these items falling.

As a further precaution, the area below the employee working at height should be segregated to prevent injury from any falling objects.

An individual should be appointed as responsible for ensuring that rigging, lighting, speakers and other props are all safely secured before members of the public are permitted to enter the tent area.

### **3.3.5 Use of Ladders**

A variety of tasks during the build up and pull down of the circus involve the requirement to work at height, for example:

- Climbing the king poles to secure or unfasten the lighting and speakers;
- Accessing the roof of the tent in order to undo the lacing of the tent;
- Attaching the decorative structures to the ticket/cafe trailer.

In a number of cases circus workers may require the use of ladders to enable them to work at height. Relevant injuries are most likely to result from slippage of the ladder due to uneven or wet ground, misuse, or an inappropriate style of ladder used.

In the circus setting, the misuse or use of inappropriate ladders has been observed, specifically:

- The use of a ladder that was too long for the intended task, and was therefore arranged with the feet of the ladder further from the base of the structure it was leaning against;
- The use of a ladder with visibly unacceptable level of wear and tear;
- The use of ladders that were too short for the intended task.

Different kinds of ladders were also observed in use by different circuses, with some opting to use a stepladder whilst others used straight or extension ladders.

- One circus was observed using a number of different ladders, each used for different tasks.

#### ***Who could be affected?***

Primarily, the circus employee involved in climbing the ladder is at most risk from injury. Due to the nature of the activities involved in the circus build up and pull down, there is the possibility that other

members of the circus team could also be injured in an incident involving a ladder, or by falling objects or debris.

### **Controls**

Where possible the use of ladders should be avoided. Alternative solutions should be considered at the 'Site Planning' stage such as attaching fixtures to the king poles before they are raised.

However it is recognised that in some instances (i.e. low risk, short duration tasks) there may not be a reasonably practicable alternative to using a ladder. In such cases, Class 1 industrial ladders should be used, as domestic ladders are considered unsuitable for industrial work.

Specific ladders should be selected according to their appropriateness for the job, ensuring the ladder is an appropriate height for the task being carried out.

Current HSE guidance advises against standing on the top platform (intended only for tools) '...unless a suitable handrail is available'. This advice is especially relevant when an inappropriately short ladder is being used.

Ladders (including feet) should be checked to ensure they are in good condition, well maintained and stored in accordance with the manufacturer's instructions.

The ground should be even and stable. Where the ground is no longer firm (i.e. following adverse weather conditions) a board should be used to spread the load. Moss, leaf litter, mud patches and uneven ground should also be considered in respect of their effect on the stability of the ladder, particularly when put under a heavy load.

When using a ladder:

- Ensure the ladder is supported by at least one other member of the circus team throughout the duration of the work. (It is advisable that the supporting team member wears appropriate protective clothing, such as a hard hat);
- Ensure that circus employees working in the area near the ladder are aware of the work being carried out at height, such that they don't disturb the ladder and are aware of the risk of falling objects. Segregation of the ladder from the rest of the site could be considered;
- Ensure the ladder is checked regularly and kept well maintained;
- Ensure that the ladder is used only for the purpose it was originally selected and intended for, and that the ladder is still the most appropriate piece of equipment for the job;
- Appropriately robust, sensible footwear (i.e. safety shoes, boots or trainers) should be worn whilst using the ladder. Footwear should be in good condition with no damage to the sole, dangling laces, thick mud or other contaminants that could potentially cause a slip hazard.

### **3.3.6 Trailer Decoration**

During the build up and pull down, circus employees were observed working on top of other structures e.g. caravans and lorries whilst constructing the decorative framework on top of the ticket office/cafe.

#### ***Who could be affected?***

As mentioned above, the circus employees involved in carrying out the work on top of the trailer is at risk from being injured in a fall, however other employees working at lower levels could also be at risk from injuries resulting from falling tools or equipment.



## **Controls**

Where possible, the number of people working on top of the trailer should be kept to a minimum at all times. In some circumstances it may be safer for some circus workers to assist whilst positioned on appropriately selected ladders.

Where it is not possible to eliminate the need for working at height, edge protection (i.e. toe boards or guard rails to protect employees from falls) could be utilised. In the food trailer situation the edging could be installed using ladders, and removed after fitting of the decorative roof.

It is also important that appropriate clothing and suitable footwear (i.e. slip resistant soles) should be worn by all individuals for the duration of the work being carried out at height (including the correct personal protective equipment).

High friction soft soled shoes such as climbing slippers (available from outdoor pursuit shops, and cheaper than the industrial equivalent) or 'beach shoes' (more widely available) could provide improved friction, reducing the risk of a slip, whilst protecting the roof from damage. However caution should be exercised when using such shoes, as they may not provide increased grip in certain conditions (e.g. wet weather or some surfaces).

### **3.3.7 Seating Structures**

Erection of the seating structures requires circus employees to work at increasing heights as the lower levels of seating are secured and the higher levels are worked on. The same principles apply in reverse during pull down activities, whilst stability of the seating may decrease as sections of the seating are removed.

#### ***Who could be affected?***

Circus employees working on the build up or pull down of the seating structures could potentially sustain an injury due to the work carried out above ground level.

## **Controls**

Where possible, assembling seating sections on the ground before raising them into position and securing should minimise the need to work at height. However different styles of seating were observed in use at different circuses and the viability of this method therefore depends on the type of seating in use.

During build up, some circus employees were observed constructing seating from the top down. This necessitated working on the higher seating levels whilst the lower seating levels were not secured. Circus employees should minimise unnecessary work at height by constructing the seating from the bottom up, in order to increase stability of the seating structure as the requirement to work at height increases. Guardrails should also be erected before the seating is constructed where possible.

Dismantling of the seating should ensue from the top down, to prevent unnecessary instability of the structure whilst work is being carried out, and to ensure that workers always have a secure platform to work on/ from.

Similarly, circus employees should begin pull down at the outside edge of the seating structures and work their way in towards the centre to maintain stability where possible. Guardrails could be removed last to provide stability for as long as possible.

## **Further information**

### **3.3.8 Use of Appropriate Personal Protective Equipment (PPE)**

PPE can help to minimise, or in some cases prevent, injuries sustained through working at height. The use of hard hats and appropriate footwear is important in minimising the potential for injury caused by

working at height either through protection from items dropped or falling from above, prevention of slips or trips whilst working at a height (i.e. leading to a fall) or protecting the body during a fall.

The use of high visibility clothing is also beneficial in the circus build up environment to ensure improved visibility.

It should be noted that PPE is the lowest in a hierarchy of controls and that options higher up in the hierarchy should be considered first.

### ***Who could be affected?***

PPE could help to minimise, or in some cases prevent, injuries sustained by circus employees whilst working at height, and also to those working or walking beneath them.

### ***Controls***

The hazards associated with individual tasks, as well as the individuals at risk should be identified. It is then possible to identify the appropriate PPE required by each individual. The PPE identified should then be provided, along with appropriate training to ensure it is used appropriately.

