



BIAZA

BRITISH & IRISH ASSOCIATION
OF ZOOS & AQUARIUMS

BIAZA Health & Safety Guidelines for Zoos & Aquariums

Compiled by the
BIAZA Health & Safety Working Group

The Health and Safety Executive provided support to the British & Irish Association of Zoos & Aquariums in producing this guidance, which is aimed at improvements within the zoo and aquarium industry. This guidance may go further than the minimum you need to do to comply with the law with regard to health and safety.

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Published by the British and Irish Association of Zoos and Aquariums, Regent's Park, London NW1 4RY, United Kingdom

Index

	Page
Introduction	4
How to use this guidance	4
Enforcement of health and safety law	5
What is a zoo?	5
Scope of this guidance	5
Chapter 1 Managing health and safety	6
Chapter 2 Safety issues - general operation of zoos	11
Building - construction, repairs and maintenance	11
Confined spaces	14
Contractor management	16
Diving activities	17
Lone working	21
Machinery/plant/equipment	23
Controlling substances that are harmful to health (COSHH)	25
Dangerous substances and explosive atmospheres (DSEAR)	28
Personal protective equipment (PPE) and Respiratory protective equipment (RPE)	30
Public safety	31
Reporting accidents (RIDDOR)	34
Slips and trips	35
Working at height	38
Working in or around water	42
Workplace transport/traffic routes	45
Violence at work	49
Chapter 3 Safety issues - animal related	51
General work with animals	51
Contact with animals	53
Permits to work	57
Public contact with animals	58
Containment of animals and escape prevention	60
The zoo perimeter	61
Animal enclosures	61
Slides, gates and doors	63
Routine entry into animal enclosures	63
Features and hazards within enclosures	64
Enclosures for venomous species	65
Large drive-through enclosures	65
Transport of animals	66

	Page
Veterinary procedures	69
X-rays, radiography and other similar techniques	70
Storage and use of veterinary drugs	70
Chapter 4 - Health	73
Health surveillance	74
Asbestos	75
Chemicals and other hazardous substances	77
Working with biocides and pesticides	79
Legionella	81
Manual handling	83
Noise	85
Mental health and stress	88
Vibration	89
Zoonoses	92
Chapter 5 - Accidents, Emergencies, Security and Communications	96
Communication systems	99
Fire	100
Firearms, blowpipes and dart guns etc.	104
First aid	106
Terrorism	108
Annex A - Principles of prevention and the control of risks from contact with zoo animals	109
References and further reading	112

Introduction

The British and Irish Association of Zoos and Aquariums (BIAZA) Health and Safety Working Group works to improve standards and exchange information relating to health and safety in zoos, aquariums and other organisations involved in conservation, education and research relating to the natural world, for example animal sanctuaries, bird gardens and safari parks. For ease of reading, in this guidance the term "zoo" has the same meaning as in the Zoo Licensing Act 1981¹, but the guidance may be appropriate for use in similar premises. Whilst relatively few serious accidents occur within zoos and aquariums in comparison with some other sectors, risks cannot always be eliminated completely, and they must be identified and managed proportionately and effectively. This guidance, written by BIAZA, has been written with the agreement of the Health and Safety Executive (HSE) and replaces the 2007 version of HSE guidance HSG 219 – Managing Health and Safety in Zoos.

This document focuses on the health and safety of employers, employees and the public within zoos and aquariums. It provides advice on issues relating to the design and operation of zoos and on safe systems of work.

How to use this guidance

This guidance refers to potential hazards and risks associated with the operation of a zoo. Safe and legal operation involves compliance with many pieces of health and safety legislation and guidance. The majority of these are listed in 'References and further reading' along with their general requirements. The guidance also refers to supplementary activities, such as educational visits, fairgrounds and adventure play areas, which may contribute to the zoo's overall business operation. Detailed guidance on these activities is not given in this document as it is available through other industry-specific documents. A selection of these can be found at 'References and further reading'.

Zoo operators should read this guidance in conjunction with the Zoo Licensing Act 1981¹ – Guide to the Acts Provisions² and the Secretary of State's Standards of Modern Zoo Practice³. The Standards, which must be fully complied with, provide minimum requirements on matters relating to public safety at zoos and nothing in this guidance or those Standards should be seen as contradictory. The Health and Safety at Work etc. Act 1974⁴, and regulations made under it, place duties on those responsible for operating zoos (the "*duty holder*"). This guidance is intended to help duty holders to identify and understand the risks from their operations and so help them comply with the legal requirements to eliminate or control these risks so far as is reasonably practicable.

When you see the term 'so far as is reasonably practicable' in this guidance, it means balancing the level of risk against the measures needed to control the real risk in terms of money, time or trouble. However, you do not need to take action if it would be grossly disproportionate to the level of risk.

BIAZA and its membership believe this guidance provides reasonably practicable health and safety advice and solutions for people running zoos. You are not, however, required to follow this guidance and can comply with the relevant legislation by any means.

Enforcement of health and safety law

Under the Health and Safety (Enforcing Authorities) Regulations⁵, the relevant local authority will normally be the enforcing authority for zoos. HSE may rarely be the enforcing authority in zoos operated by local authorities or where local arrangements are in place.

In this document, the word "**must**" is used where there is an explicit legal requirement for you to take a certain action; "**should**" indicates action you can take to comply with the law - although you, as a duty-holder, can take other action provided you can demonstrate that it still results in compliance with the law.

What is a zoo?

In the Zoo Licensing Act 1981¹ a "zoo" is as an establishment where living, wild animals are kept for exhibition to the public for seven or more days in a period of 12 consecutive months, with or without charge for admission. This will include:

- aquariums;
- sanctuaries;
- bird gardens (including birds of prey);
- safari parks; and
- any collections of living species (not normally domesticated) on display to the public.

This definition also applies to exhibitions yet to be licensed or which may be exempt from licensing control. It does not include pet shops or circuses.

The zoo itself may be a subsidiary part of premises, e.g. a display of exotic animals on a farm. It is important that zoo operators understand their legal situation and consider fully any interaction between the zoo and any other business activities associated with the premises. Further guidance as to what constitutes a zoo, and on other subsidiary legislation, can be obtained from your local authority or from the Department of the Environment, Food and Rural Affairs (DEFRA) in England and Wales, and from the Scottish Government in Scotland.

Scope of this guidance

This document covers health and safety at work issues. It does not cover matters such as safeguarding and accessibility. Links to advice in these areas can be found at 'References and further reading'.

Chapter 1 Managing Health and Safety

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
1. You must ensure the health, safety and welfare of your employees and other people who might be affected by your business and do whatever is reasonably practicable to prevent them being exposed to risks to their health and safety.
 2. You must put in place suitable arrangements to manage health and safety. The Management of Health and Safety at Work Regulations 1999 (the Management Regulations)⁶ require employers to put in place arrangements to control health and safety risks. For further guidance see Managing for health and safety⁷. By its nature, the work carried out at zoos means that self-employed people working at zoos will also have duties to comply with health and safety law.
 3. As a minimum, you must have:
 - a written health and safety policy (if you employ five or more people);
 - conducted assessments of the risks to employees, contractors, customers, partners and any other people who could be affected by your activities. These must record the significant findings in writing (if you employ five or more people). Any risk assessment must be suitable and sufficient;
 - arrangements for the effective planning, organisation, control, monitoring and review of the preventive and protective measures that come from risk assessment;
 - access to competent health and safety advice;
 - provided employees with information about the risks in your workplace and how people are protected;
 - provided instruction and training for employees in how to control the risks;
 - ensured there is adequate and appropriate supervision in place;
 - consulted with employees about their risks at work and current preventive and protective measures.

What you need to do

4. Managing hazards and risks in zoos sometimes presents unique and complex situations which can, when not effectively managed, result in serious harm to people. You must be aware of the different risks and control them effectively.
5. Safety does not just happen. It requires everybody's commitment and willingness to work in an organised way to achieve good standards. The most important steps to take in managing health and safety are to Plan, Do, Check and Act (see Managing for health and safety⁷). These concepts are recognised in all sections of this book and you can find out more in 'References and further reading'.



The Plan, Do, Check, Act Cycle

Plan - say what you want to happen

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

Do - ensure systems are in place

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

Check - ensure it is happening

8. You should ensure that your plans have been implemented, assess how well the risks are being controlled and if you are achieving the aims in your plan. By checking paperwork, auditing and investigating accidents and incidents you should be able to check whether your management plan is working.

Act - review what went well and not so well so you can improve

9. You should regularly review what you are doing to ensure it is working as you intended, is effective and that your plan remains on track. By learning from accidents that you or others may have had, you may be able to prevent them happening again.

Risk assessment

10. As part of managing the health and safety of your business you must control the risks created by your zoo. To do this you must think about what might cause harm to people and decide whether you are doing enough to prevent that happening; this is risk assessment and is required by law.
11. Risk assessment is about identifying and taking sensible measures to control the risks in your workplace, not about creating lots of paperwork that no-one reads. You are probably already doing things to protect your employees and members of the public, but your risk assessment will help you decide whether you should be doing more to protect these groups.
12. Think about how accidents and ill health could happen and concentrate on real risks - those that are most likely, and/or which will cause the most harm. The following might help:
 - think about your workplace activities, processes and the substances used that could injure people or harm their health;
 - ask your employees what they think the hazards are, as they may notice things that are not obvious to you and may have some good ideas on how to control the risks;
 - check manufacturers' instructions for equipment as they can be very helpful in spelling out the hazards;
 - ensure you have the necessary competence available if you are assessing an unusual or complex process;
 - consider people who may have particular requirements, for example those with allergies or who may have been pre-sensitised, new and expectant mothers, young workers, migrant workers, people with disabilities, temporary workers, contractors etc.
13. Having identified the hazards, you must then decide how likely it is that harm will occur. Risk is a part of everyday life and you are not expected to eliminate all risks. What you must do is ensure you know about the main risks and the things you need to do to manage them. Generally, you need to do everything reasonably practicable to protect people from harm.
14. The risk control measures employed must conform to a hierarchy to ensure the safest method of doing the work is identified. Broadly the hierarchy is:
 - Eliminate the hazard by not carrying out the work;
 - Substitute the way the work is done for a less hazardous method;

- Use engineering methods such as guards, barriers, ventilation systems etc to prevent exposure to the hazard;
 - Adopt administrative control measures such as safe systems of work, job rotation, training etc, to reduce the risk of exposure to hazards.
15. Make a record of your significant findings - the hazards, how people might be harmed by them and what you have in place to control the risks.
16. Any record produced should be simple and focused on controls. If you have fewer than five employees you do not have to write anything down, but it is useful to do this, so you can review it at a later date, for example if something changes. If you have five or more employees, you are required by law to write it down. Few workplaces stay the same, so it is sensible to review what you are doing on an ongoing basis.

Who should do a risk assessment?

17. You must carry out risk assessments, however in practice the assessment is best carried out if the people carrying out the work are involved in the process. To get the information you require for a suitable and sufficient assessment, you may also need to include others, for example contractors, equipment manufacturers or other suppliers.

Consultation with employees

18. Workplaces where employees are involved in taking decisions about health and safety are generally safer and healthier. Collaborating and engaging with your employees helps you to manage health and safety in a practical way by helping you spot workplace risks. Examples of how to do this include:
- making sure health and safety controls are practical and usable by employees;
 - increasing the level of commitment to working in a safe and healthy way;
 - consulting employees on health and safety matters. In workplaces where a trade union is recognised, this will normally be through union health and safety representatives. In non-unionised workplaces, you can consult either directly or through other elected representatives;
 - involving employees in risk assessments and in devising risk controls;
 - discussing with them the best ways of providing information and training.
19. More information on your legal duty to discuss health and safety with employees can be found at <http://www.hse.gov.uk/involvement/>

Employee capability and training

20. The Management Regulations⁶ also require you to ensure that your employees are not given work that is beyond their capability or which creates uncontrolled risks to themselves or to others. In assessing capability, it is necessary to look at their knowledge, training, experience and learning capability. Vulnerable groups, e.g. young people, new or expectant mothers etc. must also be considered.

21. The provision of relevant information, instruction and training in health and safety is essential. It should be given at the recruitment stage and again when your employees are exposed to increased or new risks, for example:
- on transfer to another job;
 - when given additional or different responsibilities;
 - if working with new animal species, new facility, new or altered equipment, technology or systems of work; or
 - where risk assessment, or the review of a risk assessment, identifies new risks or training needs.
22. Information, instruction and training given at the recruitment stage and periodically thereafter must be comprehensive, covering topics such as:
- the organisations arrangements for health and safety and who does what;
 - reporting procedures for health and safety matters;
 - basic skills required;
 - rules regarding access and prohibited areas;
 - task-specific training and the significant findings of your risk assessments;
 - workplace familiarisation with an emphasis on potential risks;
 - animal-related risks and the controls required;
 - working with new species/animals;
 - aggression and changes in animal behaviour;
 - safe use of work equipment and PPE;
 - first aid;
 - fire and emergency procedures, including means of communication.
23. It is essential that health and safety training is refreshed at regular intervals to ensure knowledge remains up to date: this is particularly important for training in skills or work practices used infrequently. For example, you may have an employee who occasionally stands in for other employees and will need refreshing when they do that work. You should ensure that an effective method of training is found to ensure people whose first language is not English understand what it is they must do to work safely.
24. It is good practice to encourage your employees to work towards vocational qualifications or other forms of continuing professional development (CPD), many of which will incorporate relevant health and safety modules.

Chapter 2 Safety issues - general operation of zoos

25. Many of the day to day work activities that will have an impact on the health and safety of people in the zoo are similar to those in other workplaces, and general information in this area can be found in 'References and further reading' in this document or at: www.hse.gov.uk
26. The nature of zoos means that the extra hazards created by animals and the public at leisure must be considered as part of the safety management system and this guidance provides advice in those areas.

Building - construction, repairs and maintenance

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Construction (Design and Management) (CDM) Regulations 2015⁸
27. Construction work has a very broad definition in the legislation and includes many activities that would not be seen as typical construction. A zoo has duties to make sure construction work carried out on its behalf is managed to reduce the risks to people from the work.
 - When designing and planning new-build or refurbishment projects, clients and designers (often zoo staff) have duties under the Construction (Design and Management) Regulations 2015⁸, to consider the need for work to be carried out safely over the lifespan of a building, e.g. to clean, service, maintain, inspect and repair it. People's ability to work safely in and around animal enclosures must also be considered at the design stage to ensure hazards and human error can be designed out so far as is reasonably practicable.
 28. The CDM Regulations⁸ apply to the building, maintenance and repair of any 'structure' and again, this is widely drawn. They create several roles with legal duties and responsibilities that apply to ensure safety during different phases of any construction project. More detail on this can be found in 'References and further reading'.
 29. Zoos will normally be classified as a 'Client' under the CDM Regulations⁸ and have the overall duty to ensure the project is managed to ensure the health and safety of all who might be affected by the work, including members of the public. The roles allocated under CDM, for example Principal Designer (PD), Principal Contractor (PC), Designer and Contractor can change as works progress and the zoo may take on and relinquish any of the roles during the project.

What you need to do

30. Construction work is a high-risk activity in any work environment and within a zoo there are additional factors to consider e.g. construction of new facilities or renovation of existing enclosures. During these times or when existing parts of the zoo are undergoing maintenance, new hazards may be created. These may affect the security or behaviour of the animals and therefore increase the risks to the visitors and particularly zoo employees.

31. Most construction work conducted will be carried out by contractors, and advice on their management can be found in a separate section of this guidance and in 'References and further reading'.
32. Because of the breadth of different circumstances in zoos, the client should ensure the PD and PC plans take account of the particular circumstances and hazards of the zoo they are working in during the design and construction phases of the project, for example:
 - ensuring the PD considers the zoo-specific hazards;
 - ensuring the PC is aware of the specific competences which contractors will require to work in the zoo and that their induction training covers all zoo-specific hazards, controls and emergency procedures;
 - ensuring arrangements and systems are in place to minimise interaction between contractors and animals and ensure any remaining contact is properly planned with zoo staff;
 - hot working around animal enclosures that will contain flammable bedding and theming must be rigorously controlled;
 - ensuring site induction training covers zoo-specific issues such as zoonoses, animal escape procedures and different alarms.
33. The following hierarchy of risk control should be followed when deciding on control measures for construction close to animal enclosures in a zoo:
 - remove the animals from the area/enclosure where work is to be carried out;
 - where dangerous animals cannot be removed, they should be kept at least two locking mechanisms away from contractors. Control of the locks should be carefully managed to ensure that this standard cannot be degraded in error, e.g. by use of a 'Lock out/Tag out (LOTO) system using a multi padlock 'tagout' style system;
 - access to other animals should be prevented by normal enclosure security measures or appropriate temporary fencing etc;
 - contractors should be accompanied by competent zoo staff with the necessary equipment to ensure safety.
34. Where work is carried out in enclosures, a COSHH assessment should be carried out to ensure the risks from any hazardous substances including zoonoses are identified and controlled.
35. Where work is carried out close to the perimeter barriers of occupied enclosures, these should be covered with solid screens.
36. Access by construction workers to enclosures where animals would normally be present should be closely controlled by zoo staff to ensure all people, tools and equipment are removed from the enclosure before the animals are re-admitted. See the section below regarding 'Contact with Animals'. Information on Permit to Work⁹ systems if they are appropriate can be found in 'References and further reading'.

37. Construction sites should be located, planned and laid out to reduce the need for movement on the wider site. All equipment must be secured when not in use to ensure there is no unauthorised access by zoo staff or the public.
38. Vehicle or equipment moves should be planned to reduce risk and those outside the construction site should be minimised at times when the zoo is open or when animals are being moved.
39. Factors that may affect animal behaviour or predictability such as sudden or prolonged loud noises should be minimised. Waste should not be burned on site and other activities that generate smoke should be avoided.
40. Further information on managing construction activities can be found in the HSE guidance document Construction (Design and Management) Regulations 2015. Guidance on Regulations⁸. See 'References and further reading'.

Confined spaces

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Confined Spaces Regulations 1997¹⁰
41. A confined space is defined as a place which is substantially enclosed (though not always entirely), and where serious injury can occur from hazardous substances or conditions within the space or nearby (e.g. lack of oxygen; drowning; being trapped by solid materials that could lead to asphyxiation, such as free-flowing grain in silos). Employers are required to assess work that may require access to a confined space and put in place controls in accordance with this hierarchy:
- avoiding entry to confined spaces, e.g. by doing the work from the outside;
 - if entry to a confined space is unavoidable, following a safe system of work; and
 - putting in place adequate emergency arrangements before the work starts.

What you need to do

42. Fatalities can occur for a number of reasons when work in confined spaces takes place without safe access, work and emergency rescue procedures being in place. There are several places in zoos where people will have to get access to confined spaces, and planning to control risks must be in place before access is approved. These may include:
- plant rooms for enclosure heating or water cleaning systems, where gases or other hazardous substances may accumulate;
 - tank, sump or manhole inspection where toxic substances, gases or oxygen depletion may be a factor;
 - water storage turrets where water is present or could be added;
 - silos for containing feedstuff or wood pellets where oxygen depletion or suffocation in the product may occur.

Further information on managing work in confined spaces can be found in Safe Work in Confined Spaces - Confined Spaces Regulations 1997. Approved Code of Practice and Guidance¹⁰. - See 'References and further reading'.

Case study: entry into confined spaces

Poor management control of entry into confined spaces can pose an immediate risk to life. While tracing a blocked drain, a new zoo plumber discovered that keepers had been climbing down ladders into three deep access holes to open valves for emptying animal ponds. No risk assessment had been carried out for the entry and there was no emergency rescue plan in place.

