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2 Occupational health and hygiene

2.1 Introduction

The Health and Safety at Work Act 1974 places duties on employers to provide a safe and healthy workplace. In particular, Section 2.2 (d) requires 'the maintenance of any place of work...in a condition that is safe and without risks to health...' and Section 2.2 (e) requires 'the provision and maintenance of a working environment for employees that is.. .safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work'.

These duties rely upon individuals, particularly those working alone, taking a high degree of responsibility for their own working practices. Consideration should also be given to good personal hygiene as an essential element in preventing illness and disease at work.

Chemicals, oils and some plants are hazardous, whilst some micro organisms are an unseen hazard. This section looks at the most common hazards faced in the countryside, and is broken down into 3 areas according to the nature of the hazard - Biological, Chemical and Physical.

2.1.1 General precautions

In general, these simple steps should be taken to help prevent illness or disease from many of the hazards in the following sections:

- Always wash hands and, if necessary, forearms and face in clean water after work or after using the toilet and before eating, drinking or smoking.
- If obliged to eat without washing hands, avoid touching food directly. Pick food up with something clean e.g. a clean plastic bag or paper.
- Clean and cover small cuts and abrasions immediately with a sterile dressing and get first aid treatment if necessary.
- Wear any personal protective equipment (PPE) issued to you. If PPE is not issued to you, you can request it if you believe the task requires it.
- All outdoor workers should have an up-to-date tetanus inoculation.
- Keep your doctor informed of the nature of your work so that he/she will be aware of any occupational diseases.
- Avoid inhaling substances and vapours which might be dangerous in the long term.
- Do not drink stream water, or assume it is clean enough to wash hands effectively.

2.2 Biological factors

2.2.1 Tetanus infection

It is important that everybody working in the field is protected against tetanus infection. The occasional death from this completely preventable disease emphasises the need for everyone in this type of work to take this simple precaution.

Tetanus spores are commonly found in soil and may affect quite minor wounds where the skin is broken. Tetanus protection is free on the National Health Service and involves two injections within six weeks and a third within six months. Protection lasts for at least five years, after which a booster is often required. Anyone who has not received tetanus protection within the last five years, or anyone who is not sure when their next booster is required, should see their doctor and discuss this matter immediately.

2.2.2 Hepatitis and E.coli

Both Hepatitis and E.coli are viruses which are transmitted mainly via the faecal/oral route. E.coli may also present a risk to anyone working with stock.

A. Hepatitis

Hepatitis is a term describing inflammation of the liver. There are five types of hepatitis, though only A and B are possible risks for outdoor workers. Symptoms include fatigue, loss of appetite, jaundice, pain and change of colour of urine and faeces.

Hepatitis A virus (HAV) is spread through the ingestion of contaminated food or water. The incidence of HAV can increase where there is poor sanitation and/or poor personal hygiene. The HAV has been found in swimming pools, the open sea and waterways contaminated by raw sewage.

Hepatitis B virus (HBV) is transmitted through contact with infected blood, blood products and injury from infected needles. It is considered a sexually transmitted disease. The HBV is relatively robust and may survive for up to 6 months in optimal conditions.

To minimise the risk of contracting either form of hepatitis the following precautions should be taken:

- Identify all workers likely to come into contact with any of the potential hosts during the course of their work.
- Ensure anyone working in parks and gardens, or anywhere where needles or other discarded 'sharps' may be found, checks the area before working in it.
- Ensure any body of water which is to be worked in or on is sampled and checked if contamination by sewage is suspected.
- Strong needle proof gloves must be worn, or tools such as litter pickers used, when handling sharps, and a safe system of disposal must be followed. This could include obtaining 'sharps' boxes from the local Health Trust.
- All food handlers must follow stringent hygiene rules, including thoroughly washing hands after any visit to the toilet, and prior to eating, drinking, smoking or handling food.
- Recommend immunisation for any employees likely to be working regularly in high risk areas such as refuse collection.
- First aiders must wear disposable plastic gloves when providing first aid, and the gloves disposed of safely after use.