Robust, sensible footwear (i.e. safety shoes, boots or trainers) should be worn whilst using ladders, or carrying out other tasks above ground level. Footwear should be in good condition with no soles hanging off, dangling laces, thick mud or other contaminants that could potentially cause a slip. Advice for special situations, such as trailer decoration still applies.

## 4. WORKPLACE TRANSPORT

### 4.1 SCOPE OF THE WORKPLACE TRANSPORT GUIDANCE

The guidance covers all vehicle movements on the circus site, including lorries, traction units, fork lift trucks, and cars. This guidance does not cover movement of vehicles between different circus sites, or the cars and car parks associated with members of the public, as these areas are not enforced by LAs.

It was agreed that site and circus-specific workplace transport hazards would be considered in relation to employees and members of the public.

### 4.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR WORKPLACE TRANSPORT

The term ‘workplace transport’ applies to any vehicle used in a work setting off the public highway. This can include vehicles such as fork-lift trucks, tractors and mobile cranes but also applies to cars, and heavy goods vehicles when operating off the public highway.

Thus, in relation to circuses, ‘workplace transport’ includes:

- Any vehicle (e.g. lorries, fork-lift trucks, visitors’ cars) moving on site.
- Vehicles associated with all people over whom the site manager/proprietor has control. This includes employees, sub-contractors, people making deliveries and visitors.

Where possible, workplace transport hazards should be considered during the site layout planning stages. This should ensure that:

- Vehicles are segregated from pedestrians;
- The site layout minimises the need for reversing;
- Good visibility and communication is possible for the drivers;
- Drivers, their supervisors and managers, are properly trained with only authorised employees operating vehicles;
- Only vehicles that are suitable for the job and that are maintained in good condition are in use.

For more information on workplace transport see ‘Workplace transport safety: An overview is available to view at <http://www.hse.gov.uk/pubns/indg199.pdf>.

The HSE website: <http://www.hse.gov.uk/workplacetransport/index.htm> contains pages specific to Vehicles at Work, including guidance on preventing falls from vehicles: <http://www.fta.co.uk/information/otherissues/workplacesafety/falls.pdf> and information regarding coupling and uncoupling: <http://www.hse.gov.uk/workplacetransport/information/coupling.htm>.

The British Safety Council: <http://www.britsafe.org/index.aspx> produces safety guides on various topics including workplace transport.

The Fork Lift Truck Association (<http://www.fork-truck.org.uk/>) provides useful information on Thorough Examinations of fork lift trucks as well as other related issues.

### 4.3 RELEVANT CIRCUS TASKS

Within the circus environment the following workplace transport hazards were specifically identified:

#### 4.3.1 Positioning of the Trucks for Equipment (During Put Up and Pull Down)

Workplace transport issues are most relevant during the build up and pull down of the big top. This is due to equipment being loaded and off-loaded from vehicles that are usually driven (reversing is commonplace) to a place of most convenience for the task at hand. Proper planning of the build up arrangements should be addressed in the Site Management Plan.

##### ***Who could be affected?***

- Any member of the circus build up team;
- Members of the public could be affected, as dismantling (pull down) of the circus tends to start during the last performance. These activities also often continue in areas that are open to the public (e.g. public parks).

##### ***Controls***

- Segregation
  - Ideally, no vehicle movements should occur whilst visitors are present on site. (i.e. pedestrians, including members of the public and workplace transport should be separated.)
  - If this cannot be avoided, safe routes for pedestrians including the public that are clearly signposted should be provided and these routes adhered to.
  - Circus employees should be present to supervise the movement of visitors on site.
  - Routes of movement for vehicles should be planned and communicated to others present if it is not possible for the route to be marked out and clearly signposted.
- Reversing
  - The need for vehicles to reverse should be minimised where possible;
  - Ideally a one-way system could be implemented and its proper use adhered to;
  - If reversing is necessary, specific areas should be planned out and clearly marked if possible;
  - Reversing alarms and aids should be appropriately maintained and used wherever possible. (e.g. Vehicle mirrors should be kept clean and well maintained to aid reversing.) Vehicle reversing alarms bring attention to the fact that a vehicle is reversing. Visible warning systems, such as flashing lights, may also be of use if the alarms are not audible over the noise of the circus build up/ pull down.
  - Some circus employees should act as wardens during these stages to ensure the safety of members of the public. This may involve keeping observers at a set distance from the activities.
- Speed

- Limiting the speed of vehicles on site is an important traffic control. This could be enforced by the site manager or proprietor refusing to accept drivers exceeding a set limit.
- High visibility jackets
  - These should be provided for all those working in the area. This will increase the likelihood that drivers will notice workers when driving the vehicles.
- Communication methods between drivers and ground staff.
  - These should be agreed and clear and are very important as miscommunications due to misunderstanding of hand signals and/or language barriers are a real problem and have been seen in practice. This is important due to noise from vehicles limiting the amount of information that can be conveyed verbally between staff. If hand signals are to be used, it is important to check employees' understanding of the signals.

#### **4.3.2 Put Up and Pull Down of the King Poles (For a Large Tent)**

The raising up of the king poles is one of the first activities to take place in the set up of the circus. Although pull down of the king poles is mainly controlled by the mechanical winch, a fork-lift truck is used to take the weight during the final stages of the pull down of the king poles.

##### ***Who could be affected?***

Circus employees are most at risk from this activity.

Although the pull down of the king poles is usually the last of the pull down activities (and so the likelihood of members of the public being present is very low) it is necessary to remember that members of the public often find observing such activities interesting, and therefore may be in the vicinity during the activities.

##### ***Controls***

- The driver of the fork lift truck aiding the lowering of the king poles must have clear visibility at all times. Some circus employees should act as wardens during these stages to ensure the safety of members of the public. This may involve keeping observers at a certain distance from the activities.
- Barriers and other warning signs should be used to warn members of the public of the nature of activities being undertaken and to ensure they do not stray into the vicinity of the activity.
- Audible and visible alarms fitted to vehicles will alert people nearby that vehicles are reversing.
- All circus staff should be aware of and understand agreed hand signals to aid communication during what can be a noisy activity.
- Members of the circus work team in the vicinity of the king poles being raised or lowered should wear appropriate head protection (i.e. hard hats) to protect from falling poles.

#### **4.3.3 Use of Fork-Lift Truck to Load Heavy Loads Onto or Off Trailers**

The use of a forklift truck is commonplace for loading and unloading heavy loads from trailers. This usually takes place at the same time as other build up/ pull down activities therefore meaning numerous transportation vehicles in use simultaneously.

### **Who could be affected?**

- Circus employees may be at risk if involved in the loading process whether it be at ground level or in the trailer itself.
- Members of the public may still be present on site and therefore at risk.