Access for all staff was stopped immediately. Following a risk assessment of each access point, the plumber and his colleague attended confined spaces entry and rescue training and the zoo purchased a rescue tripod, harness and gas monitor to detect oxygen, flammable and toxic gases. Entry was controlled using a permit to work system, and an emergency rescue plan was prepared for each access point and tested twice per year with the site first aiders.

Other shallower access points across the site were inspected and a standard checklist used to record the suitability and condition of the access point, cover and the equipment required for entry. Each point was given a unique number, photographed and its location marked on a site plan for future reference by zoo and contractor staff.

Contractor management

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
43. You must ensure, so far as reasonably practicable, that contractors you use as part of your undertaking are competent for the work they undertake, work safely and do not create risk to themselves or others. You must be aware of what contractors are doing in your premises and that you have given them the information and detail they need to allow them to do their work safely.

What you need to do

44. Poor control of contractors is a common factor in accidents; proper management of their work will reduce the risks to your own employees, visitors and the contractors themselves. Contractors may include:
- veterinary staff;
 - delivery/collection staff;
 - building/maintenance contractors;
 - service engineers;
 - scientists/researchers;
 - diving contractors.
45. You must be aware of everyone that is coming onto your site to work, know what they will be doing and how, and the level of risk from their activities. For further information regarding the control of contractors see the HSE guidance document: Using contractors: A brief guide¹¹. See 'References and further reading'.
46. Remember that depending on the work they are to do and their knowledge of the hazards in your business, contractors may be at particular risk. They may be strangers to your workplace and even regular contractors will need reminding. The level of control needed will, of course, be proportionate to the complexity of the task e.g. a person conducting Display Screen Equipment (DSE) assessments in an office environment will need less monitoring and control than a person involved in electrical maintenance work on, around or inside animal enclosures.
47. You should have a system in place that allows you to know who your contractors are, that they are competent to do the work you are employing them for, exactly what they are doing and where. Ideally this will be centrally controlled to ensure consistency of management and a central point of contact for staff in the zoo. Contractor management is especially important when work is being done in potentially unique environments such as animal houses and enclosures, paddocks, aviaries, near or over water etc. and where there may be large numbers of visitors in the zoo.

Diving activities

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Diving at Work Regulations 1997 (DWR)¹²
48. You must ensure that no diving project is carried out unless that project is managed by a competent Diving Contractor (DC) and the engagement is made in writing. The DC must ensure, so far as is reasonably practicable, that the diving project is planned, managed, recorded and conducted in a manner which protects the health and safety of all persons taking part in that project.

What you need to do

49. Many zoos and aquariums have large pools and tanks that require access by divers. Diving is a high-risk activity and employers must ensure it is managed appropriately by a properly qualified and competent DC.
50. The HSE has published five Approved Codes of Practice (ACOP)¹³ relating to diving at work (See 'References and further reading'). Most diving in zoos will fall under the Scientific and Archaeological Diving Projects ACOP which will include day-to-day routine housekeeping such as simple cleaning.
51. Maintenance, construction and repair activities will be covered by the Commercial Inland/Inshore ACOP, and for media work the Media ACOP should be followed. It is important that the correct code of practice is followed for the project being undertaken.
52. Diving projects undertaken in zoos, normally fall within the category of 'benign conditions' as defined in the HSE Diving Information Sheet No 8¹⁴ (See 'References and further reading'). The DC will decide if the conditions in the Sheet are appropriate or whether other measures are appropriate. Diving in benign conditions is defined as:
- diving inland in a tank or pool artificially constructed for the purpose of swimming, diving, or for use as an aquarium or media facility;
 - where the diver is in full view from the surface at all times;
 - where no entanglement or entrapment hazards are present; and
 - where there is no interference from other activities, e.g. no scenery or set in media diving and no powerful or aggressive animals in fish storage tanks or aquariums, as justified by the risk assessment.
53. Prior to commencing a dive, a standard diving risk assessment should be carried out which should include any zoo-specific issues such as:
- Diving with animals:

- justification of the need to dive with animals present;
 - risk to the diver from the animals;
 - defensive behaviour/strategies for the diver;
 - potential for zoonoses;
 - plans to evacuate the water promptly if the animals begin to act in ways that cause concern to the keeper, dive supervisor or divers.
- Use of cleaning materials:
- the diver should first enter the water safely and the cleaning materials should then be handed to them from the top side supervisor;
 - any tasks involving hazardous substances should have a COSHH risk assessment if required and be checked by the dive supervisor to ensure they are compatible with use by divers;
 - any debris or foreign objects need to be collected in a collection bag and taken to the surface safely before exiting the pool to remove the need for further dives.
- Use of tools for maintenance and repair:
- all tools should be appropriate for their intended use, in good repair and safe for use underwater;
 - all tools should be counted in and counted out to avoid leaving tools in the dive tank necessitating further dives;
 - divers are to be trained and competent in the use of the tools they are using in the tank;
 - tools must be used in ways they were designed for and put away when not in use;
 - if dangerous animals have been moved out of the tank to allow work, doors must be secured and locked off before divers enter the water.
- Diving in confined spaces:
- the access and egress routes should be agreed prior to the dive;
 - emergency signals and procedures must be agreed with all team members;
 - plans must be in place for removing a potentially incapacitated diver from the confined space in an emergency;
 - tethers or harnesses should be worn as appropriate for the operation;
 - any machinery in the area the diver may potentially come into contact with should be locked and tagged off;

- divers could potentially suffer from thermal stress during long jobs, so monitoring and regular breaks are essential.
 - Diving in poorly lit spaces:
 - light spaces as much as possible using specialist underwater lighting;
 - divers should wear and use torches or head torches;
 - if adequate lighting to ensure safety cannot be provided the project should be postponed until it can be adequately lit.
 - Theming/obstacles in the tank:
 - divers should be made aware of the locations of all obstacles and theming in the tank and made aware of any hazards these may present to them;
 - divers should be aware of any parts of any theming that may move unexpectedly.
 - Access and egress to the tank:
 - divers should be briefed and given all necessary detail about the tank they will work in and any peculiarities that may affect their entry or exit;
 - entry and exit points from the tank should be kept clean, free from hazards, with handholds where possible.
54. For more information on the safe management of diving see 'References and further reading'.

Case study: diving checks and double checks

A buddy team were carrying out a cleaning dive in a large aquarium tank. After diving for around 15 minutes, a diver bumped the concrete rockwork and immediately noticed that she was inhaling water. She realised that the mouthpiece had detached from the regulator and her primary air supply was sinking down to her side. The same thing had happened to the secondary air supply and, unable to signal her buddy, she had to make a controlled ascent to the surface.

The investigation discovered that the external technician had not placed cable ties on any of the regulator mouthpieces of the regulators when servicing the kit. Neither the diver nor buddy check had noticed the missing cable ties, suggesting that regular diving as a team had made them complacent about the checking procedures. The diving team were re-trained on the importance of thoroughly checking their own and their buddy's diving equipment before every use and of maintaining buddy contact during dives. They also ensured the servicing technician replaced the black cable ties with a contrasting colour to help easy identification during the checks.

Case study: sharing a diving tender

A site needed to clean multiple exhibits using SCUBA equipment. Dive buddy teams were put in place in two separate exhibits with a surface tender at each location. Short staffing meant only one tunnel/ window tender was available and had to be shared between the two simultaneous dives.

In an emergency, sharing the tunnel tender could have slowed communication of problems to the surface support or management teams, leading to a delay in urgent care being received.

The risk assessments for the different tasks and locations were reviewed. Divers were re-trained in safe working procedures and minimum safe team numbers specified for each task type and work area. Staffing of cleaning tasks is now prioritised, with only one dive allowed if there are insufficient numbers for simultaneous dives.

Lone working

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
- The Management of Health and Safety at Work Regulations 1999⁶
- 55. Employers are required to ensure the health, safety and welfare at work of all their workers and this includes those working alone. HSE defines lone workers as ‘...those who work by themselves without close or direct supervision.’
- 56. They also have responsibility for the health and safety of any contractors or self-employed people doing lone work for them.
- 57. Risk assessments and management strategies must consider the hazards peculiar to those working alone and ensure controls are in place to eliminate or reduce the risks from them. These assessments must be conducted, and controls put in place before the lone working starts.

What you need to do

- 58. Lone working can increase the risks from hazards for employees. Whether lone working is appropriate for the hazard level of the work being undertaken must be considered during the risk assessment phase and, where it is to go ahead, it should be managed carefully to ensure that any heightened risk levels are managed and controlled.
- 59. Work activities in zoos where employees may be put at higher risk and where lone working should be carefully considered may include but would not be limited to:
 - any working at height e.g. cleaning enclosures;
 - activities involving dangerous animals or their enclosures;
 - use of potentially hazardous equipment or machinery e.g. food prep;
 - where the potential for violence or aggression exists e.g. admissions staff, security staff;
 - where the employee is more vulnerable e.g. pregnant, young, disabled etc;
 - where the worker may be exposed to dangerous chemicals or hazardous substances e.g. veterinary staff.
- 60. Where staff are required to work alone there must be regular monitoring to ensure they remain safe. These may include:
 - regular and robust, time stamped 'check in' systems using phones, radio etc;
 - periodic visits by colleagues/supervisors;
 - robust reporting and checking systems with appropriate follow-up procedures to record on and off-duty status.

61. Further information on managing lone workers can be found in the HSE guidance document *Working Alone Health and safety guidance on the risks of lone working*⁵⁴. See 'References and further reading'.

Machinery/plant/equipment

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Provision and Use of Work Equipment Regulations 1998 (PUWER)¹⁵
62. You must ensure that all machinery, plant, equipment and tools provided for people at work are:
- suitable for their intended use;
 - safe for use, maintained in a safe condition and inspected to ensure they are correctly installed and do not subsequently deteriorate;
 - used only by authorised people who have received adequate information, instruction and training;
 - accompanied by suitable health and safety measures, such as protective devices and controls. These will normally include emergency stop devices, adequate means of isolation from sources of energy, clearly visible markings and warning devices;
 - used in accordance with specific requirements for mobile work equipment or other specific legislation.

What you need to do

63. Every zoo uses machinery, plant and equipment that may range from tractors through office equipment and mechanical lifting equipment to small hand tools. It is vital that you ensure that only competent and authorised people use and look after work equipment and that the equipment is fit for purpose, properly maintained and in good condition.
64. All employees using machinery should have their competence checked to ensure they:
- know how to check that the machine is set up correctly and is safe for use;
 - are familiar with the risk assessment for the equipment;
 - know when and how to use the appropriate guards and safety features;
 - are able to use the machine safely and in accordance with their training;
 - know how to use any appropriate protective clothing and equipment identified as necessary by the risk assessment for the machine;
 - know what conditions would make the machine unsafe to operate.

65. Using machinery, plant or equipment near or in an animal enclosure may cause the animals to behave unexpectedly and create risks to the health and safety of employees or others.
66. Machinery, tools and equipment can be used inadvertently or deliberately as weapons or means of escape by animals and cause serious injury to staff. When they are used inside an animal enclosure, they must be rigorously controlled to ensure both they and all their parts are removed from the enclosure before animals are readmitted to the area where work was carried out.
67. All machinery, plant, equipment and tools must be stored in a secure area when not in use to prevent access to it by unauthorised or untrained employees or members of the public.
68. Further information on the safe use of work equipment can be found in the HSE guidance document 'Provision and Use of Work Equipment Regulations 1998'¹⁵. Approved Code of Practice and guidance'. See 'References and further reading' and the HSE website at www.hse.gov.uk



(Tree Management: Marwell Zoo)

Controlling substances that are harmful to health (COSHH)

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Substances Hazardous to Health Regulations 2002¹⁶
69. You must, before you use or expose people to any substance that is potentially hazardous to health, conduct an assessment in accordance with the COSHH regulations and take measures to eliminate or if that is not possible, control exposure to the substance so far as is reasonably practicable.

What you need to do

70. You need to identify all the work activities in and around the zoo and where there is a possibility that a person may come into contact with a potentially harmful substance. You should in each case conduct a COSHH assessment.
71. As well as the more common harmful substances found in workplaces, working in zoos will sometimes expose people to a variety of unusual hazardous substances often related to working with animals. These may include:
- animal by-products e.g. venoms, saliva, blood, other body fluids and waste matter from animals;
 - dust and dirt from animals or their enclosures;
 - the waste from insects and vermin that live on and around the zoo's animals and their waste matter;
 - chemicals/drugs used in the husbandry and treatment of animals;
 - zoonotic pathogens, biohazards and infections from animals;
 - potentially harmful substances that may exist in dead animals being disposed of or prepared for feeding to others.
72. Harmful substances can get into the body in a variety of ways:
- breathing - working in dusty atmospheres e.g. cleaning out an aviary;
 - skin contact - touching or being splashed by waste products or touching a contaminated surface during enclosure cleaning;
 - swallowing - people eating or smoking without washing hands after contact with animals or cleaning their enclosures etc;
 - via the eyes – pathogens or caustic cleaning fluids;
 - puncture wounds - needlestick injuries carrying pathogens, drugs or oil-based inoculations.

73. You need to conduct COSHH assessments to identify what the hazards are in the workplace, how people are exposed to them and how they can cause harm in the way you are using them. You must include visitors and contractors in the assessments if they may be exposed.
74. The HSE guidance for COSHH contains a structured hierarchy of control designed to comply with the legal requirements and you should follow the process outlined in it and do whatever is reasonably practicable to control the hazards using the highest step possible on the hierarchy:
- Eliminate - You should examine the work process carefully to decide if it is something you must do and if not, then don't do it. Also look at the individual parts of the work to see if they are all necessary;
 - Substitute - Can you use a less hazardous substance or method of work e.g. use a liquid rather than a powder? Use a pour-on rather than an injection for worms? Can you use specialist cleaning equipment rather than brushes to clean out aviaries?
 - Engineering controls - Can you use an engineering solution to eliminate or reduce people's exposure to hazardous substances e.g. use local exhaust ventilation (LEV) systems in labs and food prep areas to remove pathogens and dusts?
 - Administrative controls - Can you change the way people work to reduce their exposure to hazards e.g. look at work processes to see if the time spent in the hazardous area can be reduced, can you provide effective hygiene facilities close to the work area?
 - Personal Protective Equipment (PPE) - PPE should be regarded as the last resort if you cannot reduce the risk to acceptable levels by any other means e.g. using respiratory protective equipment (RPE) when working with hazardous chemicals such as formalin or other disinfectants, using suitable gloves when handling animals that may create a risk to health through saliva, secretions etc.
75. COSHH assessment is another version of risk assessment and you should review your assessments regularly and after every incident to ensure you are controlling the risks in the most effective way possible.
76. Further information on COSHH can be found in the HSE guidance document 'Working with substances hazardous to health - A brief guide to COSHH'¹⁷. See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: a lack of clarity about chlorine

A keeper noticed deteriorating water clarity in an enclosure and, although there were no animal welfare concerns, wanted to improve the look of the pool for visitors.

The zoo's pool management team advised the keeper to add flocculant to the system to remove suspended solids and improve the water clarity. The mild bleach used by the pool management team to clean the bag filters reacted with the flocculant to generate chlorine gas in the plant room.

Although no ill health effects occurred, the incident investigation found that no COSHH risk assessment had been completed before purchasing and using the new product to ensure that it was suitable and that appropriate controls had been put in place. A full review of the zoo's processes for purchasing, using and disposing of hazardous substances was carried out by the Facilities Team. Purchasing approval was restricted to a small group of trained managers, and COSHH risk assessments were carried out for all tasks involving use of chemicals or other hazardous substances. Training in how to work safely with hazardous substances was made mandatory for all staff and pool plant operator training was provided for teams working with electro-chlorination systems.

Dangerous substances and explosive atmospheres (DSEAR)

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Dangerous Substances and Explosive Atmospheres Regulations 2002¹⁸
77. You are required to identify all dangerous and explosive substances in your workplace and put in place measures to remove them or control the risks they create. You must also put in place plans to deal with accidents, incidents and emergencies and ensure your staff are informed about, trained and are competent to control or deal with those risks.
78. You must also identify and classify areas of the workplace where explosive atmospheres may occur and avoid ignition sources.
79. You must conduct a DSEAR risk assessment and put in place the necessary control measures. If you employ five or more people, this assessment must be in writing.

What you need to do

80. Most zoos will contain areas where dangerous or explosive atmospheres can or will be created and these may include:
- where flammable gases e.g. LPG, oxygen, acetylene are stored and used;
 - where foodstuffs containing flour or grains, or their dusts, are prepared or used;
 - where paints or solvents are stored or used;
 - where combustible dusts e.g. from wood are created e.g. during delivery, sweeping and disposal;
 - where potentially combustible dusts from dry animal waste products are created e.g. during cleaning, sweeping and disposal;
 - if there are dangerous or potentially flammable/explosive chemicals used on site for particular processes such as ammonia for cooling.
81. You should:
- ensure you know what and where the dangerous substances are in your workplace and that you know what the risks from them are;
 - classify the areas of the workplace where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas;
 - identify and put in place the control measures necessary to eliminate the risks or, where this is not possible, control them;

- put controls in place to reduce the effects of any incidents involving dangerous substances should your controls fail e.g. provide breathing apparatus and train staff in how to use it, explosion relief panels, fire control systems;
 - prepare plans and procedures to deal with accidents, incidents and emergencies involving dangerous substances;
 - ensure your employees are properly informed about and trained to control or deal with the risks from the dangerous substances.
82. Further information on managing dangerous substances and explosive atmospheres can be found in the HSE guidance document 'Dangerous Substances and Explosive Atmospheres Regulations 2002 Approved Code of Practice and guidance'¹⁸. See 'References and further reading' and the HSE website at www.hse.gov.uk

Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE)

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Personal Protective Equipment Regulations 2002¹⁹ and The Personal Protective Equipment at Work Regulations 1992 (as amended)²⁰
83. You are required to assess the risks to people's health and safety from work and then eliminate or control those risks. Where possible, control must be achieved by collective protection, engineering controls or safe systems of work but where this is not reasonably practicable or adequate levels of control cannot be achieved, you must provide appropriate PPE.
84. If you provide PPE you must:
- ensure it is appropriate to control the risks identified in the risk assessment;
 - provide it to your employees free of charge;
 - ensure your employees know why they must use it, how to fit, use and maintain it properly and how to identify and report faults;
 - provide storage facilities to ensure the PPE does not degrade when not in use.

What you need to do

85. Your workplace may contain various hazards: machinery, vehicle movements, dust, potentially harmful chemicals, pathogens, high noise levels etc. The need for PPE to control a risk can be identified in routine or more specific types of risk assessment: COSHH, noise, manual handling and so on. Ensure that the PPE you provide for employees is suitable to control the hazard you identified.
86. Any uniform or clothing that protects against a specific risk to health and safety will be classed as PPE. This will include coveralls, eye protection, footwear, hand and arm protection, safety helmets, wet weather clothing, hearing protection and respiratory protective equipment (RPE).
87. For many zoo tasks, especially those requiring direct contact with animals, the risk assessment may show PPE to be the only realistic option to protect workers. In those circumstances care must be taken in the choice of PPE to ensure it will control all the risks identified. Such work may include:
- cleaning animal enclosures/shelters and disposing of animal waste and animal food waste;
 - helping animals with the birthing process and handling the products e.g. fluids and placenta etc;

- examining animals' mouths or carrying out rectal examinations;
 - handling tissue or bodily fluid samples;
 - preparing dead animals for feeding to others;
 - working in noisy enclosures;
 - handling animal foodstuffs;
 - use of hazardous chemical substances, e.g. disinfectants or wood preservatives.
88. When choosing PPE, you should ensure you consider the particular problems in zoos which may include:
- it must be effective against the hazard being controlled and give adequate protection against the extra hazards in the workplace, e.g. protective gloves may need adequate cut resistance on the top of the hand as well as the palm if handling birds that may bite, or other biting animals;
 - adequate stocks of replacements should be available, especially when it is used for heavy manual work or when handling animals, and may degrade or need replacement more quickly than in normal use;
 - the PPE must be suitable, fit the wearer, the task and the working environment. This is particularly important when used in close contact with animals so that it causes minimal hindrance to the user's movement and does not cause any discomfort to the employee or the animals being worked with. PPE which fits comfortably is more likely to be worn;
 - it must not introduce any additional risks, e.g. limiting the visual ability of the wearer when they are around animals or enclosure slides and doors, causing heat stress (e.g. in tropical houses), limiting hearing of colleagues or emergency instructions;
 - is compatible with any other PPE that must be worn; e.g. safety glasses may interfere with the fit of respirators.
89. Further information on the provision and use of PPE can be found in the HSE guidance document 'Personal protective equipment (PPE) at work - A brief guide'²¹. See also 'References and further reading' and the HSE website at www.hse.gov.uk

Public safety

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
- The Management of Health and Safety at Work Regulations 1999⁶

90. You must, so far as reasonably practicable, ensure the health and safety of members of the public visiting your premises or otherwise affected by your activities, e.g. the occupiers of surrounding properties. You must carry out a risk assessment of your work activities, which must include assessment of risks to non-employees.