Work with the greatest degree of risk includes litter collection, tree planting or work involving disturbance of soil in urban areas, stream and pond management and giving first aid. Only incidents of Hepatitis directly attributable to work in professions designated under RIDDOR need be reported. These professions *do not include anyone* in the countryside sector.

B. E.coli O157:H7

Escherichia coli O157:H7 is an emerging cause of food borne illness. E. coli O157:H7 infection often causes severe bloody diarrhoea and abdominal cramps; sometimes the infection causes non-bloody diarrhoea or no symptoms. Usually little or no fever is present, and the illness resolves in 5 to 10 days but occasionally it can lead to kidney failure. Most illness has been associated with eating undercooked, contaminated ground beef. Infection can also occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.

The organism can be found on a small number of cattle farms and can live in the intestines of healthy cattle. Meat can become contaminated during slaughter, and organisms can be thoroughly mixed into beef when it is ground. Bacteria present on the cow's udders or on equipment may get into raw milk.

In food preparation, E. coli O157:H7 infection can be prevented by thoroughly cooking ground beef, avoiding unpasteurised milk, and washing hands carefully.

In work on cattle farms, E. coli O157:H7 infection can be prevented by following high standards of personal hygiene - wash hands thoroughly before smoking, eating or drinking; wash and disinfect any protective clothing used and leave any protective clothing on site.

Most persons recover without antibiotics or other specific treatment in 5-10 days. There is no evidence that antibiotics improve the course of disease, and it is thought that treatment with some antibiotics may precipitate kidney complications. Anti-diarrhoea agents, such as loperamide (Immodium), should also be avoided.

2.2.3 Weil's disease or Leptospirosis

Background

The number of reported incidents of leptospirosis (Weil's disease) is increasing annually, although it must be stressed that instances are still extremely rare.

As a result, those staff likely to come into contact with it should be made aware of the health risks and precautions they need to take to avoid infection.

The leptospira organism is a parasite of animals and man (who is always an accidental host). The natural reservoir is wild animals, particularly rodents (rats), and some domestic animals such as cattle. Farm livestock may become infected by contact with an infected host or via leptospira organisms specific to that species.

The host animal carries leptospires in its kidneys and excretes the organism in urine, contaminating the surrounding environment. Human infection results from direct or indirect exposure to urine. Historically, occupations associated with rat infested environments, e.g. sewer workers and water workers were particularly at risk. Recent evidence shows that the organism is common in rivers, ditches and water courses and on farms, particularly in hay stacks and animal food stores. The main occupational groups at risk today are farmers, people working regularly in wet environments, anglers and water sports enthusiasts.

The disease is contracted by leptospires entering the body through cuts and abrasions in the skin or via the mucous membrane of the nose, mouth and eyes.

Two varieties of leptospirosis are of main concern:

Cattle associated leptospirosis (CAL). It is estimated that 50-70% of all cattle in Great Britain carry this organism. It can be contracted by working in close contact with cattle particularly at milking, during de-horning and during general rounding up periods. Symptoms in humans are a flu-like illness, severe headache and meningitis.

Weil's disease or leptospiral jaundice. This is most commonly associated with rodents, particularly rats. The symptoms associated with this form are jaundice, meningitis, conjunctivitis and renal failure. In severe cases it can lead to death.

Precautions to be taken against the risk of leptospirosis

- After working in contact with cattle, rodents or anything which may have been contaminated by them, wash hands and forearms thoroughly with soap and water, particularly before eating, drinking or smoking.
- Wet protective clothing should be dried as soon as possible.
- Wear waders and waterproof gloves if working in water.
- Avoid rubbing your nose, mouth or eyes with wet hands.
- Cover new or recent wounds and abrasions with good quality, watertight adhesive dressings. Keep the wound covered until it is healed.
- Early reporting and treatment of any infection is paramount.
- Employees should inform their GP of the nature of their work.

Weil's disease is specifically included as a reportable disease under RIDDOR.