### **Controls**

- Circus employees should wear high visibility jackets, particularly if involved in aiding the loading activities. This ensures that they are as visible as possible to the driver of the fork-lift truck as well as to other drivers of vehicles on other activities.
- Anyone not involved in the activity should remain clear of the area.
- Audible and/or visible alarms should be used to alert both employees and members of the public of reversing vehicles. Mirrors should be well-maintained to aid reversing. Additionally, non-verbal communication between the driver and other circus staff (e.g. those directing the driver) should be agreed to avoid miscommunication.
- Trailers should be parked on firm, level ground to maintain stability. The vehicle's brakes should be applied and any stabilisers positioned before any loading or unloading occurs.

#### **4.3.4 General Vehicle Maintenance**

Employers are required to maintain workplace vehicles in good working order. A competent person should make examinations regularly on certain equipment such as fork-lift trucks and a report should be kept. Maintenance of other vehicles should include checks by drivers before using the vehicle in addition to regular maintenance checks.

## 5.

# MANUAL HANDLING

### 5.1 SCOPE OF THE MANUAL HANDLING GUIDANCE

The guidance covers all circus-specific manual handling hazards identified as potentially affecting circus employees. Manual handling hazards are not considered to affect members of the public or performers when performing.

### 5.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR MANUAL HANDLING

The Manual Handling Operations Regulations 1992 (amended in 2002) apply to a variety of manual handling activities and require employers to avoid hazardous manual handling activities where reasonably practicable. With the typical tasks involved in the build up and pull down of the circus tent and associated structures, plus the repeated tasks and continually moving nature of the circus, there is potential for manual handling injuries to circus employees. Additionally, equipment and large props may sometimes have to be moved within the confines of a small space potentially compromising the ability to adopt correct lifting postures.

Tasks or activities that involve lifting, carrying, pulling, pushing, holding (i.e. static; in one position), lowering, reaching or stretching, or supporting could potentially result in or put the employee at risk from suffering a manual handling injury.

Regarding the manual handling of items, many risk factors need to be considered. These relate to the items themselves (such as weight, dimensions and grip), the task (requirements, task exposure), the individual (movements and posture when moving objects, strength, capabilities and previous injury) and the environment (layout of workplace, clear pathways, lighting, underfoot conditions).

In order to reduce the impact of lifting heavy or awkward items, lifting devices should be used where possible. However, one of the best ways to reduce manual handling hazards is at the 'site planning' stage.

#### **Elimination of handling**

If possible, the need for the movement of heavy loads should be eliminated. Many of the structures/equipment used in the circus are already split into smaller parts which can then be constructed in situ. This could be applied further to other larger/heavier pieces of equipment to eliminate the need for carrying the heavy load entirely. Consideration should be given as to whether this is always possible. Elimination of handling was observed in some cases e.g. the use of a fork-lift truck being employed for heavy loads.

#### **Reduction in handling distance**

Due to circus equipment being packed into lorries/trucks, there is scope for the equipment/structures to be transported as close as possible to where they will be constructed. This reduces the distance employees have to carry the equipment and can be applied to both the build up and pull down of the circus. Good examples of this were observed, and this should be a key consideration during the 'site planning' stage.

## **Training regarding handling techniques**

Staff should be trained in handling techniques, both for individual and team lifts. The training should cover the types of manual handling tasks employees will encounter, and cover the planning of tasks, the planning of lifts and the use of handling aids appropriate to the circus environment. Communication is an important aspect to cover, to ensure a coordinated approach to team lifts (something that was observed repeatedly), with numerous circus tasks involving 2 or more people, and some involving more than 10 people.

For more information regarding manual handling, see ‘Getting to grips with manual handling – A short guide: <http://www.hse.gov.uk/pubns/indg143.pdf>. For information on lifting and handling aids, see <http://www.hse.gov.uk/pubns/indg398.pdf>

The HSE website has various links to musculo-skeletal disorders (<http://www.hse.gov.uk/msd/index.htm>) and back pain (<http://www.hse.gov.uk/msd/backpain/index.htm>).

Also available on the website is a manual handling assessment chart tool (<http://www.hse.gov.uk/msd/mac/index.htm>) which also provides information regarding lifting, carrying and team handling.

Also, more detailed guidance on manual handling operations is available to buy from HSE Books: Manual handling. Manual Handling Operations Regulations 1992 (as amended): Guidance on Regulations (L23) (2004) (priced £8.95)



### **5.3 RELEVANT CIRCUS TASKS**

Within the circus environment the following manual handling hazards are of particular relevance:

#### **5.3.1 Rolling up tent material**

During the pull down activities it is common for the tent sides to be disconnected from the main tent top. These large pieces of plastic-coated material are then folded (by hand) before being packed away onto the main truck. During this packing up it is common for the workers to work in teams to fold, roll and place the material into a metal cage or pallet, from where it can be loaded into the truck. This material is very heavy and can often require 8-10 people on the job.

Two methods of packing up the tent material were observed in two different circuses:

- One method involved rolling the material into a metal cage/ crate. In order for the material to be rolled into the cage/crate, the cage was laid on its side. This then required the circus employees to right the cage, requiring 10 people to pull it upright from its horizontal position. Once the crate was in the correct orientation a fork lift truck could then be used to place the crate on the back of the trailer.
- The alternative method involved rolling the material onto a flat pallet and securing the material with straps. The strap was placed under the pallet prior to rolling. The pallet could then be placed directly onto the back of the trailer by the fork lift truck.

The second method is therefore preferred as this method causes less strain to be put on the circus employees.

#### ***Who could be affected?***

The members of the circus team involved in the folding and positioning of the tent material are all potentially at risk from suffering a manual handling injury due to the weight of the material, and the awkward nature of the task.

#### ***Controls***

Where possible the provision of suitable 'hand holds' would provide workers with an easier place to grip the tent material during handling.

Good practice would also involve one worker taking a lead in organising the movement, possibly through the use of verbal signals or 'counts'.

The use of the pallet method (described above) when rolling up the tent material is also good practice. This reduces the manual handling element of trying to tip or move a container whilst lifting the tent material into it.

#### **5.3.2 Arrangement/Build up of Seating**

With every move of the circus to a new location there is a need for the assembly and reassembly of seating. The common circus seating consists of frames that are fixed together to provide a supportive base for flip-down seats and benches. It is also common to find stand alone, individual seats or benches surrounding the immediate stage area.

#### ***Who could be affected?***

Workers involved in the build up of the seating may be affected due to the size and weight of the seating sections.

## **Controls**

Reducing the size (and therefore weight) of the seating sections reduces the likelihood of sustaining manual handling related injuries from lifting these sections. This could be done by breaking the sections into component parts which could then be slotted together. However, it is their length rather than the weight that necessitates their being lifted by two people.

Good practice was generally observed with employees working in well organised teams, with each individual aware of their role.

### **5.3.3. Removing Tent Supports**

Upon taking down the tent, poles are removed which hold the edges of the roof in place. These poles require a worker to shift them out of their vertical position so that they can be removed from the eyelet in the tent roofing. This usually involves a worker using their body weight to dislodge the poles.