What you need to do

91. You will need to look at all the things your visitors do and the places they can access and then assess and control the foreseeable risks to them. When assessing these risks, you should consider their lower levels of knowledge and familiarity with the hazards and risks from your work, as well as other relevant factors, for example their age or mobility issues.
92. Prior to visits by schools and similar groups, the zoo should send details of hazards, how they are managed and how visitors should behave to ensure their safety. This should include detail around responsibility for the supervision and control of groups.
93. There is useful guidance on the safety of the visiting public in Section 8 of the Secretary of State's Standards of Modern Zoo Practice³.

Foreseeable misuse

94. Your visitors will be representative of a diverse cross section of society with a variety of abilities and behaviours, for example under the influence of legal or illegal substances. You are not required to remove all risk and will not normally be held liable for unforeseeable or reckless behaviour. You should however ensure you have done all you reasonably can to eliminate or reduce the risks of harm that people are or could be exposed to from foreseeable, deliberate or unintentional misuse of your facilities.
95. You should anticipate foreseeable misuse when selecting or designing processes, equipment, enclosures, facilities, structures, buildings, fencing, pathways, decorations, theming, etc.
96. When preparing risk assessments, you should make every effort to anticipate ways in which the public may deliberately misbehave or misuse equipment or facilities and consequently be exposed to risk.
97. When designing control measures, do not rely solely on the public to behave in accordance with instructions or signage. You should ensure that any potential hazards are suitably signed and also made as inaccessible as possible.

Public pathways

98. Many zoos are open all year, will be mainly outdoors, cover large areas and have public areas and pathways which are open to the elements. These may become hazardous in certain weather conditions such as ice and snow and when wet leaves may accumulate etc.
99. To reduce the risks to staff and visitors you should consider the following when designing or refurbishing new pathways:
- cover paths and public areas with canopies to protect them from the elements;

- selection of materials i.e. use of low maintenance, slip resistant surfaces or treatments and avoiding surfaces that can break up or become slippery when wet e.g. wood;
 - route paths to take advantage of natural drainage and build them with a camber to ensure water runs off and away without forming pools or muddy areas.
100. You should have measures in place, especially on large, exposed sites, to ensure the premises are safe before the public are admitted. These may include:
- a manageable plan to allow the zoo to be opened in stages so the public areas can be progressively treated or cleared;
 - redirected pathways to keep people away from hazardous areas;
 - ensuring the most popular areas, the areas with slopes and inclines and the areas with the highest risk of slips or falls are made safe first.

Case study: safe access for all

Slips, trips and falls are common causes of injury to zoo staff and visitors, so providing safe, accessible paths is essential when designing and installing animal enclosures. By using an overhead walkway built into the natural ground contours, a zoo linked three existing animal enclosures to create a themed walkthrough complex. The entire walkway was built from low maintenance, non-slip composite board to minimise the risk of slips and falls. To enhance the visitor experience, a viewing area was formed from a converted vintage army truck set over a small pond. One side of the truck was removed, and a wide ramp and steps introduced to allow safe and easy access.

Stand-off barriers

101. Stand-off barriers should be designed and positioned to prevent people getting through, under or over them and which discourage people from sitting or leaning on them to take photographs, or to try to touch the animals (see section above on Foreseeable Misuse).
102. Design signage and theming to sit flush on stand-off barriers so they do not create hazards on pathways, especially for children.

Theming

103. Educational or decorative theming should be designed so that it will be secure and safe in use and create no hazards to the public. It should be inspected regularly to ensure it has not been damaged or degraded and become unsafe.

Reporting and investigation of accidents and serious incidents

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴.
 - The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013²².
104. You must report certain incidents and cases of ill health arising out of or in connection with work, to the relevant enforcing authority. This includes accidents involving the death of any person and accidents to employees who sustain a specified major injury e.g. a fracture, loss of consciousness etc. or who are incapacitated for work for a specified number of days. Accidents to members of the public caused by your work activities are also reportable if the injured person is taken directly to hospital and receives treatment beyond diagnostic tests.
105. More information about what types of accidents and injuries must be reported can be found in the HSE guidance document 'Reporting accidents and incidents at work - A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)²².' See 'References and further reading' and the HSE website at www.hse.gov.uk

What you need to do

106. Incidents and near misses at work can provide an indication of how well health and safety is being managed: recording and investigating incidents allows you and others to learn from them. Certain incidents are required by law to be reported to the appropriate enforcing authority.
107. An accident is work-related if any of the following played a significant role:
- the way the work was carried out;
 - machinery, plant, substances or equipment used for work was involved;
 - the condition of the site or premises where the incident happened was a factor.

How to report

108. Information on how to report different types of incident is given in the HSE guidance document 'Reporting accidents and incidents at work - A brief guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR)²².' See 'References and further reading' and the HSE website at www.hse.gov.uk

Accident investigation

109. It is important to investigate accidents so their causes can be identified, measures put in place to prevent them happening again and so your management system can take account of where things are going right and wrong. Advice on accident investigation can be found on the HSE website at: <http://www.hse.gov.uk/managing/delivering/key-actions/accident-incident.htm>

Slips and trips

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Workplace (Health, Safety and Welfare) Regulations 1992²³
110. You must take all reasonably practicable steps to ensure that your workplace is maintained and managed so that people are not exposed to risks to their health and safety from slips and trips.

What you need to do

111. Slips and trips are the most common cause of injury at work generally and can have a serious impact on people's lives. On average, they cause over a third of all major injuries and can lead to other types of accidents, such as falls from height or injury from work equipment or tools.
112. Slips and trips account for most of the reported injuries to members of the public in zoos. They can happen both inside and outdoors in public areas or on pathways.
113. Areas where there is a significant risk of people slipping or tripping should be assessed to determine what control measures can be put in place to control that risk.
114. Factors most commonly associated with slips include:
- inappropriate flooring material, path or walkway surfaces;
 - worn out or badly maintained surfaces;
 - water, grease or other contaminants on the surface;
 - animal behaviour creating changing floor conditions e.g. burrowing;
 - inappropriate footwear.
115. Factors most commonly associated with trips include:
- uneven or poorly maintained floors, paths or walkways;
 - untidy or obstructed work areas or traffic routes;
 - poor or badly designed lighting;
 - distractions, e.g. signs, VDUs, windows;
 - poorly maintained steps and handrails;
 - poorly sited and marked low fences or walls;
 - inappropriate work equipment;

- poor or badly designed lighting.
116. Things you should consider when deciding how to control the risks from slips and trips will include:
- keeping work areas, walkways and corridors free from obstructions, such as trailing cables, sacks or pallets, and ensuring there is enough secure space for storing tools and materials;
 - keeping your buildings in good repair (see sections on building work and maintenance);
 - prevent contamination of floors e.g. from animal food, liquids, powders/dust, leaves and dirt;
 - designing tasks to minimise spillages and, if they cannot be prevented, control the contamination, e.g. by containing it and ensuring regular effective cleaning;
 - providing good drainage in animal houses where floors are regularly washed and keep outdoor routes clear, e.g. salted, sanded or swept during icy conditions;
 - ensuring that spillages are cleaned up quickly using a suitable method (have spillage kits available), putting up warning signs and having procedures in place for both routine and responsive cleaning and maintenance;
 - preventing access to wet floors and ensuring the correct cleaning methods and products are used. Routine wet cleaning should happen outside of times when public and other staff access the area;
 - installing and maintaining handrails on stairs and ramps to reduce slips and trips;
 - ensuring changes of level such as stairs, steps and ramps are well marked and maintained in good condition;
 - carrying out regular inspections for trip hazards, such as uneven ground or trailing cables, and encouraging good housekeeping;
 - ensuring employees wear suitable footwear;
 - ensuring ground surfaces are suitable, drain well, and are constructed of a material that does not become dangerously slippery when wet. This is particularly important on dedicated public walkways;
 - having procedures in place to clear overnight leaf or snow fall from walkways prior to permitting public access;
 - providing adequate and suitable lighting. Using natural light where possible and trying to avoid glare. Moving suddenly from light to dark and vice versa increases the risk of slips and trips. Well-lit outside areas will also help security;

- warning people of slip risks by using signs and putting suitable absorbent doormats where surface changes occur, e.g. when coming in from wet outside walkways into dry café areas;
 - adding tread markers or other floor markings to indicate changes in level and slopes;
 - consulting and getting input from your employees about issues that affect them e.g. choice of footwear or changes in cleaning methods.
117. To help identify slip and trip risks, encourage employees to report damage to floors or walkways, and to clean up spills and remove trip hazards quickly.
118. Further information on managing slips and trips in the workplace can be found on the HSE webpage 'Slips and trips'²⁴. See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: reducing slip risks in a zoo shop

The Retail Manager noticed several visitors and staff slipping in the zoo shop during wet weather. To reduce rain pooling outside the shop door, the Estates team built an external canopy and installed additional non-slip drainage channels. A specialist contractor helped the manager to identify options for reducing the likelihood of slips on wet or muddy flooring. A combination approach was recommended and installed: an external mat to catch most of the water, followed by an absorbent mat inside the doorway to clean any remaining dirt and liquid from footwear. The manager made up a kit containing cleaning equipment, wet floor signs and portable extendable barriers and stored it nearby so spills could be removed promptly.

Working at height

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Work at Height Regulations 2005⁵⁵
 - Working at height; a brief guide INDG401 (rev 2) 2014²⁵
119. You must avoid work at height where it is reasonably practicable to do so. If work at height is not avoidable, you must prevent falls by using either an existing safe place of work or the right type of equipment for the activity. Where the risk of falling cannot be eliminated, you must minimise the distance and consequences of any fall by using suitable equipment.

What you need to do

120. Falls from height are one of the biggest causes of workplace fatalities and serious injuries. Work at height means work in any place where, if there were no precautions in place, a person could fall a distance liable to cause personal injury. Common factors in falls from heights are:
- working from ladders;
 - working on fragile or damaged roofs with glass or plastic roof lights;
 - unmarked openings in floors, raised surfaces or holes in the ground.
121. All working at height must be risk assessed to ensure the appropriate controls are identified and put in place. The Work at Height Regulations requires that risk control measures for working at height be decided in line with a hierarchy of controls which must be followed:
- only do work at height that is necessary and cannot be done in another way e.g. do not manually clean building roofs, only wash windows from the ground. If you must do the work at height, find a way to do it that does not put people at risk;
 - carry out the work from an existing place of work e.g. if you need regular access to a high workplace such as glass roofs, you should construct a safe workplace with safe access routes to it;
 - take measures to prevent a fall occurring e.g. use a mobile elevating work platform (MEWP) or scissor lift where possible, use mobile scaffold towers or provide trained staff with fall arrest equipment;
 - minimise the distance and the consequences of any fall e.g. use airbags, nets, train staff to use fall mitigation equipment;
122. Access to ladders should be rigorously controlled to ensure they are used only by those people competent to use them on approved tasks. They should only be used

for work at height that is of low risk and short duration and a safer method of access is not reasonably practicable. Like all work equipment, ladders should be inspected regularly and before each use, and maintained to ensure they are safe for use.

123. For more information on safe ladder use see the HSE guidance document 'Safe use of ladders and stepladders - A brief guide'²⁶ at 'References and further reading' and the HSE website at www.hse.gov.uk
124. Activities where zoo employees may be exposed to risk of falling from height may include but will not be limited to:
- arboriculture (tree work);
 - construction, maintenance and inspection of enclosures, aviaries, fences or glasshouses;
 - construction or maintenance of features within the enclosures such as play equipment, including climbing frames and platforms;
 - keepers feeding from high platforms;
 - cleaning of perches, windows and other features in enclosures;
 - loading of enrichment or feeding devices at height;
 - roof work;
 - when involved in recapturing escaped animals.
125. In all cases and before any work at height is carried out you should:
- thoroughly assess and plan the work to ensure the equipment selection hierarchy requirements are complied with;
 - ensure those involved in the work at height are competent both in the work and in the use of the equipment used to gain height;
 - the equipment to be used for work at height is in good condition and has been properly maintained;
 - the risks of working on or near fragile surfaces are properly managed;
 - where emergency access to high areas is required (e.g. during an escape/recapture), a specific risk assessment is undertaken beforehand to identify hazards and appropriate risk controls, and staff are trained to conduct dynamic risk assessment as the work progresses;
 - what type of work is being carried out at height - is it hazardous, e.g. animal handling, work above an occupied enclosure or use of machinery/powered tools?
 - the competence of those involved (e.g. training; familiarity with site);
 - the specific systems of work and equipment to be used;

- the work environment and weather conditions;
- safe access routes: it is better to use a dedicated route, e.g. an internal stair rather than a ladder;
- selection, use and inspection of work equipment;
- barriers or harness rails for areas that are accessed regularly: measures which protect everyone are better, e.g. protective barriers rather than fall arrest harnesses.

(Safety netting incorporated into high level working areas of a new giraffe house while under construction: RZSS Edinburgh Zoo)



Design in safety

126. When planning new-build or refurbishment projects, clients and designers (often zoo staff) have duties under the Construction (Design and Management) Regulations 2015⁸, to consider the need for work to be carried out at height over the lifespan of a building, e.g. to clean, service, maintain, inspect and repair it. They must design out the need to work at height wherever reasonably practicable to do so e.g.:
- the roof vent motors of a 12 m tall glasshouse containing pools with crocodiles could be maintained by installing an expensive high-level gantry, but it would be cheaper and safer to install drive motors at low level with easy access and no need to work at height above a Category 1 animal;
 - giraffe browse feeders or racks could be secured to the wall for keepers to load using stepladders or by throwing the browse up, or they could be fitted with winches to allow them to be loaded from ground level and so vastly reducing the risk of the keeper falling.
127. Further information on safe working at height can be found in the HSE guidance document 'Working at Height – A brief guide'²⁵. See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: safe access to clean and maintain an animal enclosure at height

Unsafe conditions presented work at height risks for keepers and gardeners working in a primate enclosure:

- a narrow ledge and low parapet wall above a natural cliff feature, which was accessed by staff to trim vegetation and remove animal faeces and waste food;*
- the main animal display and rope climbing structure on a central rocky outcrop bounded by two steep sides and a shallow moat;*
- a narrow rock ledge used regularly for cleaning the main viewing windows.*

Following a comprehensive risk assessment, additional controls were implemented:

- Work at height was avoided by fitting the mesh-walled keeper corridor running along the top of the cliff ledge with several opening flaps to allow rear access from ground level. A mesh roof was added to the corridor to form a safety cage in the event of animal escape through the flap during cleaning.*
- A safe access area on the central outcrop was marked using paint, and edge protection barriers formed using rope and wooden posts.*
- Harness anchor points were fitted by a specialist contractor at regular intervals along the viewing window wall. Double lanyard fall arrest harnesses were purchased and several keepers trained in their use, maintenance and visual inspection. The harnesses were added to the zoo's LOLER inspection scheme to ensure their ongoing safety.*
- The updated safe work procedure was discussed jointly by the two departments to make sure everyone entering the enclosure understood how to use and report any problems with the new risk controls.*

Working in or around water

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
- The Management of Health and Safety at Work Regulations 1999⁶
- The Workplace (Health, Safety and Welfare) Regulations 1992²³

You must take reasonably practicable measures to ensure that people affected by your work are not exposed to risks to their health and safety.

You must ensure that people can where necessary, safely carry out their work in and around water and that the risks involved in these activities are controlled.

What you need to do

Approximately 400 people a year die from drowning in the UK. Most good guidance recommends that physical barriers be erected to prevent unintended access to water that may pose a risk to the safety of people, but in zoos this may not always be possible or reasonably practicable.

Duty holders are required to eliminate the risk of people drowning and where this is not possible, to reduce the risk so far as is reasonably practicable.

Activities that may require access to areas close to water may include but not be limited to:

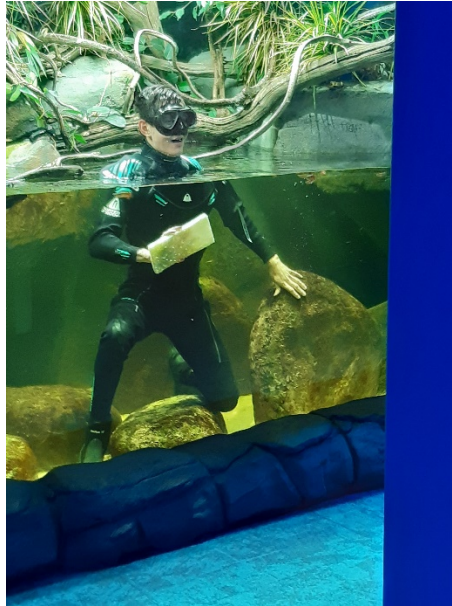
- Clearing litter/debris etc.
- Enclosure perimeter checks
- Checking animal health/veterinary procedures
- Feeding
- Maintenance/cleaning work on the enclosure or its mechanical equipment

Activities that may require non-diver access to water may include but not be limited to:

- All the above
- Viewing of animal exhibits by the public
- Catching live/dead animals

The controls for public access to ponds/aquatic exhibits should be walls/fences of adequate height. Your risk assessments must wherever possible seek to prevent people entering water where there is a risk of drowning and if they do so deliberately or inadvertently, to prevent or where that is not possible, control risks to their health and safety. The assessments must be conducted in all areas and on all activities where people get into or could fall into deep or fast-moving water or in other situations where they could foreseeably be at risk of harm.

Wherever possible, in places where it is necessary for people to work in areas close to water where there is a risk of harm, there should be physical barriers to prevent access. If this is not possible other measures must be taken to eliminate or, if not possible, control that risk. Measures must also be in place to allow trained personnel to conduct a swift and safe rescue should a person get into the water. Risk assessments should carefully consider whether lone working is appropriate in areas where a person may be working close to water.



(Keeper cleaning aquarium: Rob Jones)

Where it is necessary for a person to work in water where there is a chance of them suffering harm, the activity should be risk assessed to ensure the work is necessary and that it cannot be done in a safer way. During the work there should be another person present who is trained and equipped to carry out a safe rescue and be in a position to immediately do so or to summon further help where this is not possible.

Wherever possible, water features should be designed, or be retro fitted, to allow a person to self-rescue i.e. steps or sloping banks. They should also be designed such that a person cannot become trapped on or in any part of them.