Further guidance

HSE Agricultural pages on ww.hse.gov.uk topics such as *zoonoses in agriculture.*
HSE leaflet IND(G) 84L. HSE. *Leptospirosis - are you at risk?*
HSE booklet HSG270 *Farmwise Your essential guide to health and safety in agriculture*

2.2.4 Lyme Disease

Lyme Disease is an infection transmitted to humans by the bite of an adult female tick (in Europe, the hard-backed sheep tick *Ixodes ricinus).* However, not all ticks carry the bacteria, and most tick bites do not lead to infection.

The most common sign is a mild skin rash occurring a few days after a bite. It begins as a red spot at the site of the tick bite and then enlarges to a faint pink ring some 2-3 cm wide, leaving the central area clear. It can be so faint as to escape notice. The skin rash may be accompanied by fever, malaise and enlargement of local lymph glands. Secondary complications, which are considered rare, can occur several weeks after the bite and may be arthritic, neurological or cardiac. The infection responds well to treatment with appropriate antibiotics during the early stages.

While the incidence of Lyme Disease in the United Kingdom is still low, it is on the increase. In the United Kingdom the carrier ticks are commonly found in the Scottish Highlands and uplands, the Pennines, the Lake District, Wales and the Welsh Marches, Southwest England, the New Forest, Thetford Chase and the

North and South Downs. However they can be found almost anywhere if the appropriate conditions exist, e.g. long grass, and can occur in urban parks.

Prevention

Bites are largely prevented by wearing appropriate clothing, especially to cover the legs. High boots, wellingtons or gaiters are helpful. Arm coverings should include a close fitting cuff to help exclude ticks. Avoiding sitting directly on long grass, use a tarp or sheet to sit on. Workers should inspect their skin for ticks when bathing or showering after work. If ticks are noticed during working day, they should be removed without delay. Hands should be washed in soap and water or cleaned with a disposable cleaning wipe before doing so.

The feeding tick lies parallel to the skin with its mouth parts at right angles to the skin. Using a medical wipe, gently raise the tick's body until it is in line with its mouth parts. Carefully extract the tick by twisting it anti-clockwise, and clean the skin with a medical wipe.

If the site of the tick bite remains unhealed, if a skin rash develops, or if you feel unwell, then see your doctor immediately and tell him/her you might have the disease. Such cases are reportable to the Enforcing Authority under RIDDOR arrangements (see Section 1.10).

Lyme Disease and seabirds

Borrelia burgdorferi, the spirochete that causes Lyme Disease in humans, has recently been isolated from ticks in seabirds in Sweden and Britain. Researchers and other field staff working in seabird colonies where this tick is present may be at risk of acquiring Lyme Disease. People working in this environment should follow the precautions described above.

Further guidance

Forest Enterprises, National Trust, Arun District Council et al. *Ticks and Lyme Disease*
See also further guidance for Leptospirosis.

2.2.5 Toxocariasis

Toxocariasis is a condition contracted from *Toxocara* canis, common dog roundworm. Eggs from the alimentary canal of young dogs may be ingested by anyone fondling the animals or eating soil or vegetables contaminated by canine faeces. The eggs then hatch in the human intestine and the larvae migrate widely via the blood vessels before ultimately dying. Development of the eggs in temperate areas such as the UK is generally restricted to the summer months. Recent studies in Europe and North America have shown a substantial reservoir of infection in the urban environment, with between 5% and 25% of soil samples taken from parks, gardens and sandpits containing *toxocara* eggs.

Reaction to the migrating larvae includes fever, coughing and/or wheeziness and pallor. Some children have also developed ocular toxocariasis, with damage to the retina ensuing.

Preventative measures include worming of young dogs, and preventing them coming into contact with young children. For conservation projects it is important to:

- highlight the possibility of contact with dog faeces when working in high risk areas, or carrying out work where contact with soil is likely e.g. tree planting.

- wear gloves to prevent skin contact.

- wash gloves and hands thoroughly before eating, smoking or drinking.

- wear face masks and full face visor when using a strimmer.

Toxocara catis is a similar infection of cats, but appears to be much less frequently transmitted to humans. Precautions taken above would be appropriate.