#### ***Who could be affected?***

The worker whose responsibility it is to take down the poles may be at risk. This is due to the load suddenly becoming free which the worker may be unprepared for or may not be able to retain control over the load. This can cause unpredictable stresses on the body. Occasionally two workers are needed to push the pole in order to free it from its vertical position.

## **Controls**

Some circuses were observed slackening the guy ropes in order to facilitate removing the tent supports, however the tent supports would be easier to move if the guy ropes were slackened to a greater extent.

It may also be possible to reduce the strain on the poles by lowering the circus roof: even only lowering it slightly may make a significant difference. This would decrease the likelihood of sudden stresses being placed on the employee.

### **5.3.4. Pulling Guy Ropes Tight**

During the putting up of the big top, there is a need for workers to pull on the guy ropes in order to pull the tent roofing tight whilst other workers slot the rope ends into the mechanical winch already attached to the ground. This pulling usually involves at least 2 or 3 workers and the pulling tends to be carried out above shoulder height.

#### ***Who could be affected?***

Those workers involved in pulling the guy ropes tight could all potentially be at risk of sustaining a lower back or shoulder injury. This is not only due to the pulling being above shoulder height (which increases the risk of lower back injury) but workers are also at greater risk of slipping particularly due to the tent being constructed on grass which, when wet in particular, increases the likelihood of slipping. Other adverse weather conditions such as strong wind or gusts of wind could also increase the potential for injury.

## **Controls**

The use of verbal commands would enable all circus staff involved in pulling the guy ropes tight to pull/relax in a coordinated fashion.

Some industries have developed standardised protocols for communications. Although this may not be necessary in the circus industry, whatever system is used should be clear and understood by all employees on site.

Providing workers with appropriate footwear and laying down rubber matting on the area on which the workers are standing/working on could aid their underfoot stability.

Mechanising the pulling process, possibly by using a vehicle to pull the load of the tent roof, would take some strain off individuals.

### **5.3.5. Build up of Rigging/Platforms Inside the Tent**

During the build up of platforms and structures inside the tent (e.g. band stand), workers may pass equipment up or down in order to construct/dismantle the rigging. This involves workers reaching upwards or stretching and occasionally passing equipment over large distances.

#### ***Who could be affected?***

Workers passing equipment upwards place additional stress on their arms and back. Controlling the load becomes more difficult and, as the arms are extended, they are more prone to injury. The distances over which equipment is passed may occasionally be excessive. This is a problem for both workers passing equipment upwards and those passing it downwards as large distances are more physically demanding than small ones.

#### ***Controls***

A reduction in the distance over which the equipment must be passed would help reduce the stresses placed on the arms and back of circus employees. This could be achieved by the employee physically moving closer to the other employee (e.g. a platform of mid-height between the ground and the platform in question).

The use of pulleys could also decrease the lifting distance. Where possible, the distance should be reduced to the extent that a change of grip is not needed part-way through the lift or lower. It may be necessary for the equipment to be redesigned, or more suitable equipment bought as and when it is being upgraded.

## 6.

## SLIPS AND TRIPS

### 6.1 SCOPE OF THE SLIPS AND TRIPS GUIDANCE

The guidance covers the hazards and controls associated with uneven ground, mud, rain, lighting, and any other slip or trip hazards identified. Slip and trip hazards were considered in relation to circus workers, performers and members of the public.

### 6.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR SLIPS AND TRIPS

Slips and trips are the leading cause of major injuries occurring in the workplace, and can initiate a range of other types of accidents (e.g. falls from height).

Most circuses have a variety of physical levels, use numerous pieces of equipment and tools, work outdoors (sometimes in 'restricted lighting') and are subject to varying weather conditions. All of these can increase the potential for slip and trip accidents involving both the public and circus employees.

Assessing the slip and trip hazards in a stable environment can be challenging. This is made more complicated by the peripatetic nature of the circus.

Although it could be argued that some of the hazards identified are necessary to enable and maximise the circus performance, there are a number of considerations and controls that should be utilized to minimise the risk of injury.

The majority of information on slips and trips has been gathered indoors, however the principles apply to all circumstances where a pedestrian walks across a floor surface. For general information see the HSE website at: <http://www.hse.gov.uk/slips/index.htm>.

The HSE website also has a number of pages which are generally applicable to slips and trips in the circus environment. For general information for possible control measures visit: <http://www.hse.gov.uk/slips/preventing.htm>

Additionally the HSE publication INDG 225 (rev 1) 'Preventing Slips and Trips at Work' (<http://www.hse.gov.uk/pubns/indg225.pdf>) summarises the guidance provided in HSG 155.

For information on Personal Protective Equipment (PPE), which can contribute to minimising the risk of a slip or trip, visit: [www.hse.gov.uk/pubns/indg174.pdf](http://www.hse.gov.uk/pubns/indg174.pdf)

## 6.3 RELEVANT CIRCUS TASKS

Within the circus environment the following slip and trip hazards are of particular relevance:

### Slips

Throughout the circus performances, members of the public or circus employees could potentially be involved in a slip accident. Some conditions will pose higher risks than others, e.g. in instances where the ground is dry, even and well lit, the potential for slip accidents should be low.

#### 6.3.1 The Effects of Weather on Flooring Conditions

Circus sites experience variable weather conditions. Therefore there is a risk of flooring surfaces (both internal and external) becoming contaminated with moisture (e.g. resulting from weather conditions or spillages of drinks) due to pedestrian traffic.

Weather effects are likely to exacerbate other characteristics associated with increased slip risks, such as mud and grass cuttings, further increasing the potential for a slip.

#### ***Who could be affected?***

Members of the public visiting the circus could potentially be involved in a slip, resulting from the effects of weather on different types of flooring. Circus employees and any other pedestrians on the circus site are also at risk in these conditions.

#### ***Controls***

Where possible, contamination of flooring should be prevented through the use of barriers to the rain (e.g. canopies to prevent moisture from contacting the ground in the immediate vicinity of the circus site). These options are only appropriate where the circus entrance is situated near enough to a path; otherwise the canopy will just result in a mud patch occurring further away from the circus entrance.

Suitable matting could be used outside doorways (i.e. entrance and exit points), particularly in wet conditions, to help minimise the potential of slips. Any matting used should be securely fixed and must not have curled edges as this presents a trip hazard.

It is important for flooring materials to be well maintained in order to reduce the potential for slips and trips. Regular checks should ensure flooring (including the steps and metal framework of the seating structures) are clean, not worn, and are free from holes and cracks. Slip resistant materials should be used in areas that are anticipated wet or otherwise contaminated.

Sawdust was observed being used by circuses in muddy areas to soak up some of the moisture. Although sawdust may absorb some of the moisture and help to prevent slips in some circumstances.