Advice on providing personal buoyancy equipment and its use and applicability can be found in the HSE guidance document 'Personal buoyancy equipment on inland and inshore waters'²⁷. See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: safe access onto an island enclosure

When designing and theming enclosures, zoos can be tempted to prioritise animal welfare and attractiveness to visitors over practical concerns with deep water, steep slopes and heavy shrubbery commonplace. These features can present risks to keepers and maintenance staff when accessing the enclosure for husbandry or maintenance tasks.

Keepers kept these risks in mind when designing an island pygmy marmoset enclosure set above a deep aquarium tank. The risk of falling into the water was reduced by installing a safe entry point to the on-show area through the back wall of the enclosure. To avoid having to enter via the aquarium below, staff walk onto the island using secure, camouflaged stairs. Access is restricted to a small group of trained staff wearing fall restraint harnesses and lanyards clipped to a secure anchor point by the entry door. Lone working is prohibited, and all keepers carry radios. An emergency rescue plan has been prepared and is tested annually.

Workplace transport/traffic routes

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Workplace (Health, Safety and Welfare) Regulations 1992²³
128. You must take reasonably practicable measures to ensure that people affected by your work are not exposed to risks to their health and safety.
129. You must ensure that people and vehicles can circulate in the workplace in ways that do not create risk.

What you need to do

130. Workplace transport accidents are a common cause of death and serious injury in the workplace. All good guidance recommends segregating people from vehicles so far as is reasonably practicable. For more information on workplace transport safety, see the HSE document 'A guide to workplace transport safety'²⁸ at 'References and further reading'. More guidance can be found at www.hse.gov.uk
131. Many types of vehicles operate in zoos including:
- lorries of various sizes;
 - tractors, with or without trailers;
 - lift trucks and other types of mechanical plant and handling equipment;
 - utility vehicles such as All-Terrain Vehicles (ATVs), golf buggies etc.;
 - cars and coaches in visitor car parks;
 - leisure vehicles such as road trains/miniature railways/monorails etc.
132. The HSE guidance referred to above contains guidance about standard vehicle operations, but zoos have particular hazards involving vehicle movements including:
- limited but necessary vehicle movements when visitors are on site;
 - the possibility of collisions with animals;
 - reversing operations/blind spots or poor visibility especially near staff involved in animal movements;
 - external vehicle operators lack familiarity with zoo-specific hazards and emergency procedures;
 - accidents involving leisure vehicles.

133. Your workplace transport risk assessments must consider all the activities involved in the management of vehicles when on site. As with contractor control, it is important that you know what vehicles are on your site at any time, who is in them and what they are doing:
- mark the traffic and pedestrian movements on a plan so you can see where pedestrians and vehicles interact;
 - identify improvements that will reduce the possibility of contact between pedestrians and vehicles;
 - remember to include less frequent tasks, e.g. contractor visits;
 - ensure you consider delivery drivers as they are particularly vulnerable and can pose greater risks to others because of unfamiliarity with the site.
134. As part of your control strategy you should consider the safety of the site, the vehicle and the drivers.

Safe sites

135. Since traffic routes in zoos can sometimes be very narrow and may involve steep inclines and tight bends, the segregation of vehicles and pedestrians is very important. You should consider the following in your planning and control to prevent workplace transport accidents:
- clearly mark traffic routes so drivers and pedestrians know what to expect;
 - have a clearly marked and enforced speed limit;
 - reduce vehicle operations as far as possible during public opening hours;
 - provide separate routes for pedestrians and vehicles where possible;
 - plan traffic routes around a one-way system so reversing is eliminated. If reversing cannot be avoided, have a system in place to ensure people are not at risk i.e. use reversing cameras, Belisha beacons, trained banksmen etc.
 - remove blind spots and other things that may restrict drivers' and pedestrians' ability to see one another e.g. remove vegetation, put up mirrors on corners etc.
 - provide clearly signposted crossing points where pedestrians can safely cross traffic routes;
 - use standard 'Highway Code' signs to indicate vehicle routes, speed limits, pedestrian crossings etc.;
 - ensure lighting is adequate where people and vehicles operate and that it is suitable for poor weather and darkness;
 - ensure road surfaces are well maintained;
 - ensure loading areas are kept clear of unnecessary pedestrians, are level and exclude the public;

- manage and enforce speed limits passively (speed bumps) and actively (disciplinary processes).

Safe vehicles

136. Vehicles in zoos, whether road legal or not, must be safe and fit for purpose. You should consider the following when considering the safety of vehicles:

- ensure all vehicles are in good condition, well maintained and that all safety features and systems are working correctly;
- keep vehicles and keys secured to prevent improper/unauthorised use;
- ensure vehicles are both designed and suitable for the purpose for which they are used;
- ensure the vehicle was designed and is suitable for, the number of passengers it is carrying;
- rollover protective structures (ROPS) should be fitted if a risk of rollover is present. Operators should wear seat belts if using vehicles fitted with ROPS;
- reduce the risk of falls when climbing onto a vehicle or trailer by providing suitable access equipment such as steps or walkways;
- source or retro fit vehicles with reversing aids such as cameras or extra mirrors;
- source or fit vehicles with reversing warning systems, beacons, sirens etc.
- create and maintain a system to ensure all servicing, repairs and mandatory inspections are carried out.

Safe drivers

137. Safe and competent drivers are vital in ensuring a safe workplace. You should consider the following when managing drivers on your site:

- make your site rules and standards clear to visiting drivers. Deal promptly with those breaking your rules;
- ensure that all drivers/operators are qualified and competent to operate the vehicles they are using;
- operators of miniature trains, road trains etc. must be competent in all aspects of their operation and in managing the passengers;
- reassess driver/operator competence at regular intervals, e.g. every three years, or when new risks arise such as changes to working practices or the site layout;
- provide barriers and warning and advisory signs where they may reduce the risk of vehicles and pedestrians coming into contact.

138. Further information on managing workplace transport can be found in the HSE document 'A guide to workplace transport safety'²⁸. See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: tractor trailer rides

A zoo improved accessibility and visitor enjoyment by introducing a farm-themed trailer ride around their large site. An initial assessment identified several risks including: interaction of vehicles and pedestrians; falls from the trailer and exposure to loud noise and whole-body vibration for the driver and guard collecting tickets.

A suitable second-hand tractor with rollover protection and an adjustable suspension seat was purchased from a reputable dealer. A specialist company supplied a trailer with central seating secured to its floor, a rear wheelchair ramp, child buggy storage and mesh-infilled sides to allow safe viewing while preventing falls.

To avoid reversing and reduce the risk of pedestrians being injured, a circular, fenced route with clearly-marked pickup and crossing points was designed. The resurfaced route was compacted to reduce shocks. The guard travelled in the trailer each time to help with access and ensure that visitors remained seated. The guard carried a radio and used a green flag visible in the tractor mirror to signal that it was safe to move off, with a red flag used to alert the driver to any problems. Staff wore suitable hearing protection and swapped between activities regularly to reduce their noise and vibration exposure.

The trained and competent driver completed daily safety checklists, which were signed off weekly by the duty manager. The vehicles were serviced annually by a specialist dealer. The safe work procedure was discussed with the relevant staff and the site traffic risk assessment and associated management plan were updated to include the new ride.

Violence at work (see also Terrorism (p.107))

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013²²
139. You must consider the risk of violence and aggression directed towards your staff at work and eliminate it or if this is not possible, reduce it so far as is reasonably practicable. You must also provide suitable information, instruction and training in how to minimise these risks.

What you need to do

140. HSE defines violence to employees at work as 'any incident in which a person is abused, threatened or assaulted in circumstances relating to their work'.
141. It is important to recognise that the above definition covers verbal threats and abuse as well as physical assault, whether it is by members of the public, pressure groups or someone at work. Every reported incident should be treated seriously as even minor incidents may escalate if not addressed.
142. You must identify where there is potential for violence to all your staff, but certain groups may be at more risk:
- staff who handle money, for example in admissions/shops/kiosks/when banking takings;
 - keepers;
 - delivery staff;
 - security staff;
 - admissions staff
 - car park attendants;
 - new employees;
 - staff travelling on business within the UK or abroad e.g. on animal transports (particularly high profile) or high value or to conferences.
143. Certain circumstances may also increase the risk of violence, for example high profile or controversial breeding programmes, euthanasia of well-known animals or animal escapes.
144. Some incidents which occur outside a zoo's perimeter will still be work-related. For example, staff may face adverse public reaction when taking animals to an external event or presenting at conferences. It is important that managers are aware of all possible instances where work-related violence might take place. Managers with

employees in high risk positions should seek advice from the crime prevention officer at their local police station.

145. Staff should be briefed and consulted regularly to ensure they know how to report acts of violence and aggression and what the zoo's policies and procedures are for dealing with it.
146. You should have a clear and defined policy statement detailing actions to reduce the potential for violence at work. A successful policy will need the support and co-operation of all employees and should include:
 - recognition that prevention of violence at work is important;
 - measures for dealing with violence: for example, contacting a senior manager or in serious situations, the police;
 - a scalable and managed procedure for dealing with violence and aggression where physical force is threatened or used against staff or visitors;
 - arrangements for consultation and communication with employees;
 - formal arrangements for reporting (including reporting to outside authorities where necessary), classifying (e.g. injury, distress, emotional shock, work absence) and recording all incidents;
 - assurance of full support for any employees suffering violence at work and arrangements for aftercare, e.g. provision of external counselling services;
 - a transparent investigation procedure;
 - training for employees on violence at work issues, e.g. recognising it, defusing aggression, dealing with the potential impact;
 - training for managers and supervisors in identifying and controlling risks of violence, dealing with incidents and supporting staff.
147. Where there have been incidents of violence to staff, you may wish to consider installing signage to inform members of the public that such behaviour is unacceptable, and the potential consequences for them.
148. Further information on controlling violence at work can be found in the HSE document 'Violence at work – A guide for employers'²⁹. See 'References and further reading' and the HSE website at www.hse.gov.uk

Chapter 3 Safety Issues - animal related

149. Zoo animals vary in size, hazard and temperament and the risks they present to zoo staff and the public must be managed.
150. This section of the guidance looks at the management of those risks and provides advice to those involved in doing or managing that work.
151. This guidance is concerned with the health and safety of people around animals and not that of the animals. The safety of animals is considered only where this may create risk to people.

General work with animals

Key legislation and what the law requires

- The Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Provision and Use of Work Equipment Regulations 1998 (PUWER)¹⁵
 - Secretary of State's Standards of Modern Zoo Practice 2012³
152. You must ensure that people are protected from risks to their health and safety that may result from your work activities involving animals.
 153. Your risk assessments must consider and define control measures to address the particular risks and hazards created by keeping often very dangerous animals in captivity and displaying them to the public.

What you need to do

154. This guidance should be read in conjunction with Defra's 'Secretary of State's Standards of Modern Zoo Practice'³.
155. Animals are sentient and sometimes cognitive beings and you need to identify and manage both the physical and biological risks they present to people.
156. As a general principle, a collection should only hold animals for which it has the resource and competence to manage the animals, so they do not create a risk to the health and safety of people.
157. The physical risks may come from:
 - the size and power of the animal, or the species in general;
 - the natural instincts of the animal and group/hierarchical behaviour;
 - breeding or other natural behaviours;
 - the predatory nature of the animal;
 - the reaction of humans and animals to fear;

- the fact that some animals have the ability to kill/injure.
158. The biological risks may come from:
- the transmission of infectious diseases between animals and people (zoonoses);
 - natural chemical/biological/venomous/passive defences;
 - disease or infection carried in the waste or by-products of animals.
159. Further information on managing zoonoses can be found in Chapter 4 of this guidance and the HSE webpage 'Zoonoses'³⁰. See 'References and further reading' and the HSE website at www.hse.gov.uk
160. Controlling the hazards presented by work activities must follow the general principles of risk control outlined in the risk assessment guidance in Schedule 1 of The Management of Health and Safety at Work Regulations 1999⁶.
161. Great care must be taken during recruiting to ensure that keepers and others working with animals not only have the necessary skills and knowledge but are of the correct temperament and attitude. Prior to being left to work without supervision, keepers should undertake an appropriate period of mentoring, acclimatisation and assessment depending on the hazard presented by the species they are going to be working with. Written records of this training (e.g. sign-off sheets confirming progression and competency) should be maintained.
162. Working hours for keepers and others working with animals should be monitored to ensure they have sufficient time away from work, so they are rested and alert whilst with the animals. This is especially important for staff working with Category 1 or other animals that have been identified as creating significant risk of harm to people.
163. All keepers and others working with animals should be given regular refresher training and continuing professional development to remind them of how they must manage the risks they are exposed to as a result of working with animals. They should also be subjected to regular monitoring/audit to ensure they continue to work safely in accordance with their training. The frequency and depth of this should be species and hazard dependent.
164. Animal keepers working in direct contact with animals should be aware of and work in accordance with the standards laid down in the Secretary of State's Standards of Modern Zoo Practice³, especially those parts referring to the hazardous animal categories. These categorise animals according to their likely ferocity and ability to cause harm to members of the public visiting zoos/aquariums (as opposed to a risk to staff):
- Category 1 - Greater risk: where contact is likely to result in serious injury or threat to life e.g. large carnivores, large hoofstock, primates and venomous snakes;
 - Category 2 - Less risk: where contact may result in injury/illness but would not be life threatening e.g. medium sized mammals/primates and some bird species including birds of prey;

- Category 3 - Least risk: includes all those animals not listed in the Secretary of State's Standards of Modern Zoo Practice³ in either of the above categories i.e. all the rest of the animal kingdom.
165. It should also be noted that individuals and groups of animals in any of the categories may have peculiarities which, dependent on their age, rearing history and sexual maturity, will be relevant in determining the safety of close-contact working.
 166. Where there is limited knowledge about an animal's character or likely behaviour a precautionary/zero risk approach should be adopted. Additionally, there may be animals in lower categories that have previously, or are likely to, cause injury or transmit disease. These should be treated as if they were Category 1 animals.
 167. Risk assessments for work with animals must be carried out by competent people and must consider all of the hazards and foreseeable behaviours of the animals and apply controls to eliminate or control them so far as is reasonably practicable. Clear, written protocols should be read and understood by all relevant staff, and should be displayed in working areas, especially for work with Category 1 animals. The risks presented by an animal should not be regarded as less serious because of any apparent rapport with staff.

Case study: removal of old bedding from a multi-level primate enclosure

Keepers decided to replace the deep-filled bedding substrate in an empty three-level primate enclosure to make cleaning easier and improve animal welfare. Their risk assessment identified hazards including falls from height, strenuous manual handling, high temperatures and inhalation of bedding dust.

The width and height of the top two levels meant that keepers had to dig and sweep these areas manually. To make their working environment more comfortable, they turned off the area heating and opened all the roof vents to help ventilation. Interlocking rubbish chutes were secured to the top level using temporary fixings so that keepers wearing FFP3 disposable respirators could shovel the old bedding directly into the chute hopper. This had the added benefit of reducing the risk of keepers falling when carrying full waste bags down the vertical metal ladders between levels. The keepers took regular breaks to reduce fatigue. A mini-digger was hired to loosen the deep compacted bedding in the ground level area. The waste was dampened using a fine water spray to keep down airborne dust, bagged and loaded via a ramp into a nearby lidded skip using a powered wheelbarrow. The empty beds were hosed down by staff wearing waterproof clothing and visors before the new bedding material was added.

Contact with animals

168. Human contact with dangerous animals should be kept to the lowest level reasonably practicable to ensure the safety of people. Any contact should be subjected to risk assessment considering the hierarchy of risk control in Annex A to this guidance.
169. Factors to consider when contact with animals is necessary would include but may not be limited to:

- Category 1 (See SSSMZP): In normal circumstances you should adopt a non-contact policy for Category 1 animals. Only if the work cannot be done without contact, a specific risk assessment must be undertaken which covers the reason the contact is necessary, why the work cannot be carried out without contact and how it will be managed. Situations where this may be justified would include where:
 - contact is essential for veterinary or good husbandry reasons;
 - the animal has been tranquilised or anaesthetised; or
 - the animal has been rendered harmless by some other appropriate means, e.g. crush cages.

- Category 2 (See SSSMZP): Contact between keepers and animals in Category 2 may be allowed subject to certain criteria being met:
 - each animal must be individually risk assessed over a period of time, so risk from contact can be effectively assessed and minimised so far as reasonably practicable;
 - the keeper is competent for the contact.



(Crocodile training under protected contact at Paignton Zoo: Miriam Haas)

170. With all animals, the decision to allow 'hands on' contact must not be left to individuals' own personal preferences but should be part of a very clear organisational policy, with absolute limitations and controls. This is particularly important for animals in Category 1 as:

- the risk of serious personal injury or fatality is high;

- the provision of effective personal protective equipment is unlikely; and
 - attempted rescue in an emergency may lead to others being placed at equal or greater risk.
171. Wherever venomous species are kept, you must ensure the availability of 'in-date' anti-venom where it exists, either at the zoo or accessible hospital as appropriate. This should be audited at least annually using procedures agreed with the local health protection unit of the Health Protection Agency. It is important that sufficient accurate information is prepared and readily available for use by paramedics and the local hospital in the event of a bite or sting to an employee or a visitor to the zoo.
172. Regular liaison should be made with local medical services to ensure that they know which venomous animals are kept at the zoo, and there are procedures in place for dealing with emergencies. You must ensure these procedures are in place. See also Appendix 8.3 of the Secretary of State's Standard of Modern Zoo Practice³ and BIAZA Best Practise Guidelines Venomous Reptile Management in Zoos & Aquariums³¹ (see 'References and further reading').
173. Where a zoo has demonstrated a valid reason to adopt a policy allowing contact with Category 1 animals, a very detailed risk assessment must be carried out. The controls identified must consider the following aspects:
- the suitability of the contact area, looking particularly at space, visibility, obstructions, surface hazards, cover and provision of refuge;
 - awareness, training, and general suitability of the relevant employees;
 - the species, age, size, demeanour and known character of individual animals at the time any permitted contact commences;
 - the potential for hierarchical challenges or disruption of group structure that could affect the safety of such contact;
 - the need to establish and demonstrate an acceptable relationship between the animal and keeper;
 - limitations of the keepers and animals to be included in the work system;
 - keeper/animal ratios during contact;
 - the provision of personal protective equipment;
 - the need for supervision and control, which might include permit-to-work schemes; and
 - the use of back-up personnel and warning/rescue systems.
174. These controls must be reviewed regularly to ensure that the risks are adequately controlled. All personnel should be aware of poor work practices which might increase the risks from contact. In particular the potential for personality changes in both employees and animals which might make the practice unsafe. In such cases remedial action, which might include prohibiting further contact, must be taken.

Case study: safe tiger training



(Tiger training: Marwell Zoo)

Training large carnivores can present a risk of serious injury or fatal injury. A zoo restricted training to specific safe working areas with smaller gauge mesh to prevent training tools (for example, feeding tongs) to enter or be pulled through into the enclosure. Safe distance zones are marked on the floor as a visual reminder and all training equipment (such as target sticks) are long enough to prevent animal contact. Safe training areas are included in the design of all new enclosures.

Animals are allocated a primary trainer, who works with them regularly and has received formal safety training in how to work safely around them. Only primary trainers have keys to the enclosures and are allowed to open or close gates and slides. Other staff involved in training are given a safety briefing, highlighting hazards and existing precautions before starting. Trainers are not allowed to work alone with the animals.

Case study: handling aquarium animals

After treating a stingray, an aquarist realised that the container they had used was too small for the available capture equipment. They decided to scoop the stingray up by hand without wearing any PPE. The stingray started to struggle, striking the upper arm of another member of staff who was helping. The barb pierced an artery, causing the injured person to go into shock.

The staff member was taken to hospital where they underwent several surgeries to repair the pierced artery and skin damage following envenomation.