2.2.6 Stings and bites

A. Insect stings

Bee, wasp and hornet stings are usually more painful and alarming than they are dangerous. An initial sharp pain is followed by mild swelling and soreness which can be relieved with first aid. Many caterpillars, but more particularly yellow, brown tailed and Lackey moths, have rows of hairs along their bodies the tips of which carry small amounts of toxins. These hairs coming into contact with sensitive skin can produce a rash or slight swelling. To protect yourself avoid handling any "hairy type" caterpillars, wear long sleeves.

Treatment

If the sting is still in the skin, remove it carefully with a pair of tweezers. Grasp the sting below the poison sac as close to the skin as possible and pluck firmly.
Apply a cold compress to relieve pain and minimise swelling. Advise the casualty to see his /her own doctor if pain and swelling persist or increase.
For a sting in the mouth, give the casualty ice to suck to minimise swelling and seek medical assistance immediately.
If a rash develops from contact with caterpillars, treat with a proprietary insect sting/bite cream or in severe cases seek medical advice.

Anaphylactic shock

Some people are allergic to these stings and can rapidly develop the serious condition, anaphylactic shock. This is the name given to a massive allergic reaction within the body. It is a serious, potentially fatal condition that may develop in some people within a few minutes or seconds of a sting from a particular insect. Managers should ask before work starts if anyone is aware they suffer from this reaction.

The reaction causes substances to be released into the blood that dilate blood vessels and constrict air passages. Blood pressure falls dramatically and breathing becomes difficult. Swelling of the face and neck increases the risk of suffocation. The amount of oxygen reaching the vital organs is severely reduced. The casualty urgently needs oxygen and a life-saving injection of adrenaline. There is no specific first aid treatment beyond assisting breathing and minimising shock until help arrives.

Seek assistance immediately once symptoms appear. The symptoms to look out for after a sting include:

- Anxiety
- Widespread red, blotchy skin eruptions
- Swelling of the face and neck
- Puffiness around the eyes
- Impaired breathing, ranging from a tight chest to severe difficulty.
- The casualty may wheeze and gasp for air
- A rapid pulse
- Slurred speech

B. Injuries by marine creatures

Sea creatures can cause injury in a number of ways. Jellyfish, corals and sea anemones can sting. Their venom is contained in stinging cells (nematocysts) that stick to the victim's skin. It is released when the cell ruptures.

If a spiny creature such as a sea urchin or weever fish is trodden on, its spines may puncture the skin and break off to become embedded in the foot.

A painful local reaction will usually develop, though serious effects are rare.

Most of the marine species normally encountered in British and Irish waters are not very toxic.

The weever fish is commonly found in British and Irish waters. It lies buried in the sand close to the shoreline so it is easily trodden on. Venomous spines on the gill covers and first dorsal fin may puncture the skin causing swelling and soreness.

To treat a weever fish puncture wound or other similar wound:

- Put the injured part in water as hot as the casualty can bear for at least 30 minutes. Top up the water periodically as it cools, being careful not to scald.
- Take or send the casualty to hospital, where spines remaining in the skin may have to be removed.
- To treat stings from other marine creatures:
- Pour alcohol (any alcoholic drink will do) or vinegar over the injury for a few minutes to incapacitate stinging cells that have not ruptured.
- Apply a paste of equal parts sodium bicarbonate (baking powder) and water to the wound.
- Dust a dry powder over the skin around the injury to make the remaining cells stick together. Talcum powder will suffice, but meat tenderiser is better still. One active ingredient, papain, can inactivate venom.
- If the injuries are severe or there is a serious generalised reaction, seek medical attention immediately.

C. Adder bites

The adder is the only poisonous snake native to the UK. Its bite is rarely fatal but can be very frightening for the victim.

Treatment

- Lay the casualty down and tell them to keep calm and still.
- Do not attempt either to suck the poison out or to apply a tourniquet.
- Keep the wounded part below the level of the heart so that the venom is contained locally.
- Seek medical advice immediately.

2.2.7 Working with animals

A. Dead animals

Due to the very nature of the work, field staff and volunteers are likely to come into contact with dead birds or other animals. The principal hazards to workers are from zoonoses - animal borne infections transmissible to humans. These include brucellosis, Q fever, leptospirosis and ringworm. The most common means of infection is direct contact with the animals or their by-products, and through broken skin, nose and eyes.