Good practice would involve identifying high slip-risk areas. For further information on possible control measures <http://www.hse.gov.uk/slips/preventing.htm>

Additionally the HSE publication INDG 225 (rev 1) 'Preventing Slips and Trips at Work' (<http://www.hse.gov.uk/pubns/indg225.pdf>) summarises the guidance provided in HSG 155.

## **Trips**

### **6.3.2 Uneven ground**

Circuses are often erected on parks, commons, recreational areas or public gardens. Although the areas chosen are generally flat, there may be smaller, uneven areas surrounding the circus site which affect pedestrian access routes.

#### ***Who could be affected?***

Members of the public, particularly high-risk groups such as the young and the elderly, are most likely to be affected by uneven ground. These effects may be heightened due to unfamiliarity of the area, a factor that is compounded when the public are leaving post evening performance, when natural light is likely to be diminishing. Circus employees and any other pedestrians on the circus site could also be at risk from a trip on uneven ground.

#### ***Controls***

Where possible, large areas of uneven or inclined ground should be identified and avoided at the 'Site Planning' stage. Where this is not possible, or the uneven ground is too widespread to avoid, special provision should be made to ensure adequate lighting in the uneven areas.

Where appropriate, the provision of hand rails, signage and floor markings should be utilised to alert pedestrians to the potential trip hazard.

The provision of roped off entrance and exit walkways are ideal as they organise pedestrians, and enable greater control of trip hazards in a dedicated area.

### **6.3.3 Cabling, Rigging and Other Obstructions**

Unlike other semi-permanent structures, the circus site includes essential cables and rigging, which, due to the layout of the circus site, may be necessary to situate across or in close proximity to pedestrian routes (i.e. surrounding the tent and trailers or around the stage area). These and other obstructions, which may be specific to the individual circuses, pose potential trip hazards.

#### ***Who could be affected?***

As with all of the slip and trip hazards, there is potential for both circus workers and members of the public to be at risk from a trip caused by cabling, rigging or other obstructions.

#### ***Controls***

Work areas (including those open to the public) should be kept as tidy and clear from obstructions as possible. It is recognised that in the circus environment there may be a number of essential items, i.e. cabling and internal rigging.

Cabling and rigging should be kept well maintained and in good condition, to prevent unnecessary or additional hazards. Positioning of cables should be considered during the 'Site Planning' stage, and should be organised to avoid pedestrian and public routes (e.g. segregating pedestrians and cabling using fencing). Where this is not possible, cable covers or other methods for attaching cables securely to surfaces, would help keep cables contained and make them visually distinguishable.

Alternatively cabling could be suspended above walkways, in order to avoid trailing across pedestrian walkways. Where this is identified as an appropriate measure, the hazards associated with working at height should be considered.

Adequate measures (e.g. the use of signs) should be taken to identify and highlight the trip hazard to the public. Increased lighting in these areas may also reduce the potential for a trip accident.

The use of tent peg covers may reduce the severity of an accident if an incident does occur.

## **Slip or a Trip**

### **6.3.4 Staircases or Seating Structures**

Inadequate maintenance or poor lighting of staircases (including those integral to the seating structures) increase the potential for slip and trip accidents.

#### ***Who could be affected?***

Anyone who uses the staircases or seating structures could be at risk of a trip, however members of the public are most likely to be at risk from a slip or trip on these structures due to the unfamiliar environment of the circus tent, amplified by the environment of diminished lighting and the opportunities for distraction.

#### ***Controls***

Seating aisles, passageways, steps and stairs should be kept clear of obstructions. They should also be clean, maintained in good condition and be adequately lit.

The rises and goings of steps and staircases (including those of the seating structures) should be consistent, whilst the treads (including those in backstage areas) should be in good condition. The use of colour contrasting is important to allow pedestrians to differentiate between steps.

Seating and stair manufacturers may advise on the suitability of flooring, and methods for increasing the slip resistance of existing flooring.

#### **Other**

### **6.3.5 Lighting**

There are a number of circumstances within the circus setting where diminished or minimised lighting could contribute to the risk of a slip or trip accident (e.g. members of the public may find themselves leaving their seats after a performance has begun, and the audience facing lights have been minimised). During a performance there is also the increased opportunity for distractions, whilst following the performance, the area surrounding the circus tent may also be poorly lit.

#### ***Who could be affected?***

Although there is potential for all members of the circus team and members of the public to suffer a slip or trip as a result of reduced lighting, it is common for the circus 'front of house' staff to carry and use torches while lighting levels are minimised during a performance. Therefore a slightly higher potential for members of the public to be involved in a slip or trip accident is anticipated.

#### ***Controls***

Lighting should enable potential hazards (i.e. obstructions and smooth surfaces) to be visually distinguishable to all pedestrians, especially members of the public. Therefore it is important that an alternative method for enabling visibility should be employed when lighting is minimised, especially in the unfamiliar surroundings of the circus tent.

The positioning of suitable and adequate lighting should be considered during the 'Site Planning' stage. Existing lighting should be checked to ensure it is in good condition and well maintained.

It is good practice to give appropriate warnings prior to light levels being reduced. The use of emergency lighting and fluorescent tape markings to highlight steps, edges and the seating structure may reduce the potential for slip or trip accidents during diminished lighting. Additionally, small

LEDs (Light Emitting Diodes) could be positioned along the stair nosings and leading to entrances or exits, to guide the public under the reduced lighting of a performance.

Special consideration should be given to the combined effects of a poorly lit environment in conjunction with adverse weather conditions. (see 4.3.1, 'Effects of Weather on Flooring Conditions').

### **6.3.6 Footwear**

Where other attempts to minimise the risks of slips and trips have been exhausted, the use of slip resistant footwear can play an important part in preventing avoidable accidents. In the circus setting, provision of appropriate footwear could help to minimise the likelihood of a potential slip by circus workers.

Appropriate, well fitting footwear should always be worn when taking part in work tasks. The use of appropriate footwear is especially important where other variables (e.g. the weather) cannot be controlled. In the circus situation, a wide cleat patterned, slip resistant soled shoe would probably be most appropriate. However it is important to trial footwear to ensure it is fit for the intended purposes of the specific circus.

For further information see the Personal Protective Equipment at Work Regulations, INDG174, HSE Books. Or for a downloadable copy visit: [www.hse.gov.uk/pubns/indg174.pdf](http://www.hse.gov.uk/pubns/indg174.pdf)

### **6.3.7 Slips and Trips at Height**

The use of appropriate footwear becomes increasingly important when working at heights, where a slip or trip could potentially be the initiating event for a different type of accident (e.g. fall from a height). The potential for slips and trips to occur at height is similar to that at ground level, although the consequences can be more serious. For further information regarding slips and trips at height, see 'Working at height guidance'.



## 7.

# ELECTRICAL SAFETY

### 7.1 SCOPE OF THE ELECTRICAL SAFETY GUIDANCE

The guidance covers the electricity supply, cabling and connected equipment such as lighting, speakers, heating, performance equipment and living quarters. Electrical safety is considered in relation to employees, members of the public and circus performers.