An investigation found that there were no risk assessments or formal procedures in place for moving or treating stingrays. Following a comprehensive risk assessment, the entire team was trained in moving and handling stingrays with new capture equipment and suitable PPE purchased for use. Manager sign-off and supervision were implemented for all animal treatments and movements.

Permits to work for entering animal enclosures

175. Some work activities, e.g. entry into certain enclosures of hazardous species, have the potential for serious injury and fatalities. In such circumstances the introduction of a permit-to-work scheme for those not authorised to operate the safe system of work for that enclosure, can be used to manage these activities.
176. Typical examples of work activities where the introduction of a permit-to-work scheme may be appropriate are:
- where a person enters, or is working around or above, the enclosure of an animal from Category 1 (see above);
 - where a person enters the enclosure of an animal from Category 2 where that animal may create a specific, uncontrolled risk, its character is unknown or there are other uncontrolled hazards e.g. zoonoses;
 - where unfamiliarity with the animal or species may lead to a significant risk;
 - where maintenance work etc. is carried out on or close to the barrier enclosing a hazardous animal;
 - where external contractors or anyone unfamiliar with the animals could inadvertently enter an enclosure containing venomous snakes or large carnivores;
 - where work will include the correctly licensed use of firearms, tranquilliser guns or especially hazardous veterinary products;
 - the application of pesticides;
 - the use of certain types of plant and equipment, particularly in public areas.



(Veterinary use of firearms: Terri Hill)

Case study: moving stingrays between tanks

Two stingrays were to be moved between quarantine tanks. The procedure involved experienced staff working with rubber nets from outside the tanks. Whilst there were enough experienced staff to catch the animals using nets from outside the tank, the supervisor in charge decided to speed up the process by putting two interns inside the tank to assist with the catch.

The interns were dressed in 7mm neoprene suits that provide limited protection from a stingray barb and one of the interns was stung when one of the ray's barbs pierced the suit.

There were clear internal policies that limited intern interaction with animals which were ignored in this instance in the interests of unnecessarily saving time. This was a potentially serious accident which occurred because the supervisor decided to put people at risk contrary to agreed procedures.

Saving time will rarely be a valid reason for increasing the risk of harm to people and especially when dealing with dangerous and unpredictable animals.

Public contact with animals

177. Any contact with dangerous animals should be kept to the lowest level reasonably practicable to ensure the safety of people. Any contact should be subjected to risk assessment considering the hierarchy of risk control at Annex A to this guidance.
178. Situations where the public may become involved in close interaction with animals may present risks of injury and infection to the public and/or cause unpredictable/unexpected situations and animal behaviour responses which in turn can increase risks to human safety. Examples of this will include:
- walk-through enclosures;
 - drive-through exhibits where animals are displayed in more natural habitats;
 - touch pools;
 - educational contact sessions;
 - children's animal contact areas;
 - animal experience activities (e.g. "keeper for a day"/"animal encounters") where there may be direct contact.
179. You must carry out a risk assessment for these activities which should consider the participants' lack of training, experience and understanding of animals. Any individual factors, for example age, mobility issues; learning disabilities and pre-existing health conditions should also be considered for the activity and restrictions placed upon them if reasonable adjustments cannot be made.
180. Direct contact between the public and animals must not be permitted unless any risks from the animals from physical contact or zoonoses have been eliminated or controlled so far as is reasonably practicable. This should be decided on an individual case basis only after a comprehensive risk assessment has been carried out.

181. Where, following risk assessment, hazardous animals are permitted out of their enclosures, or the public allowed in, enough authorised and experienced employees must accompany the animals in order to maintain proper control of any foreseeable behaviours.
182. The animals that are intended to be used must be selected as suitable for the purpose of the encounter.
183. Members of the public who feed or handle animals in contact areas or use walk-through attractions, may be exposed to zoonotic infections. You must ensure you do all you can to ensure the public is aware of the risks and you should consider:
- printing information on feed bags;
 - printing information in zoo brochures and on information sheets;
 - placing notices at admission gates and in contact areas;
 - prominently displaying signs and pictures in feeding areas (remember children are most vulnerable and may not be able to read);
 - supervision by zoo employees;
 - clearly guiding and encouraging people to use the washing facilities that should be readily available as close as possible to the exit to the activity. These facilities should contain soap and warm running water.
184. Animals should where practicable be excluded from areas where people are eating.
185. Further information on managing public contact with animals can be found in the HSE webpage 'Preventing or controlling ill health from animal contact at visitor attractions'³². See 'References and further reading' and the HSE website at www.hse.gov.uk
186. Where pre-arranged groups are catered for, particularly schools and playgroups, you should consider sending pre-visit advice for teachers, carers, parents and children on the health risks involved with animal contact to allow them to brief the groups before they arrive on site.

Case study: meet the tigers experience

An Events team wanted to try out a more exciting tiger-feed experience for visitors. The keeper-led activity had taken place inside the animal house; however the new format allowed feeding from a short stick, inside the standoff fence and beside a busy public area. During an early trial, a visitor crouching to feed the tiger fell forward, injuring their hand on the metal fence and narrowly avoiding being bitten. The incident investigation found that the original risk assessment and safe work procedure had not been updated for the new location, for feeding from different heights or the potential for participants and keepers to be distracted by other visitors nearby.

The safe work method was updated and included:

- Use of a dedicated, themed hut incorporating a waist-high solid barrier from behind which participants could feed the tiger through a mesh fence. The participant's companions were still able to see the experience through the open upper sections and a securable gate prevented unseen entry and distraction by other visitors.

- Use of a longer feeding stick, marked with the safe holding areas, which was loaded by the keeper and then passed to the visitor.
- The keeper delivering a specific briefing in a quiet area before approaching the hut, to ensure that everyone was fully aware of the health and safety risks and control measures and the actions to take in an emergency.

Containment of animals and escape prevention

187. Animals kept at zoos must be effectively contained to protect staff, visitors and people outside the zoo. Even low risk animals can create unrest and risk should they escape their containment.
188. Containment should be layered to provide more than one level of protection. The outside perimeter boundary enclosing the entire zoo will form the outer layer, with inner layers consisting as necessary of:
- enclosures;
 - aviaries;
 - fenced, walled, moated or ditched paddocks (enclosures);
 - tanks;
 - vivaria;
 - pools.
189. The zoo should develop a scalable plan for dealing with animal escapes. The planning should consider the following:
- command and control chains and responsibilities;
 - how alarms are given and by whom;
 - how the necessary people (including firearms-trained staff) are alerted and briefed;
 - how the public are to be managed and informed;
 - liaison with the emergency services and how and by whom they will be called;
 - animal recovery.

The zoo perimeter

190. The perimeter boundary of the zoo, including all entry and exit points, should be appropriately designed, constructed and managed to prevent, so far as is reasonably practicable, both the escape of animals and the entry of unauthorised people. Appropriate warning signage should be placed at regular intervals around the boundary.
191. Where potential access points are routinely unattended (e.g. service gates), they must normally be secured and opened only by staff who will remain at the access point until it is again secured.

Animal enclosures

192. Enclosures must be designed, constructed and maintained to prevent animals escaping and to allow for people to conduct necessary work in them safely. The enclosure is the primary risk control measure and the levels and types of protection required will depend upon the species and the hazard the animal could present.
193. The law requires that duty holders prevent, so far as is reasonably practicable, risks to people's health and safety. A lack of resources is not a defence against a charge of failing to ensure that people are safe.
194. Animal enclosures and their security systems should comply with the general principles outlined in the Provision and Use of Work Equipment Regulations (PUWER)¹⁵ in that:
 - they must be constructed or adapted to be suitable to contain the animals they are used or provided for;
 - they must take account of the working conditions and health and safety risks to the people working in and around them;
 - they must take account of the possibility of human error and wherever possible, design or engineer out the possibility of such error;
 - all switches, doors, catches, locks etc. must fail to a condition where a person will be safe. Consider electrical failure if safety features need electricity to function;
 - all of the enclosure including switches, doors, catches, locks, viewing panels etc. must be maintained in good working order to ensure they operate safely and effectively. This is particularly important where the enclosure and any security equipment is exposed to conditions liable to result in damage and consequent dangerous situations. Regular, documented inspections and proactive maintenance should be carried out and be recorded;
 - they must be designed so that a person can quickly escape to a place of safety. Doors and locks must be designed to facilitate and not impede this;
 - all people using, supervising or managing the use of the enclosure are provided with adequate, clear health and safety information. This will include, where necessary, clearly written instructions on its use and suitable markings and warnings;

- the duty holder must ensure that all people who use, supervise or manage the use of enclosures have received adequate training, which must include the correct use of the equipment, the risks that may arise from its use and the precautions to take;
 - they must be constructed or adapted so that routine and emergency maintenance operations can be carried out safely without exposing people undertaking maintenance operations to risks to their health and safety.
195. Where the zoo has free-roaming animals, this enclosure may be the perimeter fencing of the zoo. The enclosure should also be constructed to reduce so far as is reasonably practicable, the risk of unauthorised people gaining entry. Where moats are used to prevent escape, rescue equipment should be readily available to retrieve anyone falling into the enclosure. Staff must be trained to deal with this type of event and be able to use any such equipment.
196. The design and construction of enclosures and fences must take full account of the risks associated with the strength, ferocity and other characteristics associated with the particular animal. Specific provisions will need to be made for animals that are capable of jumping, climbing or burrowing, e.g.:
- a roof of adequate strength over the entire enclosure;
 - fencing of appropriate height, which may include internal overhangs for additional security;
 - downward extensions into the ground coupled with underground horizontal returns, of adequate width and depth, back into the enclosure.
197. In selecting materials for the construction of enclosures, you should consider:
- the ability to withstand repeated wear and attack by animals;
 - durability in all weathers;
 - access to allow checks to be made for any signs of deterioration, e.g. rusting;
 - corrosion below ground level;
 - access for effective and safe cleaning;
 - the need, for safety reasons, to be able to see clearly into the enclosure.
198. Sections of electric fence may be used in certain circumstances where the risks associated with its use can be effectively controlled.
199. Where contact between animals and the public through an enclosure may result in serious injury, then outer stand-off barriers should be provided. These should be:
- at an appropriate distance from the enclosure;
 - designed in a way that discourages people, especially children, from climbing over, through or under;
 - of adequate strength and securely built;

- fitted with locked gates at staff entry points.
200. Stand-off barriers may also be appropriate in off-show areas to prevent close contact by staff or other people such as contractors etc.

Slides, gates and doors

201. Slides, gates and doors to enclosures must be effective in containing the animals. Any gate, slide or door to which unauthorised people/personnel may gain access must be securely locked. The design and operation must also permit safe entry and exit by employees, including any tools or equipment they may need to carry and prevent an animal escaping. Wherever reasonably practicable there should be two lockable slides/doors between a person and a Category 1 or other animal which has been assessed as constituting a significant risk to people. A robust safe system of work (SSOW) must be followed if a person is working in a place where there is one lockable slide/door between them and such an animal. The design should allow for any lock, latch or bolt to be easily operated from the inside. Doors should be hung to open inwards into the enclosure to provide protection from an approaching animal.
202. An airlock type, double gate or 'porch' designed to allow a safe pre-entry view into the enclosure, should be considered for all appropriate areas to reduce the likelihood of escape and especially for entry into carnivore, primate and bird enclosures. The inner door should open into the animal space and the outer door open towards the outside to allow for ease of personnel and equipment access.
203. Any door separating the enclosure and the public area should be kept closed when workers are in the enclosure.
204. Gates or doors that are mechanically operated need to be suitable and regularly inspected and maintained.

Routine entry into animal enclosures

205. Zoo employees enter animal enclosures for feeding, cleaning, alterations and maintenance etc. People are also likely to enter areas where animals are under quarantine or isolated in order to carry out health checks. Even animals which are not normally aggressive may be a risk to keepers because of:
- the bulk of the animal;
 - the general health of the animal;
 - the speed of its movement;
 - the temperament of the animal;
 - the infectious agents they may carry;
 - numbers of animals in the group/colony;
 - the natural social activities of the species, particularly during feeding, breeding etc.
206. The risks involved in entry to the enclosure must be assessed on each entry occasion to take account of the variability in the animal's behaviour. The necessary

controls must be put in place before entry is made and if necessary, the entry postponed until the risks have reduced to an acceptable level.

Features and hazards within enclosures

207. Animal enclosures often feature enriching elements. These may take the form of:
- play equipment;
 - cover and hides;
 - water features, including waterfalls and pools.
208. Animal play features, shelters and planting may create potential hazards such as:
- increased risk of slips, trips and falls;
 - entrapment;
 - difficulty in observing colleagues;
 - difficulty in observing the presence or behaviour of animals.
209. The hazards created by enriching elements and how access to the enclosure will be managed must be considered before they are placed in the enclosure. They must be taken account of as part of the entry risk assessment.
210. Enclosures and stand-off areas should be kept free from any vegetation or other structures which could aid the escape of animals.
211. Viewing panels used in enclosures must be able to withstand attacks by animals etc. Where glazing is subjected to extreme or repeated force, e.g. by gorillas, specialist advice should be sought about the choice of glass. The framework supporting the glass must also be of sufficient strength and durability. Where glass is used it must be marked or incorporate design features so as to make it clearly visible to people and animals.

Case study: safe maintenance inside aquatic exhibits

Theming in all animal enclosures is liable to damage not only from the animals but from the environment and through natural degradation.

A team of divers were cleaning, inspecting and testing the structural integrity of a large section of underwater theming when it came away from its supports and fell, uncontrolled, from the supporting structure. Fortunately, no one was working around it in a position where they were affected by the fall.

There was a thorough investigation and the risks to divers from entrapment or being struck by poorly maintained or damaged theming were reviewed. All such equipment in the zoo was thoroughly examined to make sure it was appropriately strong and safe, and the frequency of inspection was increased along with the stringency of the planning for the associated dives where damage may be suspected.

Enclosures for venomous species

212. Venomous species should normally be kept in solid walled and roofed enclosures. Any ventilation or drainage system must be designed to prevent escape.
213. If an open-topped enclosure is to be used, the following factors should be considered:
- walls should be of sufficient height and suitably surfaced to prevent escape;
 - the design must not allow people to reach in and contact the animals;
 - walls and any stand-off barrier must be designed to prevent people climbing and falling in;
 - sufficient, clear warning signs should be prominently displayed.
214. The access route to any enclosure containing venomous species should incorporate an outer chamber fitted with an inner and outer door designed to prevent escape of the species. Both doors should be kept locked. The inner chamber must be clearly visible from all areas in the outer chamber, and vice versa. Care should be taken in the design of the enclosure, outer chamber and service areas to ensure the animal can be seen at all times.

Large drive-through enclosures

215. Teams of employees will sometimes have to work in drive-through enclosures whilst animals are present. Your risk assessment and safe working procedures for this type of contact should consider the following:
- arrangements put in place for the safe recovery of broken-down vehicles and their occupants. These should include giving people entering the enclosure instructions on how to summon assistance. Particular consideration must be given to the rescue of people who may need to leave their vehicle, for example in the event of fire. Patrol vehicles must have adequate space to accommodate them if necessary;
 - adequate vehicle-based patrols to ensure swift reaction, all in radio contact, to monitor the visiting public and to maintain awareness of the location and behaviour of the animals. The patrols' duties might also include preventing animals from gathering around visitors' vehicles and the entry and exit gates. The vehicle should be designed to give adequate protection to the driver and passengers;
 - teams working in the enclosure should always include sufficient numbers of people who are competent to deal with any animal issues. A risk assessment must be carried out and a safe system of work developed with a plan to deal with foreseeable problems;
 - the team should work from a vehicle which is of adequate size and capable of withstanding animal attack and they should remain close to the vehicle at all times;

- a lookout should always remain with the vehicle to watch for any approach of animals that might pose a threat. Where ground features might obstruct the view of the lookout, further lookouts should be provided in safe positions to ensure early warning of danger;
 - the lookout should be provided with the following:
 - a means of warning employees of approaching danger, e.g. an air horn or whistle;
 - a means of communication for summoning assistance; and
 - where appropriate, firearms.
216. The team should never leave the enclosure until all staff have been accounted for.
217. Gates controlling entry and exit from large drive-through enclosures may be manually or mechanically operated. They should operate in ways that ensure the animals remain inside the enclosure and do not create risks to staff or visitors. Employees in charge of the gates must be competent for their work and the following should be considered to ensure they can work safely:
- they should have a safe workstation capable of providing safe refuge from which to operate the remote control of the gates. This should allow good visibility of the area surrounding the gate;
 - protection from adverse weather conditions;
 - easy access to drinking water and sanitary accommodation;
 - a visible waiting area for vehicles inside the enclosure that is clear of vegetation and obstructions which could potentially hide or assist animals in an attempted escape;
 - an appropriate means of communication to report danger and summon assistance;
 - a system to ensure that the gates can be operated safely in the event of mechanical or power failure.

Transport of animals

218. Moving animals, whether within the premises or to an outside destination, is a hazardous operation for the staff and animals involved and potentially for others in the area. The operation should be planned by competent people to ensure any risks are adequately controlled. Hazards will vary depending on whether or not the animal is in a conscious condition when moved. Factors to consider should include:
- the condition, size and type of animal, and its potential behaviour if conscious;
 - its potential behaviour if it becomes conscious during handling;
 - any unexpected movements while it is sedated, e.g. reflex motions;

- site and access conditions at the point from which the animal is to be moved, and the location to which it is being moved;
 - how it is to be moved e.g. manually carried, using manual handling equipment (MHE), by vehicle, in water, etc. The condition and suitability of the transport crate should also be checked before the animal is loaded and the move takes place;
 - the route along which the animal is to be moved: are there any overhead or other obstructions that may affect the safety of the move?
 - the number of competent and appropriately trained staff required to do the job safely;
 - the availability of appropriate and properly maintained equipment, including capture equipment, nets, firearms, lifting/handling aids, PPE etc;
 - whether or not the operation should take place while the public is present;
 - environmental conditions including the weather, light, slippery conditions.
219. Where practicable, manual handling should be avoided. If manual handling cannot be avoided, it must be assessed to ensure the risks are as low as reasonably practicable, should be kept to a minimum by staff who are appropriately trained and supervised with the emphasis on planned teamwork and use of handling aids.
220. Equipment that should be readily available for such work includes:
- suitable lifting equipment e.g. boards or other equipment for sliding sedated animals;
 - suitable crates or transit cages;
 - suitably adapted vehicles;
 - crush fencing;
 - emergency equipment including firearms if appropriate.
221. Capture techniques must consider the likely behaviour of the animal to minimise the risk of injury to either animals or handlers. Animals likely to cause danger must always be kept secure.
222. Immediately before the move, the transit route and the destination should be cleared and checked for safety. Where necessary, other personnel and the public should be cleared from the area.

Case study: boxes of bears

Before welcoming two new European brown bears into the collection, keepers worked through a risk assessment and associated safe work procedure detailing each step in the unloading and settling-in. Everyone was given a specific role in the unloading process, with other departments and contractors

informed about the arrival timings and procedures to allow them to review risks to their staff. The Senior Keeper ran through the procedure the night before the bears' early morning arrival to make sure that everyone understood their tasks and positions.

Only keepers, the firearms team and forklift driver were allowed in the immediate house area during the lorry's arrival. The team kept in radio contact at all times, including the Animals' and Visitor Experience Duty Managers on standby.

Each transport crate was unloaded by forklift beside the house access, then moved manually by the keeper team to its final position and fastened securely to the external wall to minimise the risk of escape. The crate door was then opened.

Non-essential staff then moved away from the area and the firearms team took up their agreed positions nearby. Keepers holding fire extinguishers were stationed in the external house area to act as an additional deterrent. The slide was then operated by the Senior Keeper, to allow the bear to enter safely into the house.