The information contained in this section is not exhaustive and is intended only as a starting point for LA H&S officers before (when planning) and during an inspection. Expert advice should be obtained where required.

### 7.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR ELECTRICAL SAFETY

Around 1000 work-related accidents involving electricity are reported to the Health and Safety Executive and Local Authorities each year, with around 20 of these being fatal accidents. The types of injury caused by electricity fall into the following categories:

- Electric shocks;
- Electrical burns caused by the heating effects of current passing through tissue;
- Muscular reaction to current leading to physical injuries, such as when somebody is ‘thrown off’ a ladder when experiencing an electric shock and suffering consequential injuries from the fall;
- Thermal burns caused by arc flashovers or explosions.

Even a small electrical current flowing through the body can kill. Alternating current as low as 50 milliAmps (mA) can cause cardiac failure or difficulty with breathing, and even lower current can cause muscular contraction and reaction that may lead to physical injury. To put this into perspective, a 40 Watt electric bulb, at 240 volts takes 170 mA. This is illustrated on page 5 of HSE Guidance, entitled ‘Electrical Safety for Entertainers’ which is available from the HSE website: <http://www.hse.gov.uk/pubns/indg247.pdf>.

The most common causes of electrical fatal and major injury accidents are:

- Use of electrical equipment that is poorly maintained and in a hazardous condition;
- Contact with overhead power lines;
- Contact with underground power cables (e.g. during excavation work);
- Work on or near low voltage systems without implementing safe systems of work, such as safe isolation procedures or safe live working procedures;
- Fires and explosions caused by defective electrical systems.

The majority of the factors listed above are potentially relevant in the circus context.

The use of portable and temporary electrical equipment can create significant risks of electrical injury. These risks can be minimised by ensuring that the equipment is constructed to a good standard, is well-maintained and in good condition, and is suitable for use in the prevailing environmental conditions.

For portable equipment such as power tools and handlamps, the use of reduced voltage equipment supplied at 110 volt centre-tapped-to-earth (for single phase applications) is recommended where practicable; if low voltage 230 V single phase equipment has to be used, the equipment should be supplied through a residual current device with a rated residual operating current no greater than 30

mA. Portable equipment should always be checked before use to ensure that it and its supply cord have not been damaged – if damage is seen, the equipment should be taken out of use and repaired.

Temporary installations must be constructed and maintained to the same standards as permanent installations.

The web page <http://www.hse.gov.uk/LAU/lacs/19-3.htm> HSE/ LA Enforcement Liaison Committee (HELA) Local Authority Circular details relevant parts of the ‘Electricity at Work Regulations 1989’, and provides useful guidance.

It is highly recommended that any installation and maintenance work on the power generation and distribution system is carried out by a suitably qualified and experienced electrician.

### **Some things to consider:**

- What voltages are being used in the electrical system? This can range from Safety Extra Low Voltage through 110V ac and 230V ac, single phase to three phase 400V ac distribution systems and larger machinery. The voltage is one of the system characteristics that will determine the safety measures needed to control the risk of injury from the system.
- Are the equipment, generator, heating, lighting or electrically operated tools hired or owned by the circus operator? If the equipment is hired it should come with documentation concerning the inspections and tests carried out before hire and with instructions for use and maintenance. If it is owned by the circus operator, has it been inspected and tested regularly and by whom?
- Is the electrical equipment being used for its intended purpose? For example lighting designed for indoor use should not be used outdoors and cables should not be used to carry current at levels above their rated current carrying capacity.
- Can various parts of the installation be isolated? Does the operator know which isolator controls which part of the installation? If multiple generators are being used to power various parts of the site do they know which generator to isolate to make particular equipment safe?
- Are the electrical circuits protected by RCDs? If so when were they last tested, by whom and what were the results?
- Does the circus operator have a planned preventive maintenance regime for its electrical distribution systems and equipment? Who carries out maintenance, are they qualified and competent?

### **Standards and Guidance**

The basic legal requirements for electrical safety at work are set out in the Electricity at Work Regulations 1989. The provisions of the Electricity Safety Quality and Continuity Regulations 2002, as amended, may also apply to the power distribution network.

BS 7671:2001 - Requirements for electrical installations (also commonly known as the IEE Wiring Regulations. Sixteenth edition.) covers the design, construction and maintenance of low voltage fixed electrical distribution systems. Installations that conform to this standard are likely to achieve compliance with the relevant aspects of the Electricity at Work Regulations 1989. Although compliance with this standard is not a statutory requirement other than under building standards legislation, the standard provides a widely recognised and accepted code of practice in the UK.

### **Other Useful Sources of Information**

There is very little published guidance that is specific to the Circus environment, however good practice and relevant information can be found in the following references:

HSG 175: Fairground and amusement parks: Guidance on Safe Practice: Appendix 4

HS(R)25: Memorandum of Guidance on the Electricity at Work Regulations

HSG85: Electricity at work – Safe working practices.

The Provision of Use of Work Equipment Regulations (PUWER) 1998.

HSE - Free Leaflets - Electrical / Electronics <http://www.hse.gov.uk/pubns/elecindx.htm>

HSE - Electricity and the law - <http://www.hse.gov.uk/electricity/information/law.htm>

HSE - Electrical safety at work - <http://www.hse.gov.uk/electricity/index.htm>

## 7.3 RELEVANT CIRCUS TASKS

Within the circus environment the following electrical safety hazards are of particular relevance:

### 7.1.1. Generators

Generators are commonly used in circuses as the main source of electrical power. Depending on the size of the site and the electrical load there may be several in use, possibly supplying different voltages for different applications.

#### ***Who could be affected?***

Any member of staff or member of the public who can gain access to the generator or its associated wiring and loads could be injured if the generator is not installed or maintained correctly. Consideration should also be given to the positioning of the generator to prevent inadvertent contact with hot surfaces or dangerous parts of the generator.

#### ***Controls***

It is important to consider the following:

##### Location

- Does the public have access to the generator?
- Is it clear which generator powers what equipment?
- Are different locations supplied from different generators? It is potentially unsafe to supply one location from more than one generator.
- Are the cable runs to the equipment kept as short as possible and protected against damage by the public or vehicles?

##### Capacity

- Does the generator have the correct capacity for the connected load?
- Have circus staff considered what equipment will be connected to it?
- Is the current carrying capacity of the cables sufficient for the connected load?

##### Electrical Protection

- Are the earthing arrangements suitable for the application?
- How are the electrical cables connected to the generator? If by plug, is it the correct type of plug and is it in good condition? If by direct cable connection onto the generator terminals, is the cable secured at a glanding plate, can you see the inner insulation or even the bare conductors?
- Can the generator be switched off in an emergency?
- If there are any electrical sockets on the generator are they in good condition?
- Does the generator have overload protection and protection against fault current? Suitably rated protection devices such as fuses and circuit breakers should be installed on all live conductors, with the rating of the devices coordinated with the load current and the current carrying capacities of the cables. The use of a Residual Current Device (RCD) can reduce the likelihood of an electrical injury although, if an RCD is installed on generator supplies, consideration needs to be given to the potential for, and consequences of, nuisance tripping. An

RCD should only be used as a secondary means of reducing the risk of people being injured by electricity. RCDs should be regularly tested by pressing the ‘test’ button, and by making sure that the RCD trips before use. Faulty or inoperative RCDs should be removed from use, and it is recommended that they are tested regularly by a qualified electrician. For more information see HSE Guidance ‘Electrical Safety for Entertainers’ at <http://www.hse.gov.uk/pubns/indg247.pdf>, and [information on RCDs](#).

- Is the enclosure where any electrical connections are made in good condition and lockable?

### **7.3.2 Cables/ connections**

As one generator can be used to supply many different items in different locations and more than one generator on site is common, inevitably sites will have many electrical cables running between the generators and connected loads. As well as the electrical risks associated with damaged cables, cables can also be a slip or trip hazard (see slip and trip section of the guidance).

#### ***Who could be affected?***

There is potential for both circus employees and the public to suffer electrical injury through cables becoming damaged and exposing live conductors and indirectly from metal becoming live as a result of faults in cables.

#### ***Controls***

- Cables have a rated current carrying capacity which, if exceeded, will result in cables heating up and potentially causing a fire; the current carrying capacity for a particular cable varies according to how and where it is installed, but it must not be exceeded.
- Cables should have adequate insulation to prevent contact with live conductors and to provide protection against mechanical damage and general wear and tear. Insulation and sheathing should be checked regularly to identify damage and wear and tear before it can lead to injury. Cables may need to have enhanced protection against mechanical damage, depending upon their routing – this protection can be provided by using armoured or braided cable, by burying cables to a safe depth and marking the cable routes, by running the cables through ducting, conduit or trunking, or by running the cables over safe routes where they will not be susceptible to damage. Planning the location of cable runs can prevent damage and limit access to the cables by circus staff and the public. If the cables have to cross an area used by vehicles and/or people the cables should be kept in one run if possible. This run can then be buried or laid through a lay flat cable protector.
- The connection of the cable to the generator could be by a plug, or screw or bolted terminals. What is the condition of the plug? Is the outer insulation clamped adequately? Is any of the inner insulation visible? If screw or bolted terminals are used, is the outer insulation clamped? Is the inner insulation outside the connection enclosure visible? Is the cable’s circuit protective conductor (earth conductor) connected appropriately and securely?
- The insulation on power cable conductors is coloured to show the conductor’s purpose. However, different standards are used around the world, and you should never assume that a cable of a particular colour is at a particular voltage. It is very important that you identify what voltages are present on an installation you are not familiar with. Any connections of cables/ enclosures should have the correct IP rating. An IP number, expressed as IP followed by two numbers, is often used when specifying the environmental protection afforded by enclosures around electronic equipment. Any cable entering the enclosure should have an appropriate cable gland to maintain the enclosures IP rating.

### 7.3.3 Electrical Lighting Equipment

Lighting is an essential part of the circus electrical system and will be assembled and dismantled many times a year, and will quite often be exposed to a harsh environment. Lamps and lamp caps can be easily damaged leaving exposed live filaments that may be energized at 230V ac.

#### **Who could be affected?**

Both the public and particularly circus staff fitting, dismantling and maintaining them on a regular basis.

#### **Controls**

- Are the lights securely attached to the structures? battens or support wires and are wires designed to support the weight?
- Are they exposed to rain, if so are they designed for this purpose?
- Are the lighting cables and lamps out of the reach of the public?
- Are broken lamps temporarily covered or totally enclosed to guard against them being broken or removed?
- Are the lamps protected against damage from projectiles?

### 7.3.4 Electrical Equipment

Electrical equipment, including portable equipment such as electrical tools, extension cables and cleaning equipment, may be more vulnerable to damage when used in a circus environment. A general inspection may reveal some problems but some electrical faults, such as open circuit earth connections and damaged insulation, can only be revealed by testing by a competent person.

#### **Who could be affected?**

There is potential for both circus employees and the public to be injured by faulty electrical equipment and cables.

#### **Controls**

- The fixed power distribution system should be installed and maintained to the standards set out in BS7671:2001 *Requirements for electrical installations*. This requires persons who are responsible for erecting and maintaining the power generation and distribution systems to have a good understanding of the standard and how to apply it in the circus environment.
- Electrical equipment should be examined regularly to check for deterioration especially on plugs and cables. Advice on the in service inspection and testing of electrical equipment is published by the Institution of Engineering and Technology in the *Code of practice for the in-service inspection and testing of electrical equipment*. This document addresses the maintenance requirements of portable, transportable, and fixed electrical equipment.
- Is the equipment being used for its intended purpose? Incorrect use of equipment can lead to damage that can lead to electrical injury, including from overheating and potential fires.
- It is recommended that a Residual Current Device (RCD) with a rated residual operating current of 30 mA is installed on the supplies to equipment, especially 230 V portable equipment that may be used outside.

### **7.3.5 Underground or Overhead cables and wires**

The positioning of underground or overhead cables (in proximity to a circus location) should be considered at the site planning stage. Where the presence of overhead lines or buried cables are realistic possibilities, relevant utility maps and cable locating devices should be employed to locate, identify and mark out the cables. For further information see the HSE guidance booklets ‘Avoiding danger from underground services’ (HSG 47) and ‘Avoidance of danger from overhead electric power lines’ (GS6).

If there are any risks identified concerning underground or overhead cables, these should be taken into account as part of the build up and pull down of the circus site.

#### ***Who could be affected?***

Circus employees could be affected at the build up and pull down stage of the Circus site.

#### ***Controls***

- Utilise up to date utility maps of services in the area surrounding the Circus site.
- Implement the control measures set out in HSG47 and GS6
- Contact local authorities, utility suppliers and consult the owners of the land for advice.

## 8.

## NOISE

### 8.1 SCOPE OF THE NOISE GUIDANCE

Noise was chosen as a topic to include in the guidance to draw attention to the new noise regulations that came into force in 2006. The guidance covers noise relating to music (including rehearsal exposure), generators and any other noise exposure hazards identified. Noise hazards were considered in relation to employees and performers. In the circus setting, audience members are unlikely to be exposed to repeated or dangerously high sound levels for sustained time periods.

### 8.2 GENERAL HEALTH AND SAFETY GUIDANCE FOR NOISE

Hearing ability may be irreversibly compromised following exposure to high levels of noise. 'Noise exposure' refers to the level of noise, as well as the cumulative effects on circus employees, including backstage crew and performers. It is therefore particularly important to consider not only the level of noise exposure experienced by employees during the build up and pull down of the Circus site, but the effects of background noise (including generators), rehearsals or performance, and also the length and frequency of these exposures.