Case study: moving animal crates using a telescopic fork lift

Keepers needed to use a telescopic forklift to load animal transport crates into a high-level safety cage on a platform. They identified risks including: the use of large mechanical lifting equipment on uneven ground; working around the forklift during the lift; falling from the platform edge; manual handling of the crate inside the house; and the possibility of animal escape. A method statement was produced for the task using the risk controls identified.

After a trial run using a crate containing feed sacks to simulate an animal's weight, overhead branches were trimmed to allow the forklift straight access to the platform edge and additional compacted hardcore was installed to ensure a stable, flat loading surface.

The real transport was scheduled for early evening to minimise the number of people present and the firearms team stayed nearby in case of escape. All staff wore high visibility clothing and hard hats and were prohibited from standing near the forklift or under the load during the lift.

The crate was lifted into the safety cage using the forklift and guided onto a rolling frame using long ropes by two keepers at ground level and two keepers on the platform. The open gates on the platform provided edge protection during the lift. Once the load had been released by the forklift, the four keepers rolled the crate to the bed area, and locked it in position to prevent the animal escaping. The slides were then opened to allow the animal to enter safely.

Veterinary procedures

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Ionising Radiations Regulations 2017 (IRR17)³³
 - The Control of Substances Hazardous to Health Regulations 2002 (as amended)¹⁶
223. You must do all that is reasonably practicable to ensure that people both in, and not in, your employ are protected from risks to their health and safety. This includes contractors and temporary employees such as veterinary staff. You must make reasonable enquiries to ensure that such people are competent to do the work you are contracting them for.
224. All contractors, including veterinary staff, are to be given the information they need to ensure they are not exposed to risks they would otherwise not be aware of and that they are aware of site health and safety processes and procedures. This may include an induction session during which their duties and obligations to follow the zoo's H&S rules and procedures will be explained.
225. You must ensure that risks to people created by your work are eliminated or reduced to the lowest reasonably practicable level.



(Veterinary treatment at RZSS Edinburgh Zoo: Jan Morse)

What you need to do

226. Veterinary staff in zoos will often have frequent and regular access to the animals. They will normally be contractors rather than employees and you must ensure they are competent for their work and that any equipment they bring to site is safe for use there. See the section about contractors in Part 2. You should ensure that veterinary staff are competent for their work before deciding on how much access they have to the animals. They should be subject to the same access conditions as all other people and should never be able to be alone with any animal that could be dangerous. You should take reasonable steps to ensure that any equipment they bring to site is well maintained and safe for use.

X-rays, radiography and other similar techniques

227. Depending on the type of activity you are carrying out with ionising radiation equipment or radiation sources and the level of risk involved, you may need to register, notify or get consent from the HSE.
228. For all work involving exposure to ionising radiation, you must carry out an assessment to identify the risks to your employees and others and the steps needed to protect them. These steps should reduce exposure to ionising radiation to a level as low as reasonably practicable and ensure that it does not exceed the specified dose limits set out in the IRR17³³.
229. Ionising radiations occur as either electromagnetic rays (such as X-rays and gamma rays) or particles (such as alpha and beta particles). They occur naturally (e.g. radon gas) but can also be produced artificially, for example by diagnostic X-ray machines used by vets. Vets may also use radioactive sources for diagnostic and/or therapeutic reasons.
230. The guidance also explains and sets limits and restrictions for exposure for certain types of employees, for example pregnant or breastfeeding women and young people whose knowledge of the risks from radiation may be limited.
231. Only appropriately qualified and competent staff or contractors may be in control of activities involving sources of radiation. Controls must be in place to ensure that staff are aware of these sources and so prevent inadvertent exposure. Where unqualified people, for example keepers, assist in the work, they must be properly trained and supervised.
232. Approved signs should be prominently displayed to warn of sources of potential radiation: this is particularly important when mobile X-ray generators are being used in non-clinical animal areas. Radioactive sources must be kept securely to prevent unauthorised access.
233. Further information on using ionising radiation equipment can be found in the HSE approved code of practice 'Work with ionising radiation. Ionising Radiations Regulations 2017 Approved Code of Practice and guidance'³³. See 'References and further reading' and the HSE website at www.hse.gov.uk

Storage and use of veterinary drugs

234. The storage and use of veterinary medicines are regulated under the Control of Substances Hazardous to Health Regulations 2002 (COSHH)¹⁶. This legislation places requirements on duty holders regarding the control and management of hazardous substances and this will include most veterinary medicines.
235. All drugs, vaccines and other veterinary products should be kept in a locked and secure place. Only authorised people should have access to these items. Where you need to store chilled or frozen products, a lockable refrigerator or freezer must be dedicated to this purpose, kept secured and temperatures monitored to ensure they are appropriate for the contents. You should not use facilities used for animal or human food. You should also make arrangements for the safe disposal of out-of-

- date/unused veterinary products. This should be discussed with your veterinary surgeon.
236. Veterinary drugs and medications should only be administered by veterinary staff or under the direction or direct supervision of a veterinary surgeon. Only veterinary staff, those working for them or under their direction, should have access to these products and be permitted to administer them.
237. Your COSHH assessment should consider all routes of exposure, including the risks associated with:
- inhalation of powders/aerosols, for example generated during preparation of medicines or during surgical procedures;
 - absorption through intact skin e.g. splashes from drenches/chemical solutions/washes on the skin, or splashes of animal body fluids on the mucous membranes of the eyes or mouth;
 - the use of sharp instruments: contact with bloodborne pathogens via needlestick injuries or cuts;
 - unintentional injection of the drug into the person administering it or their assistant;
 - the availability and effectiveness of antidotes;
 - poor hygiene: ingestion of contaminants from the hands when eating or drinking.
238. Agreed, structured and risk assessed procedures should be followed e.g. the antidote for a drug should be available for use prior to the priming of a syringe with the drug if there are possible harmful effects on humans. Used syringes and needles should not be re-sheathed and should be placed directly into a suitable, clearly marked 'sharps box' container and disposed of appropriately as clinical waste. At no time should they be left in any place where other employees or members of the public could reach them.
239. If syringes, darts or other containers are pre-filled in advance of a procedure, they must be properly labelled showing their contents, concentration and date.
240. Zoo licensing conditions require records of treatment for animals: you should include information on relevant human health and safety-related matters in these documents to help you in reviewing your risk assessments.
241. Supplies of antidotes for potentially toxic products used at the zoo should be held either at the zoo (when immediate use is essential e.g. immobilisation drugs), or at a local hospital or GP's/doctor's surgery where they can be accessed as required. These arrangements should be recorded and reviewed with the hospital/GP as necessary, particularly when new drugs are introduced. Information sheets to aid treatment should be readily available. Further advice is available in the BIAZA Best Practise Guidelines Venomous Reptile Management in Zoos & Aquariums³¹ - See 'References and further reading'.

242. Further information on COSHH can be found in the HSE guidance document 'Working with substances hazardous to health A brief guide to COSHH'¹⁷. See References and further reading and the HSE website at www.hse.gov.uk

Chapter 4 Health

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
243. You must assess risks to your employees' health and safety from work and put in place effective risk controls to eliminate or reduce these risks so far as reasonably practicable.

What you need to do

244. Unlike the immediate and obvious effects of a physical injury, health problems caused or made worse by work can develop unnoticed over time. Knowledge and awareness of potential hazards can reduce the likelihood of work-related ill health. Occupational ill health can result in sickness, prolonged absence from work and, in some cases, early retirement. Long-term sickness absence affects the productivity of business as well as the well-being and employment prospects of workers. You are required to take steps to eliminate or reduce ill health so far as is reasonably practicable.
245. The following issues should be considered as part of a strategy to reduce ill health in zoos:
- exposure to harmful substances e.g. chemicals, blood-borne infections;
 - inhalation of harmful particles e.g. coal dust, hay, wood dust, animal dander, cement etc;
 - poor working practices such as excessive or poor manual handling techniques;
 - vibration from hand-held or ride-on equipment e.g. use of gardening machinery and tractors;
 - noise from equipment or work activities, e.g. in loud animal houses or hospitality events
 - environmental factors, such as cramped working conditions;
 - diseases transmitted by animals (zoonoses) e.g. parvovirus, campylobacteriosis, toxoplasmosis, salmonellosis, brucellosis, tuberculosis, chlamydiosis etc.;
 - ionising radiation (see section on Veterinary Procedures).
246. You should put in place measures to assess and monitor workplaces and activities to ensure exposure is eliminated or kept to the minimum level reasonably practicable.
247. Where employees are subject to conditions which may create risks to their long-term health you should consider regular health surveillance and monitoring to ensure issues can be identified and controls put in place early.

Health surveillance

248. You must assess the risks to your employees' health. As part of the risk assessment you must identify circumstances in which health surveillance must be provided.
249. You are required to provide health surveillance if:
- there is a known health effect from exposure to an agent (for example noise, vibration or substances which cause occupational asthma);
 - there is a reasonable likelihood of exposure to the agent in your workplace situation; and
 - there is a valid test to detect ill health.
250. Specific medical examinations may be required for certain employees, e.g. food handlers, drivers, divers or those involved in boat work on lakes/inland waterways or at sea. Examples of jobs within zoos where specific health surveillance may be needed would include:

Job	Type of Health Surveillance		
	Hand arm vibration	Noise (audiometry)	Respiratory sensitiser (spirometry)
Horticulturalist	X	X	
Grounds & waste operatives	X	X	X
Keepers		X	X
Veterinary			X
Railway (steam)	X	X	X

251. The frequency of surveillance should be based on competent advice depending on the level of the hazard and exposure.
252. Health surveillance under the COSHH Regulations 2002 (as amended)¹⁶ requires that individual health records must be maintained and retained for at least 40 years and in line with General Data Protection Regulations (GDPR)³⁴. For more information on GDPR see 'References and further reading'.
253. You must ensure that appropriate plans are put in place for managing employees who have reported or have been identified as showing symptoms or early signs of occupational ill-health. This may involve adjusting working patterns, referrals to other specialists, temporary or permanent re-deployment to other departments. Any action taken should involve the relevant parties e.g. employee, line manager, health and safety manager, human resources manager.
254. Further information on health surveillance can be found on the HSE webpage 'Health Surveillance'³⁵. See 'References and further reading' and the HSE website at www.hse.gov.uk

Asbestos

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - Control of Asbestos Regulations 2012³⁶
255. You must identify the presence, type and condition of any asbestos-containing materials. If asbestos is present anywhere on your site, including in residential accommodation you own, or you choose to presume that it is, you must manage it. You must prepare and implement a plan to manage identified or presumed asbestos-containing materials. You must provide information on the location, type and condition of asbestos-containing materials to other employers or contractors who are likely to disturb them, to allow them to put in place appropriate risk controls while carrying out their work.

What you need to do

256. Asbestos may be present in any zoo building built or refurbished before the year 2000. Asbestos causes long latency illness which currently kills around 5,000 workers each year: many more than are killed in road traffic accidents. It is estimated that around 20 tradesmen die each week because of past exposure to asbestos fibres.
257. Dangerous exposure to asbestos occurs when very small fibres are inhaled having been released when asbestos is damaged or disturbed. The only way to protect people is to prevent their exposure to asbestos in a condition where it may release fibres.
258. Asbestos was widely used in construction and can be found in a wide variety of public, staff and animal-related buildings and installations in zoos, especially:
- pipe laggings/coatings/boxing around pipe work etc.;
 - lagging/insulation on boilers and water heaters in plant rooms;
 - sprayed insulation on steelwork, ceilings and walls in staff and public areas e.g. for heat, fire or noise protection;
 - ceiling tiles;
 - wall panels/weather boarding/soffits and window mullions;
 - corrugated cement roofing or building materials, including downpipes/rainwater goods on animal houses or public buildings;
 - water tanks and toilet cisterns;
 - loose packing or insulation materials;
 - decorative plaster finishes e.g. "Artex";

- decorative/fire protection cladding.
259. You should have an asbestos management survey conducted by a competent person to identify the presence of asbestos, its type and condition and any places where it is presumed that asbestos may be.
260. The survey will allow you to prepare an asbestos risk register, which will be the basis of the management plan for asbestos found, or presumed to be, in your buildings.
261. Your management plan should contain current information about the presence and condition of any asbestos on the premises. It must be kept up to date so you should ensure that:
- regular inspections are undertaken to check the current condition of asbestos materials (at least annually);
 - the register records any asbestos removals;
 - additions to the register are made when new areas are surveyed, and asbestos is located or suspected;
 - changes are recorded e.g. where asbestos-containing materials have degraded;
 - any work carried out on asbestos is recorded.
262. The asbestos risk register can be kept as a paper or electronic record. It must be easily accessible to your employees and anyone else who may be working on your building.
263. You must ensure that any person whose work on your site is likely to disturb asbestos is competent to do their work and is aware of the asbestos and the measures they should take to ensure they are not exposed. They should be given access to the register and alerted to the presence of asbestos.
264. Where major changes to the fabric of the building will be carried out, a refurbishment or demolition survey, as appropriate, must be undertaken. This is fully intrusive and may be destructive to allow access to all areas where work is to be carried out. Guidance on the asbestos surveys is given in HSG264 Asbestos: The survey guide⁵².
265. For more information on controlling asbestos see the HSE approved code of practice 'Managing and working with asbestos - Control of Asbestos Regulations 2012. Approved Code of Practice and guidance'¹³⁶. See References and further reading and the HSE website at www.hse.gov.uk

Chemicals and other hazardous substances

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH)¹⁶
266. You must prevent or, if this is not reasonably practicable, adequately control your employees' exposure to substances which can cause harm to health. Control is adequate when the risk of harm is 'as low as is reasonably practicable'. To help identify what you need to do, you must carry out a risk assessment for activities involving exposure to hazardous substances.
267. See the section controlling substances that are harmful to health (COSHH) in Chapter 2 of this guidance.

What you need to do

268. Every year, thousands of workers are made ill by hazardous substances, contracting lung disease such as asthma, cancer and skin disease such as dermatitis. Ill health caused by work is preventable: many substances can harm health but, used properly, they almost never do.
269. The care of animals in zoos can expose people to a variety of potentially harmful substances which could include:
- animal bedding dust from straw, sawdust etc, or general dust in animal enclosures that may contain faecal matter or skin particles which can cause lung diseases such as asthma (see section below on respiratory sensitisers);
 - dusts and aerosols from grains and flour and other proteins in feedstuffs such as fish that can cause lung diseases including asthma (see section below on respiratory sensitisers);
 - blood and other bodily fluids from living or dead animals that may contain a variety of pathogens/zoonoses (see zoonoses³⁰ section in this guidance);
 - fruit and vegetables in feedstuffs can cause dermatitis;
 - veterinary medicines, e.g. tranquilisers, antibiotics, vaccines (see section on veterinary procedures in this guidance).

Respiratory sensitisers

270. Certain types of zoo work as described above can involve exposure to respiratory sensitisers. These are substances that when inhaled can cause lung sensitisation/asthma. The symptoms include:
- coughing and sneezing;

- wheezing and tightness of the chest;
 - stuffy nose (rhinitis); and
 - sore, prickly eyes (conjunctivitis).
271. Once sensitised, the changes are often irreversible, and the symptoms may become worse, effectively preventing further work with the sensitised substance.
272. Respiratory sensitisers must be included in your COSHH risk assessment (See the section Controlling substances that are harmful to health (COSHH) in Chapter 2 of this guidance).
273. Where you suspect that a person has been sensitised by something they are exposed to at work, you should prevent further exposure until you have carried out a thorough investigation, identified where and how any exposure occurred and put in place any further necessary controls. Advice should be sought from a competent occupational health provider about whether that person can return to work in that area or others where the substance may be present.

Working with biocides and pesticides

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Pesticides Regulations 1986 (COPR)³⁷
274. If you use a pesticide, you must:
- take all reasonable precautions to protect human health and the environment;
 - confine the application of the pesticide to the crops or area to be treated;
 - ensure that when using pesticides in certain specified areas, e.g. those used by the general public, that the amount of pesticide used, and the frequency of use are as low as are reasonably practicable;
 - ensure that anyone using a professional pesticide has either a recognised specified certificate included in the list on the HSE website, or be working under the direct supervision, for the purposes of training, of someone who has such a certificate.

What you need to do

275. Biocides and pesticides are used in zoos for numerous reasons including:
- rodent control;
 - application of 'spot-on' pesticides;
 - control of weeds;
 - environmental control of parasites;
 - control of unwanted micro-organisms by disinfection;
 - control of algae in enclosure ponds
276. There are hazards associated with the use of these products in zoos which, if not controlled, can represent a risk to human health. In selecting such products for use, particularly disinfectants and sanitisers that currently do not have to be formally approved, it is important that you select the safest possible product that is still capable of performing adequately.
277. These products may be chemical or microbiological. You should request and evaluate relevant data sheets from the supplier and carry out a full COSHH risk assessment to identify the required exposure controls (see the section in Part 2 - controlling substances that are harmful to health (COSHH)).
278. The substances used should be mixed and applied in accordance with the manufacturer's instructions and the control measures identified in the COSHH

assessments. The equipment used e.g. knapsack sprayer, should be appropriate for the substance being used, in good repair and fitted with the correct controls and nozzles. PPE where required must be appropriate for the way the substance is being used and the operators must be trained in its use. Pesticides can in some circumstances penetrate gloves and other PPE rapidly; PPE which has been splashed should be either cleaned or changed promptly as appropriate.

279. Many zoos, particularly smaller establishments, will choose to allocate much of this type of work to outside contractors. The zoo must ensure their chosen contractor is competent and that the contractor has done the necessary assessments to ensure the substances used are appropriate, used safely and that they do not create risk to people (see the section – ‘Contractor management’ in this guidance).
280. Further advice on safe working with biocides and pesticides can be found at the HSE guidance document 'Code of Practice for Using Plant Protection Products'³⁸. See 'References and further reading' and the HSE website at www.hse.gov.uk

Legionella

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH)¹⁶
281. You must assess the risk of Legionella bacteria being created in your premises and put in place control measures to eliminate or reduce so far as is reasonably practicable the risk of people being exposed to it.
282. You must appoint a person competent to identify, assess and control any risks from Legionella. This person can be from within or outside the company.

What you need to do

283. Legionnaires' disease is caused by Legionella bacteria and is a potentially fatal type of pneumonia.
284. The bacterium that causes it, *Legionella pneumophila*, occurs naturally in small numbers in water sources such as rivers, lakes and reservoirs, but usually in low numbers. It may also be found in man-made water systems in zoos such as:
- cooling towers for offices, guest facilities and other air conditioning/cooling systems;
 - hot and cold-water storage tanks and associated pipework systems;
 - plumbing systems such as staff washrooms and showers and where there are pipework 'dead legs';
 - humidifiers/misting systems in vivaria and tropical houses;
 - some sprinkler and fire control systems (especially where long runs of pipework are exposed to warming);
 - water features in enclosures and park areas, e.g. fountains or water-based play equipment.
285. Water systems used intermittently, redundant parts of systems or "dead legs" or systems where water is constantly recirculated are particularly hazardous. The bacteria grow best in water stored at between 20°C and 45°C, and can live in water at up to 60°C where there is a source of nutrients for the bacteria, e.g. rust, scale, slime or animal/fish food.
286. You must ensure that all potential sources of bacteria are identified and assessed and that they are either eliminated or controlled. Possible preventive/control measures include:

- using a competent person to put in place and run a robust and regular system of monitoring, testing and dosing as necessary, for all systems where the risk assessment suggests Legionella could be present;
- storing water at temperatures above 60°C or below 20°C;
- insulate or regularly drain runs of pipework supplying equipment or enclosures which might produce fine droplets of water (aerosols);
- draining or dismantling redundant pipework, tanks and fittings rather than leaving them in place to act as reservoirs for bacteria, e.g. in animal enclosures/houses;
- use appropriate PPE when cleaning emptied pools and moats, especially when using a pressure hose;
- assigning an authorised and trained person to manage your Legionella risks.