Circuses may move site numerous times in a circus season, which typically lasts from March/April to October. With numerous performances throughout the season, and rehearsals out of the 'circus season', there is the potential for employees within the circus environment to be exposed to high (and frequent) levels of noise from the repeated performances (i.e. music) and build up/ pull down activities.

Circus performance related activities (not including build up or pull down) are covered by the Noise at Work Regulations 1989, where the first action level is 85dB and the second action level is 90dB.

[http://www.opsi.gov.uk/si/si1989/Uksi\\_19891790\\_en\\_1.htm](http://www.opsi.gov.uk/si/si1989/Uksi_19891790_en_1.htm)

Circus build up and pull down activities are covered by the Control of Noise at Work Regulations 2005, where the lower and upper exposure action values are 80dB and 85dB as a daily or weekly average. <http://www.opsi.gov.uk/si/si2005/20051643.htm>

In the circus setting, audience members are unlikely to be exposed to repeated or dangerously high sound levels for sustained time periods. Although there are no national audience exposure limits for noise, audience members are not considered to be at risk of suffering hearing impairment, and are therefore excluded from the remit of this guidance.

Where levels of amplified sound are high, it is good practice to warn the audience about the noise levels. However a good guide is noise values of no more than 107dB, 1 metre from the front of a loudspeaker and 96dB at 3 metres (some LAs may set their own limits).

For further information regarding exposure limits visit <http://www.hse.gov.uk/noise/index.htm>

To download the free HSE leaflet 'Noise at Work' (INDG362 (rev1) which provides guidance on the 2005 Regulations, visit: <http://www.hse.gov.uk/pubns/indg362.pdf> Information is also available in HSE's priced book 'Controlling Noise at Work' (L108) available from HSE Books or from bookshops, priced £13.95.

The HSE website provides a good collection of resources regarding the hazards associated with noise exposure - see <http://www.hse.gov.uk/noise/index.htm>

The site provides information for both employers: <http://www.hse.gov.uk/noise/advice.htm> and employees: <http://www.hse.gov.uk/noise/worried.htm> and provides a variety of tools to estimate noise exposure: <http://www.hse.gov.uk/noise/calculator.htm>



## 8.3 RELEVANT CIRCUS TASKS

Within the circus environment the following noise hazards are of particular relevance:

### 8.3.1 Live Music

An increasing number of circuses are returning to the use of live musicians to accompany performances.

#### ***Who could be affected?***

- Live musicians.

Live musicians are at a potentially high risk of suffering detrimental effects due to their close proximity to the noise source (their own instruments, other nearby instruments (e.g. the person playing behind them) and nearby speakers).

With multiple performances per day, possibly with additional rehearsals, the risk to live musicians' hearing is increased in terms of both noise level and cumulative exposure as well as performance exposure to noise from other musicians' instruments.

- Other circus employees (such as performers, backstage crew and front of house employees).

Other circus employees are also likely to be subject to noise exposure levels at a similar frequency but at lower levels than for live musicians.

#### ***Controls***

- Live musicians and other circus employees.

The following are simple controls that all circuses should be able to adopt easily:

- Physical arrangement should be considered in order to reduce unnecessary noise exposure. For example musicians should be positioned away from loud speakers, or other musicians' instruments.
- Loud speakers should be directed towards the audience not the band or circus employees, to reduce the noise levels repeatedly experienced by the musicians.
- Noise levels should be restricted during rehearsals and sound checks.
- Where applicable, relevant information and physical controls (i.e. ear plugs) should be available to musicians/ employees for use during performances or rehearsals.

#### ***Further Information***

The performance related activities in a circus come under the Noise at Work Regulations (1989). See the HSE website for further information: [http://www.opsi.gov.uk/si/si1989/Uksi\\_19891790\\_en\\_1.htm](http://www.opsi.gov.uk/si/si1989/Uksi_19891790_en_1.htm)

### 8.3.2 Public Address System

Circuses typically utilise a Public Address (PA) System to communicate with the audience, make announcements and, where live musicians are not used, play pre-recorded music. In circuses with live musicians, the PA System may be used to provide music or special effects for some acts.

#### ***Who could be affected?***

Circus employees (such as live musicians, performers, backstage crew and front of house staff) are all likely to experience similar noise and exposure levels during performances, as a result of the PA System.

Performers are potentially at a higher risk of suffering detrimental effects due to their proximity to the PA System speakers, which are commonly located in the stage area. Therefore performers could be affected by the cumulative exposure to noise from PA System speakers.

### **Controls**

- The PA System should not be used at full capacity during warm up or rehearsals.
- Speakers should be positioned to face the intended recipients (i.e. speakers should be set up to face out across the audience), or be positioned on the service side of food and ticket kiosks.
- Speakers should not be positioned immediately behind employees where the employee is likely to remain within close proximity of the speaker, e.g. at a food or games kiosk.

It is good practice to elevate speakers and amplifiers, to prevent lower frequency sounds from being absorbed, (potentially leading to increased volume as a compensation measure).

### **8.3.3 Build up and Pull Down activities**

Build up and pull down activities are considered particularly hazardous, due to the high frequency of activities undertaken by circus employees. The associated use of power tools and hammering means this repeated exposure to noise (combined with prolonged lengths of time in transit vehicles) could potentially pose a risk to employees hearing.

#### ***Who could be affected?***

All employees of the circus who directly engage in circus build up and pull down activities are potentially at risk of developing hearing impairments as a result of the cumulative noise exposure experienced during these activities.

### **Controls**

- Tools and machinery should be well maintained and checked regularly to minimise unnecessary noise.
- Personal hearing protectors should be available for use during build up and pull down activities.

### **Further Information**

Build up and pull down activities are covered by the Control of Noise at Work Regulations 2005. See the HSE website for further information: <http://www.opsi.gov.uk/si/si2005/20051643.htm>

### **8.3.4 Generators**

Generators are commonly used as the main power source for circus lighting and music equipment.

#### ***Who could be affected?***

- All circus employees could potentially be affected by the noise from generators.

### **Controls**

- An effective, good practice control measure would entail positioning generators at the edge of the circus site, away from working areas.
- Generators of sufficient (but not excessive) power should be used.

Generators should be kept well maintained and checked regularly to minimise unnecessary noise.

### **8.3.5 Other Noise Sources**

There are a number of additional potential noise sources. These include:

- Fireworks and explosions used in the performance, and
- Other sound effects used by the acts.

#### ***Who could be affected?***

- Circus employees may be subject to repeated exposures to other noise sources.

#### ***Further information on cumulative exposures***

The proper assessment of the risks to hearing would include an assessment of cumulative exposures. Under the Control of Noise at Work Regulations it is possible to consider weekly averaging of the daily noise exposure.

Additional activities causing exposure to noise during a week will also add to this exposure.

For general noise exposure level information please see the HSE website: <http://www.hse.gov.uk/noise/index.htm>