287. For more information on controlling Legionella, see the HSE approved code of practice 'Legionnaires Disease – The control of legionella bacteria in water systems - Approved code of practice and guidance on regulations'³⁹ - See 'References and further reading' and the HSE website at www.hse.gov.uk

Case study: Legionella

A zoo installed a misting system into a tropical butterfly house to maintain the right type of environment for the species and habitat within the building. The misting system was included in the water risk assessment and management plan which included the routine cleaning, descaling and sampling of the system to monitor for Legionella spp.

A routine sample identified that there was Legionella spp. in the system. The system was immediately taken out of use, cleaned, disinfected and resampled to check whether the cleaning and disinfection had been effective.

Further sampling identified that there was still Legionella spp. present. Investigation identified that the system was not purging the water once the misting cycle had finished so water stayed in the pipework creating a dead leg. Combined with the high ambient temperature this caused a growth of Legionella spp. The system was adapted to ensure that the water was purged from the system.

Further sampling confirmed that there was no further Legionella spp. in the system and it was returned to use and the management plan continued to be implemented. The zoo maintenance team, specialist contractor and animal team all worked together to ensure that the system was maintained efficiently and did not present any further risk.

Manual handling

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Manual Handling Operations Regulations 1992⁴⁰
288. You must avoid manual handling activities so far as is reasonably practicable. If you cannot avoid manual handling, you must make a suitable and sufficient assessment of the risk of injury. You must reduce the risk of injury from these activities so far as reasonably practicable by using mechanical assistance, or making changes to the task, load or working environment.

What you need to do

289. Manual handling means moving an object or load using one's body. When done unsafely it is the largest cause of musculoskeletal disorders, which form over a third of the workplace injuries reported to HSE annually. Many musculoskeletal problems, such as back pain can build up over time and be chronic, but some can be caused by a single event.
290. There are large amounts of manual handling in a zoo and often in awkward or difficult circumstances which can make the risk of injury greater. These may include:
- supporting e.g. holding a whole or part of an animal during a veterinary procedure;
 - lifting and/or lowering e.g. stacking or moving bales of straw;
 - pushing e.g. manoeuvring a wheelbarrow full of manure;
 - pulling e.g. hoof-stock animals, cages or retail or catering supplies;
 - throwing e.g. feeding animals from a platform.
291. The Manual Handling Operations Regulations require that work activities involving manual handling should be avoided if it is reasonably practicable to do so. If they cannot be avoided, you must assess and plan the work considering the following:
- does the task involve awkward postures which may put extra strain on parts of the body not able to easily absorb it such as bending, stretching or twisting in small enclosures or animal housings?
 - is it repetitive such that it may cause pain in muscles, tendons or nerves through overuse?
 - is it being done at height where movement may be restricted or carry extra hazard such as when lifting feedstuffs to high stations?
 - is the person doing the task physically fit enough?

- are the people doing the work competent to use the equipment they need (ladders/scaffold etc)?
- do the people doing the work have any pre-existing issues making them more vulnerable to injury e.g. pregnant or tired?
- is the load particularly heavy, awkwardly shaped, hot/cold, or likely to move unexpectedly, or otherwise hazardous such as moving packaged liquids or animals?
- does the environment create extra hazards?
- is the floor or ground slippery with waste or liquids?
- does the surface slope or is it uneven?
- is the area adequately lit?
- does the person need to wear PPE?

292. For more information on management of manual handling see the HSE guidance document 'Manual handling - Manual Handling Operations Regulations 1992 - Guidance on Regulations'⁴⁰ at 'References and further reading' and at www.hse.gov.uk

Noise

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Noise at Work Regulations 2005⁴¹
293. The Control of Noise at Work Regulations 2005⁴¹ (Noise Regulations 2005) require you to prevent or reduce risks to health and safety from exposure to noise at work. You must:
- assess the risks to your employees from noise at work;
 - take action to reduce the noise exposure that produces those risks to below the action levels in the Control of Noise at Work Regulations⁴¹;
 - provide your employees with hearing protection if you cannot reduce the noise exposure to safe levels by using other methods;
 - ensure exposure to noise levels around the Action Levels are managed;
 - provide your employees with information, instruction and training;
 - carry out health surveillance where there is a risk to health;
 - keep a record of your risk assessment and control actions (if you employ more than five people);
 - keep health records for employees under health surveillance;
 - review and update your risk assessment regularly.

What you need to do

294. Dangerous levels of noise at work can cause hearing loss or other auditory problems like tinnitus that can be temporary or permanent. It can come from repeated exposure or through 'one-off' loud sounds such as gunfire or loud tools. People often experience temporary deafness or "*ringing*" in the ears after leaving a noisy place and whilst hearing will normally recover within a few hours, this should not be ignored.
295. Hearing loss is more commonly gradual because of prolonged exposure to harmful noise which can come from many zoo activities:
- the operation of mechanical plant, especially in confined spaces;
 - use of work equipment for example power tools;
 - use of firearms;

- work with animals at the zoo, e.g. primates, certain birds and some large species e.g. elephant;
 - large numbers of visitors, especially in confined spaces;
 - loud music provided in hospitality areas.
296. The risk to hearing from noise depends on how loud the noise is and for how long people are exposed to it. In any workplaces where people may be exposed to levels of noise above the Action Levels in the Control of Noise at Work Regulations⁴¹, you must conduct noise assessments where employees may be exposed to noise that may breach the Action Levels. The assessments must be conducted by a competent person and will normally be by noise level measurements.
297. If individuals are, or may be exposed to levels of noise above the Lower Action Level you need to decide how you will control that risk e.g. control the noise or provide appropriate, effective hearing protection. Things to consider in this may include:
- using quieter equipment or a different, quieter process e.g. replace older, noisy power tools with more modern, quieter versions;
 - engineering/technical controls to reduce, at source, the noise produced by a machine or process e.g. ensure mobile plant and equipment is maintained properly and fitted with the necessary equipment to reduce noise;
 - using screens, barriers, enclosures and absorbent materials to reduce the noise on its path to the people exposed e.g. move noisy animals to different parts of the enclosure when work must be done;
 - designing and laying out the workplace to create quiet areas e.g. when new enclosure layouts are designed, consider how noise can be reduced with sound-absorbing materials etc;
 - improved working techniques to reduce noise levels e.g. buy in foodstuffs that do not require processing, procure fencing and structural materials that require less finishing on site;
 - limiting the time people spend in noisy areas by job sharing or by redesigning work in noisy areas so it takes less time.
298. Even after all of the above has been considered, the risk assessment may show that you still need to issue hearing protection and you should ensure you source the most appropriate and effective equipment for the circumstances and that it is effective. This would qualify as personal protective equipment and should be managed in accordance with the guidance in Chapter 2.
299. Some individuals may be at higher risk or need to be provided with health surveillance and you should discuss this with an occupational health specialist.
300. Medical screening of new employees will help identify any existing issues with their hearing and allow employers to make decisions about how and where the person can be safely employed.

301. Further information on managing noise at work can be found in the HSE guidance document 'Noise - The Control of Noise at Work Regulations'⁴¹. See 'References and further reading' and the HSE website at www.hse.gov.uk

Mental health and stress

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
302. You are required to risk assess tasks at work that may expose people to risks to their health and safety. Where there is a possibility that a person's work may expose them to harmful levels of stress or other issues that may adversely affect their mental health, you must consider that as part of the risk assessment and either eliminate, or where that is not possible, control the risks of these issues becoming harmful.

What you need to do

303. Stress and certain other mental health issues are the adverse reactions people have to excessive pressures or other types of demand placed on them. Pressure is part of work and life generally and is part of what keeps us motivated and productive. Too much pressure however, or pressure that lasts for a long time, can lead to stress or other mental health issues, which undermine performance, is costly to employers, and can damage both physical and mental health.
304. Different people react to pressure and stress in different ways and if you decide a stress or mental health risk assessment is necessary it should reflect this. You should assess the risk by looking at all available information, such as feedback from staff and sickness absence reports and 'fit' notes, exit interviews from staff who are leaving, your own observations of how your staff are performing in their jobs and by asking them directly.
305. Examples of work where high pressure may be experienced by members of zoo staff will include:
- if involved in despatch/euthanasia of animals, especially where they have been involved with the animals for long periods;
 - if involved in disposal/feedback of animals;
 - if involved in high intensity crises/emergency activities;
 - if involved in disputes with members of the public.
306. You may need to take account of temporary or permanent issues that are outside the workplace and outside your control when putting in place controls to manage stress. Further information on managing stress can be found in the HSE guidance document 'Tackling work-related stress using the Management Standards approach'⁴². See 'References and further reading' and the HSE website at www.hse.gov.uk

Vibration

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
- The Management of Health and Safety at Work Regulations 1999⁶
- The Control of Vibration at Work Regulations 2005⁴³

307. You must:

- assess the risks to your employees from vibration at work;
- take action to reduce vibration that produces those risks to below the levels as listed in The Control of Vibration at Work Regulations 2005⁴³;
- ensure the legal limits on vibration exposure are not exceeded;
- provide information and training to employees on health risks and the actions you are taking to control those risks;
- carry out health surveillance (regular health checks) where there is a risk to health;
- keep a record of your risk assessment and control actions;
- keep health records for employees under health surveillance;
- review and update your risk assessment regularly.

What you need to do

308. Regular and frequent exposure to vibration from equipment (hand arm vibration) can cause damage to the nerves, soft tissue and joints in workers' hands and fingers, resulting in conditions such as vibration white finger and carpal tunnel syndrome. In many cases, the damage is permanent.
309. Workers who operate or drive off-road machinery may be exposed to high levels of whole-body vibration and suffer from low back pain.
310. Many types of equipment used in zoos have the potential to cause vibration-related injury, through poor design, poor maintenance or incorrect use. These may include:
- chainsaws used in forestry, fencing or enclosure maintenance work;
 - hammer drills used in routine maintenance or small construction projects in enclosures or public areas;
 - grinding wheels used in workshops;
 - leaf blowers used intensively to clear public areas and enclosures during autumn;

- trimmers and brush cutters for clearing and tidying public areas and enclosures;
 - tractors, ride-on mowers, mobile plant or small transport vehicles, particularly when used off-road in enclosures or in public areas.
311. The risk from vibration depends on how high the vibration levels are and how long your employees are exposed for. Things that may increase risk may include, but will not be limited to:
- old, worn or poorly maintained power tools that create high levels of vibration;
 - incorrect adjustment of straps, controls and harnesses on power tools;
 - incorrect use of power tools exposing users to higher risk of injury;
 - working with the arms raised or other awkward postures which decrease blood flow and increase the amount of force needed to support and operate the tool;
 - work in cold, wet conditions;
 - poor design, maintenance or adjustment of machinery seating and/or controls, making it difficult to operate the machine or vehicle easily or to see properly without twisting, bending or stretching. This will be made worse by travelling over rough ground or high speeds;
 - poor posture or sitting for long periods without being able to change position.
312. When deciding on control measures for eliminating or reducing the risk of vibration you should consider:
- when sourcing tools and equipment, include the requirement for them to produce the lowest possible levels of vibration;
 - eliminate exposure to vibration e.g. buy in finished materials instead of grinding metal or hand-sanding wood;
 - limit tool use and use work schedules that reduce individual employee exposures;
 - regular maintenance programmes for tools and equipment;
 - provide information, instruction and training on how to minimise exposure;
 - provide warm gloves and suitable clothing to protect employees from the cold and damp which can increase the risk.
313. Some individuals may already be suffering from the early effects of vibration or may be at higher risk. These may need to be provided with health surveillance and you should discuss this and their ongoing care and work with an occupational health specialist.
314. Some individuals may be at higher risk or need to be provided with health surveillance and you should discuss this with an occupational health specialist.

315. Further information on managing vibration at work can be found at the HSE webpage 'Vibration at Work'⁴⁴. See 'References and further reading' and at www.hse.gov.uk

Zoonoses

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Control of Substances Hazardous to Health Regulations 2002 (COSHH)¹⁶
316. You must prevent or, if this is not possible, control so far as is reasonably practicable your employees' exposure to substances which can cause harm to health. This includes exposure to biological agents capable of causing zoonotic disease. You should always work to eliminate risk, but control of exposure is adequate when the risk of harm is reduced to 'as low as is reasonably practicable'. You must carry out a COSHH risk assessment for activities involving exposure to zoonotic disease organisms.

What you need to do

317. Animals have the potential to transmit diseases to humans, known as "zoonoses". Even where the animals appear disease-free, their health status should be established by regular veterinary examination to identify latent infection or carriers, i.e. infected animals showing no symptoms. In the normal course of their work, zookeepers and other employees may be exposed to a variety of zoonotic infections including:
- avian and ovine chlamydiosis (psittacosis);
 - leptospirosis;
 - avian or swine influenza;
 - tuberculosis;
 - salmonellosis
 - any infection reliably attributable to work with animals or any potentially infected animal material.
318. Illnesses contracted at work are normally notifiable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (see above: RIDDOR)²².
319. You should identify if effective vaccines are available for diseases to which your employees may be exposed and offer them free of charge. They should be advised of the advantages and disadvantages of vaccination and the effect infection may have on their ability to continue working.
320. Medical screening of new employees will help identify their immunity status regarding common zoonotic disease. This may also indicate existing conditions that would make employees more vulnerable to infection.
321. Monitoring the health of employees likely to be at risk will help detect occupational illnesses. This should include investigating sickness absences, providing information

on signs of infection and encouraging all employees to report any suspicious symptoms they may have to their GP and line manager to assist with early diagnosis and infection controls.

322. Visitors to zoos can also be exposed to zoonoses, particularly if they feed or handle animals or in walk-through enclosures. Children and the elderly are especially vulnerable. See the section on public contact with animals.
323. Zoo operators need to take special precautions to reduce the risk of visitors being infected. Such precautions should include the isolation of sick or suspect animals. Zoonotic diseases can be transmitted from animals to people in numerous ways including:
- contact with bodily fluids such as saliva, blood, urine and other waste products for example via broken skin or by splashes in the eyes, mouth or nose
 - bites and scratches;
 - respiratory aerosols;
 - handling dead animals during post-mortem or butchering for feed.
324. Your COSHH risk assessment for work involving exposure to zoonotic disease organisms should include consideration of:
- the type/form of organism;
 - the potential sources of contamination (e.g. faeces, bedding, blood or other bodily fluids etc.);
 - the nature of the work carried out;
 - all potential routes of exposure (inhalation. Ingestion, injection or dermal);
 - the method of disease transmission and the existing controls in place;
 - the likelihood of exposure to and the consequences of infection. You should identify those who may be at more risk from infection, e.g. new or expectant mothers, immunocompromised individuals, people with underlying health conditions and children.
325. The measures you put in place to control zoonoses should take account of good animal husbandry techniques and should consider the following:
- regular, thorough handwashing using soap, preferably with warm water and paper handtowels. Anti-bacterial hand gels should not be regarded as a reliable hand cleaning method;
 - providing and monitoring the use of suitable and sufficient PPE as identified in the COSHH risk assessment, e.g. gloves, visors, aprons, boots, disposable gloves. See the Personal Protective Equipment section in this guidance;
 - providing adequate changes of clothing and laundering facilities for employees to allow soiled clothing to be changed promptly;

- providing showers and changing areas, following particularly dirty work;
- verifying the health and immunisation status of animals prior to their joining your collection and disease screening of animals before, during and on leaving your collection;
- regular animal health checks by a veterinary surgeon including parasite monitoring and control, skin treatment programmes and vaccination;
- safe quarantine and handling procedures for ill animals;
- maintaining good standards of hygiene in animal enclosures and exercising care in the use of water hoses during cleaning to minimise aerosol generation;
- avoiding contamination of animal drinking water with faeces;
- following established good practice when taking blood samples:
 - use vacutainer devices as appropriate rather than needles and syringes;
 - used needles should not be re-sheathed - they should be disposed of immediately into a suitable, clearly marked 'sharps' box;
 - make arrangements for the proper disposal of sharps and other clinical waste.
- avoiding mouth-to-mouth resuscitation techniques on new-born animals - use traditional husbandry methods instead;
- avoiding handling new-born animals or birth products with bare hands;
- disposing of animal waste correctly.

Personal hygiene

326. A good standard of personal hygiene should be strongly encouraged throughout the zoo. It is one of the most effective controls against zoonotic infection and should include:

- the provision of adequate washing facilities, including soap and running water, where possible warm, and paper towels wherever people come into contact with animals;
- wear appropriate gloves where possible;
- ensuring that cuts and abrasions are washed immediately with soap and running hot water (antiseptic wipes should only be used by a trained first-aider);
- ensuring that any existing cuts, abrasions and open sores are covered with a waterproof dressing before starting or returning to work or before further contact with animals;

- ensuring that people wash their hands regularly and especially before they eat, drink, smoke or use the toilet;
- ensuring people eat only in designated clean areas;
- training employees and advising visitors to:
 - avoid, wherever possible, any face-to-face contact with animals;
 - keep their hands away from their face, particularly the mouth, nose and eyes; and
 - avoid tasting food intended for animals.
- training employees to recognise zoonotic infection risks as well as the necessary control measures;
- the provision and monitoring of the use of protective clothing by staff;
- ensuring that employees clean or change footwear and overalls before leaving animal areas, disinfect footwear if necessary and wash their hands after handling contaminated clothing.

Information, instruction and training

327. The zoonotic risks associated with working in contact with animals should be included in the ongoing training of all employees. Sufficient information should be given to enable managers and their employees to effectively contribute to the assessment and control of the risks and thereby prevent infections. This should also cover the practical use of procedures, techniques and safety equipment required to control the risk of infection.
328. Further information on COSHH can be found in the HSE guidance document 'Working with substances hazardous to health - A brief guide to COSHH'¹⁷. See 'References and further reading' and the HSE website at www.hse.gov.uk See also Chapter 2 in this guide.
329. Further information on managing zoonoses and RIDDOR¹⁹ notifiable diseases can be found in the HSE webpage 'Zoonoses'³⁰. See 'References and further reading' and the HSE website at www.hse.gov.uk

Chapter 5 Accidents, Emergencies, Security and Communications

330. You are required to assess the risks to people created by your business and put in place reasonably practicable control measures.
331. Where possible you should anticipate issues and put in place passive control measures e.g. automatic fire alarm and extinguisher systems or vehicular traffic restriction posts and bollards that will either eliminate the risks to people or mitigate any outcome. Where this is not possible you must put in place systems and procedures to reduce so far as is reasonably practicable the risks to the health and safety of people.

Emergencies

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
332. You are required to assess and eliminate the risks created by your work. Where this is not possible you are to put in place reasonably practicable control measures to control them.
333. This duty will include the requirement to assess and have reasonably practicable measures in place to deal with foreseeable emergencies.

What you need to do

334. All workplaces should have plans to deal with emergencies. The complexity and depth of the plans will depend upon what they are created to control. Plans should be in place to cope with reasonably foreseeable events such as:
- death or serious injury of an employee or a member of the public;
 - an explosion (non-terror related);
 - flooding;
 - extremes of weather;
 - animal escapes;
 - electrocution;
 - major fire;
 - major chemical spill.
335. These events may occur individually or in combination, for example a fire causing damage to an enclosure: your plan should take into account the potential for multiple events to occur simultaneously or consecutively;

336. Quick and effective action will calm the situation, allow control to be established, reduce the consequences and allow the business to get back to normal as soon as possible. This will only be possible if people are working together to a well-rehearsed plan.
337. Factors that should be included in emergency plans will include but not be limited to:
- high level ownership and input;
 - regular, realistic rehearsal at all levels to test the plan;
 - inclusion of outside agencies in planning e.g. the emergency services and utilities;
 - training staff to ensure they will react correctly in a variety of circumstances;
 - clear lines of command and control with defined responsibilities and oversight to ensure critical tasks are completed;
 - procedures to communicate quickly and effectively with the public to reassure and to guide them to safety;
 - contingency plans to deal with loss of business-critical facilities such as power, high-profile enclosures etc.
 - coordination with other duty holders/franchisees etc. on site;
 - dealing with the media.
338. Different emergencies will have different specific details to be dealt with. General points that should be included in all emergency plans will include:
- consider how the alarm will be raised and what might happen afterwards, especially regarding the public and consider pre-warning staff. Do not forget night and shift working, weekends and times when the premises are closed or when manning is reduced, e.g. holidays;
 - plan what to do, including how to call the emergency services. Help them by clearly marking your premises from the road and meeting them on arrival with directions and a clear briefing of the situation. Consider drawing up a simple plan showing the location of hazardous items. Ensure their routes on site are clear;
 - decide where staff and the public are to go to reach a place of safety and to get rescue equipment and ensure this is communicated effectively. You must provide suitable forms of emergency lighting;
 - you must ensure there are enough emergency exits for everyone to escape quickly and keep emergency doors and escape routes unobstructed and clearly marked. Ensure the public know what to do in case of a dangerous animal escape;
 - nominate competent people to take control before the emergency;

- decide which other key people you need such as a nominated incident controller, someone who is able to provide technical and other site-specific information if necessary and first-aiders;
 - plan essential actions such as emergency plant shutdown, isolation or making processes and animals safe. Clearly identify important items like shut-off valves and electrical isolators etc.
 - ensure people cannot increase their risk by escaping to a more dangerous area;
 - ensure your plans take account of disabled and otherwise vulnerable people.
339. You should liaise closely with the emergency services in your area to ensure they are aware of both the risks and hazards in your premises and how they can manage any emergency without creating risks to themselves or others.
340. You must train all staff in emergency procedures. Do not forget the needs of people with disabilities and vulnerable workers.
341. Work should not resume after an emergency if a serious danger remains. If you have any doubts, ask for assistance from the emergency services.

Communication systems

342. Communication systems are vital in zoos, particularly in larger establishments or those containing dangerous animals where employees may find themselves working alone in remote, confined or difficult situations. Zoo staff must be contactable when there is a need to:
- communicate during an emergency e.g. fire, animal escape, security threats or accident;
 - summon assistance, particularly in the case of vulnerable employees or those working alone;
 - report a serious maintenance matter requiring urgent attention, or stop a work activity, where a serious uncontrolled risk has been identified.
343. Clear and effective communication in these situations can be critical and you should have a robust system in place to ensure staff can communicate easily and effectively.
344. The use of public address systems may also form part of the communication system and may be an important part of any emergency notification system for managing visitors. Where no public address system exists, there should be enough staff to ensure verbal communication with visitors is effective.
345. Mobile phones can be useful for routine communication but the potential for network disruptions and restrictions limit their effectiveness in major emergencies.
346. Where a radio system is to be used the following should be considered during operational use and training:
- clear instructions regarding minimising the use of the radio, especially during emergencies;
 - visitors will sometimes overhear messages; staff must know what the effects of this could be and what appropriate and inappropriate use of the system is;
 - daily and ongoing checks to ensure that the equipment is working correctly, especially where a person is working alone;
 - the development and management of a robust battery-charging regime;
 - tests to ensure that the equipment operates in all areas and find effective alternatives where it doesn't;
 - contingency planning for when the system fails;
 - appropriate controls when working close to animals, e.g. volume control;
 - the use of a second channel or coded instructions/information when the message content, if overheard, could potentially cause undue public alarm or panic.

Fire

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - England and Wales – The Regulatory Reform (Fire Safety) Order 2005⁴⁵
 - Scotland - The Fire Safety (Scotland) Regulations 2006⁴⁶
 - Northern Ireland - The Fire Safety Regulations (Northern Ireland) 2010⁴⁷
347. As the employer you are deemed to be the 'Responsible Person' (RP) and have duties under the fire safety legislation for fire safety in non-domestic premises. You must ensure the safety of people by putting in place and maintaining appropriate fire safety measures based on an assessment of risk. This includes planning for emergencies and providing staff with information, fire safety instruction and training. You must also cooperate with other employers (who may also be RP) sharing your premises in relation to fire safety. You may identify Competent People (CP) to assist you in carrying out your duties.

What you need to do

348. Fires in zoos can have devastating consequences for employees, visitors, and animal collections. Effective fire safety depends on a combination of physical, passive and active fire precautions, and a robust and effective system of management. Fire safety in the zoo environment is particularly challenging due to the presence of animals and large numbers of visitors who are unfamiliar with your premises.
349. As the RP for the zoo, you must ensure that a suitable and sufficient fire risk assessment is carried out by a competent person. This will help you to determine if you need to implement additional physical and/or procedural controls to prevent a fire from starting, to minimise its spread and to ensure that people can escape safely. The risk assessment should be reviewed on a regular basis and updated when there are any significant changes.
350. Further in-depth information and guidance around the conducting of fire risk assessments in a variety of different types of premises can be found in the Fire Risk Assessment Guides⁴⁸. You may need to use different guides for different premises within your zoo e.g. shops, educational establishments etc. See 'References and further reading'.
351. When conducting the risk assessment for the zoo premises the following should be considered and controlled but this list is not exhaustive, and the final assessment will be premises dependent:

Fire hazards

- Sources of ignition:
 - visitors or staff smoking materials;
 - electrical faults in buildings or outside installations e.g. lighting;
 - fire spreading from outside the zoo;
 - hot work;
 - arson.
- Sources of fuel:
 - animal feed or bedding;
 - inappropriately stored flammable liquids e.g. paints, solvents, vehicle fuels;
 - long grass and other vegetation;
 - waste including litter, scrap wood, plastic, old furniture;
 - temporary structures e.g. tents, pop-up shops, displays;
 - gases e.g. LPG, acetylene.
- Sources of oxygen:
 - general air;
 - oxygen used in veterinary procedures;
 - certain fertilisers used on grass.

People at risk

- In and around the premises:
 - staff, contractors, visitors.
- People especially at risk:
 - the disabled, unaccompanied children, lone workers, non-English speakers, those impaired through drugs or alcohol.

Warning of fire

352. You must provide adequate warning of fire to all who may be affected by it. This could range from people shouting 'Fire Fire Fire' to complex electronic fire alarm systems and will depend upon the size, type, occupation, purpose and use of the premises. When assessing the adequacy of an alarm system you should consider:

- the alarm's effectiveness throughout the premises including within any animal enclosures;

- the type of occupants or activity in the building; will a sudden loud alarm cause animals to behave unexpectedly whilst keepers are inside an enclosure?
- does the building have areas where fire could develop undetected such as feed stores, or do people work alone in the building? If so, automatic fire detection may be necessary;
- how the Fire Service will be called;
- if a multi-occupancy building, how are other occupants notified?
- the effectiveness and frequency of the testing and maintenance regime for the alarm system.

Fire-fighting equipment

353. You must provide fire-fighting equipment that is appropriate to the size and layout of the premises, with what is likely to burn and the nature of the activities.
354. You must also ensure all fire-fighting equipment is in the correct place and position, is regularly maintained by competent people and is in satisfactory order before the premises are used.
355. Different extinguisher types and systems will be required in different parts of the zoo e.g. certain gas extinguishers are suffocants whilst water should not be used on fires where fats, electrical or liquid fuels are involved; each location should be individually assessed. Further guidance on the selection of firefighting equipment can be found in the Fire Risk Assessment Guides⁴⁹. See 'References and further reading'.

Fire escape routes and fire exits

356. You must ensure that your risk assessment identifies adequate fire escape routes; that they are in place and kept clear and free from hazards. Your escape routes should also be suitable for staff and visitors who may be disabled, are not familiar with the layout, may be unaccompanied children and those who are less able such as the elderly or infirm.
357. Particular care must be taken during or after building or maintenance works to ensure fire escape routes are not blocked and still allow people to escape to a place of safety.
358. Consideration should be given to the safety and security of animals should a fire occur. Fire escape routes for people should not be impeded by any animal evacuation movements and dangerous animals must remain secure.

Training, instruction and information

359. All your staff must be given information and instruction on fire safety as part of their induction, when the premises or their work changes and regularly after that. Ensure you include staff who work outside normal working hours, such as keepers, volunteers, security, cleaners or maintenance staff, etc.
360. Contractors must also be given sufficient instruction and training on your fire safety procedures. They must be given more in-depth instruction if their work is likely to involve heat or open flames.

361. The training should include:

- the significant findings from your fire risk assessment;
- the measures that you have put in place to reduce the risk;
- what staff and contractors should do if there is a fire;
- the identity of people you have nominated with responsibilities for fire safety; and
- any special arrangements for serious and imminent danger to persons from fire.

362. Further, comprehensive guidance on all aspects of assessing and planning for fire control can be found in the fire risk assessment guides⁴⁹. See 'References and further reading' and the Government website at www.gov.uk

Firearms, blowpipes and dart guns etc.

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Firearms Act 1968 (as amended)⁴⁹
 - The Firearms Rules 2017⁵⁰
363. If you use firearms, blowpipes, dart guns etc. you must ensure that all reasonably practicable measures are in place to ensure the storage and use of such weapons and equipment and their ammunition does not create uncontrolled risks to people.

What you need to do

364. Firearms and/or dart guns/blowpipes have numerous uses including for:
- vermin control;
 - delivering medication;
 - euthanasia or despatch;
 - sedation or general anaesthesia;
 - training;
 - last resort control method.
365. Where there are hazardous animals whose escape or uncontrolled movement may represent a significant risk to employees or members of the public, pressure may be applied to regain control of the situation and management control must be clear and tight. The use of firearms is a high-risk activity with the potential to cause fatal or serious injury if high levels of control of their use are not maintained and rigorously enforced.
366. Zoos should ensure they have discussed plans with their local police force for dealing with situations where an animal may have escaped from the confines of the zoo grounds, and/or have to be despatched or sedated in a public area using zoo specialist firearms, blowpipes or dart guns etc.
367. Staff must not use or have access to firearms, blowpipes or dart guns for which they are not licensed and/or authorised and competent. Personnel using firearms, blowpipes and dart guns must have received adequate training for their work and any certificates or licence applications and approvals must reflect the likely uses. The zoo must ensure there are always sufficient numbers of licensed, trained and competent staff available to deal with situations where these items may be needed.
368. Firearms staff who may be required to operate in areas where the public or other people may be present must undergo realistic training and undertake regular practice exercises in the use of their weapons and in the conditions in which they are likely to

have to operate. Regular refresher training and re-assessment must be carried out and documented. The training should consider the use of firearms in public and in what may be controversial circumstances. Outside assistance with training may be necessary for this.

369. Staff using blow pipes and dart guns must be trained in the safe use of the equipment including loading and unloading the medicines etc. that may be delivered in the darts. This will include emergency protocols for accidents and the use of antidotes.
370. The zoo should hold on site the firearms of the minimum calibre necessary and the appropriate ammunition to control the risks presented by the animals in the collection. The amount of ammunition held on hand should also be the minimum necessary to allow for training and any operational use. All firearms and ammunition must be stored in secure containers approved under the current firearms legislation.
371. All firearms, blowpipes and dart guns must be appropriately and correctly maintained and inspected regularly and serviced as appropriate by a competent person i.e. a registered armourer to ensure they are safe for use.
372. In drive-through enclosures where the public are close to dangerous animals, firearms will need to be on hand at all times. Special arrangements such as secure boxes in patrol vehicles manned by competent firearms staff may be needed.
373. Use of a firearm other than for routine euthanasia, training or vermin control must be approved at the highest level and only as a last resort when people are at risk e.g. if a dangerous animal is at large in public or is escaping, and despatching it is the only viable option to prevent that escape.
374. A risk assessment must be carried out every time a firearm, blowpipe or dart gun is used. In emergencies or fast-moving situations, this assessment may be dynamic, but its significant findings should be written down once the situation is resolved. Depending upon circumstances, the following factors may need to be considered:
 - ensuring the minimum number of people are in the area;
 - ensuring the operator or their 'spotters' do not get into a position of danger from the animal;
 - using the calibre necessary to achieve the aim and reduce the possibility of 'shoot through' or collateral damage in case of ricochet or missed shot;
 - where reasonably practicable and safe, using a competent 'spotter' to advise the marksman of potential risks such as people in the danger area;
 - ensuring the target is in clear sight before the shot is taken and with a background clear of cover or places where people may be;
 - ensuring a 'safe shot' with an appropriate backstop in case of 'shoot through' or a miss;
 - ensuring the animal is dead or sufficiently incapacitated post shot so that it poses no further risk to people before leaving the scene;
 - The risk assessment should also include related non-firearms risks, for example work at height, use of vehicles, manual handling of darted animals etc.

- All animal collections that contain potentially dangerous animals are required to have written procedures in place which allow them to efficiently and effectively manage escapes, and carry out regular drills and firing practices. Further information can be found in the BIAZA document 'Guidelines for the use of firearms in zoos and safari parks'⁵¹. See also 'References and further reading'.

First aid

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
 - The Health and Safety (First-Aid) Regulations 1981 (as amended)⁵²
375. You must make appropriate first-aid arrangements for your workplace. In doing so you should consider the circumstances of your workplace, workforce and the health and safety risks that may be present to help you decide what arrangements you need to put in place.
376. You must provide all your employees with details of the first-aid arrangements.

What you need to do?

377. In the event of injury or sudden illness in your workplace, failure to provide first aid could result in the person's death or permanent incapacity. Having clear processes in place for providing assistance is essential in reducing these risks.
378. You must provide adequate and appropriate equipment, facilities and adequately trained personnel to ensure your staff promptly receive the necessary attention if they are injured or taken ill at work.
379. When deciding upon what is required for first aid, you must consider the less common hazards present in a zoo or aquarium. These may require first aid treatment for unusual incidents such as:
- venomous bites and stings;
 - bites from animals which carry especially harmful mouth bacteria, which are usually treated with antibiotics as a precautionary measure;
 - severe trauma;
 - injection with animal medicines.
380. Suitable training for first aid staff may need to accommodate supplementary skills not normally included in a general first aid at work qualification to be able to competently treat or stabilise these conditions until competent help arrives.
381. Whilst first aid provision for visitors is not a direct legal requirement it should be provided as part of the zoo's duty of care. The type of first aid offered, should reflect the incident demographic, i.e. most frequently injuries will be minor, such as those resulting from slips trip and falls of children; and that more serious incidents are likely

to be of a medical nature. Staff should be trained in the use of defibrillators if these are available.

Terrorism and security issues

Key legislation and what the law requires

- Health and Safety at Work etc. Act 1974⁴
 - The Management of Health and Safety at Work Regulations 1999⁶
382. You must identify, assess and eliminate or, if that is not possible, so far as is reasonably practicable, control the significant risks arising from your work activities. This would include taking reasonable steps to reduce the possibility of a terrorist or similar security incident in your zoo.

What you need to do?

383. Although rare, terrorist attacks in the UK are a real and serious danger especially where there are large numbers of people at leisure. A zoo would be seen as a soft target with limited protective security and the potential to cause large numbers of fatalities and casualties.
384. As has been seen in the UK and across Europe, attacks can happen at any time and any place without warning. Understanding the threat, and how it can be mitigated by putting in place what are often simple control measures, will make it less likely your zoo will be targeted.
385. The UK Government has produced 'Crowded Places Guidance'⁵³ listed in 'References and further reading'.

**Annex A to
BIAZA Health and Safety Guidelines for Zoos and Aquariums**

Principles of prevention and the control of risks from contact with zoo animals

Legislation requires that workplace hazards be controlled in accordance with the General Principles of Prevention. Numerous examples of this principle can be found applying to working at height, control of chemicals and workplace transport etc.

The Principles should be treated as a 'hierarchy of risk control' and duty holders must use the highest reasonably practicable control level on the hierarchy. Any regulatory investigation involving animal safety will seek to establish why it was not reasonably practicable to use a higher level of risk control. If it was feasible, a possible breach of law will have been established.

Different work activities with the same species or even a specific animal may require different risk control strategies. The highest reasonably practicable level must always be employed. Any planned or possible contact must be subjected to a risk assessment by a person competent to plan and conduct the contact.

'Animal' should be widely interpreted to mean any creature kept in the collection.

'Dangerous or potentially dangerous' should be widely interpreted to mean any hazard i.e. physical, venomous, health hazard, disease transmission etc. This must be determined by risk assessment and take into consideration guidance from elsewhere such as the Secretary of State's Standards of Modern Zoo Practice³.

'Direct contact' should be widely interpreted to mean where physical contact is possible. 'Contact' should be widely interpreted to mean any interaction with an animal or its environment including for example 'Keeper for a Day', feeding experiences and petting areas.

Any contact with animals carries the risk of zoonoses and other health hazards and should be assessed accordingly.

Prevention principle	Possible route to compliance	Possible hazard controls
Eliminate the hazard.	Do not keep dangerous or potentially dangerous animals in a collection.	Remove and do not keep dangerous or potentially dangerous animals in a collection thereby removing both the hazard and the risk to people.
	Eliminate the possibility of any direct contact with dangerous or potentially dangerous animals.	<ul style="list-style-type: none"> • Design or modify enclosures so that necessary routine contact with animals is done from outside or from secure areas. • Design or modify enclosures so that equipment can be used to reach into enclosures to carry out necessary work tasks. • Design or modify enclosures so that inspection and maintenance tasks can be completed from outside

Prevention principle	Possible route to compliance	Possible hazard controls
		<p>enclosures.</p> <ul style="list-style-type: none"> • Design or modify enclosures so that animals can be secured in a separate, equally secure area before making any necessary entry to the enclosure. See section on animals enclosures (chapter 3).
<p>Reduce the risk from the hazard to the lowest reasonably practicable level</p>	<p>Permit only necessary, possible direct contact with dangerous animals or potentially dangerous animals.</p>	<ul style="list-style-type: none"> • Animal is sedated or anaesthetised to a state where it does not constitute a risk to people. • Animal is contained in an appropriate restraint/crush or tethered in a way that prevents it creating a risk to people. • Use refuges/vehicles or similar to provide place of safety. • Have immediate access to equipment e.g. nets/firearms etc. necessary to control the animal if necessary. • Reduce the numbers of people involved and the contact time to what is absolutely necessary. • Only competent and authorised people should be in a situation where direct contact is possible. • Staff should never work alone where direct contact is possible and there should be continual oversight and supervision of the work. • Enclosure is kept locked and keys are held by competent, authorised staff only. • Locks and gates must be checked by a second person when all people have left the enclosure.
	<p>Permit only necessary contact with animals other than those above.</p>	<ul style="list-style-type: none"> • Reduce the numbers of people involved and the contact time to what is absolutely necessary.

Prevention principle	Possible route to compliance	Possible hazard controls
<p>Manage the risks created by contact.</p>	<p>Permit routine contact with animals that are not dangerous or potentially dangerous e.g. petting area, walk-throughs, large animal feeding etc.</p>	<ul style="list-style-type: none"> • Must always be supervised by a competent person. • If the contact animal is dangerous or potentially dangerous, such measures as are necessary should be taken to ensure there is no risk to people from it. • Clear instructions are given about the contact, its risks and the importance of control measures i.e. hygiene • The contact must be assessed and restricted to those people capable of understanding the risks and following instructions. • Robust plans in place to deal with unforeseen situations. • If the contact animal is dangerous or potentially dangerous, such measures as are necessary should be taken to ensure there is no risk to people from it. • Use PPE identified in the risk assessment.

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