To minimise the risk from carcasses, whenever possible workers should:

- Avoid touching corpses unnecessarily. If obliged to examine a corpse, do so as briefly as possible. Wear long waterproof gauntlets or use an implement such as a stick to turn over the corpse.
- Avoid touching the mouth, eyes or nose until able to wash properly.
- Wash hands and forearms thoroughly before eating, drinking or smoking.
- Disinfect or safely dispose of any protective clothing used.
- Avoid ingesting or inhaling any particles, e.g. fungal spores or feather dust, when dealing with corpses.
- Dispose of any corpses properly, i.e. by incineration or burying, checking first with the Environment Agency that any site chosen is suitable.
- Sites for burial must be at least 30 metres from any watercourse, be at least 1 m deep and free from water when first dug. The burial location must be recorded.
- Exercise great care where there is a suspicion of poisoning.
- Avoid handling the corpse if it needs to be collected for laboratory examination. Place it in a clearly marked, strong, tightly sealed polythene bag or plastic container. Use a stick or tongs to place it in the bag or container and avoid inhaling any of the air it displaces.

B. Live Animals

There are a wide range of circumstances when outdoor workers will come into contact with live animals, in particular, those who work with stock or carry out live trapping or bird ringing.

Work with stock is thoroughly covered by MAFF publications. Anyone expecting to work with stock should read the guidance suggested in section 2.2.3

Bird ringing courses cover the necessary safety precautions for carrying out this work, and only qualified ringers should undertake such work unsupervised. Where non-qualified people are involved in bird ringing they must be closely supervised by a qualified ringer, who must brief them on any necessary safety measures to be taken.

Live mammal trapping is carried out by many organisations for research purposes. A number of zoonoses may be contracted from small mammals or their by-products, including leptospirosis, hantavirus disease and Q fever. The risk of any of these is low, and the precautions below should be followed to keep this risk to a minimum:

- Keep high standards of personal hygiene as outlined for handling dead animals.
- Cover cuts with waterproof dressings.
- Wear strong gloves to avoid risk of bites.
- Wear a respiratory face mask to avoid inhalation of bacteria.

2.2.8 Hazardous Plants

A. Phytophotodermatitis

Many plants, or parts of plants and fungi, found in the countryside are known to be poisonous, i.e. if ingested by man or domestic animals they can have adverse health effects. However, it should be noted that although a plant may be considered to be poisonous, it may not be harmful at all stages of its growth, and not all parts of the plant can cause harm.

In addition, the amounts that have to be ingested to produce an adverse effect on health range from the relatively small (as in the case of Yew leaves) to much greater quantities over prolonged periods (as in bracken and ragwort poisoning).

There are simple precautionary measures which can be taken when working with these plants and fungi to reduce risks to your health. Prevent all contact by covering up bare skin, wear long sleeves and if appropriate wear protective gloves. If using machinery to cut and clear these plants ensure that the correct protective clothing for the machine is worn and consider using a face-shield with a 10" visor. Always wash hands, arms and areas of exposed skin before eating, drinking or smoking.

Phytophotodermatitis (ppd) is a type of dermatitis contracted as a result of skin contact with certain species of plant, the most notable being giant hogweed (*Heracleum mantegazzianum)*. In recent years the number of cases of ppd appears to have increased.

Phytophotodermatitis results in conspicuous blistering, darkening and reddening of the skin. It occurs when skin which has made contact with certain plants (such as giant hogweed) is also exposed to ultra violet radiation (UVA) which is significant in bright sunlight. The active photo-sensitising ingredients in giant hogweed are also found in other members of the *Umbelliferae* family and therefore could be responsible for a ppd incident.

Although well documented in certain parts of the country, giant hogweed is still uncommon in many areas. However, ppd incidents may also result from contact with other species. The table below lists plants of the *Umbelliferae* family and a few others that could be responsible for ppd.

Table 2.3: Species that could be responsible for phytophoto dermatitis in the British Isles

	It is recommended that anyone who may be exposed to high levels of contamination from the plant should wear protective clothing
Angelica archangelica	Garden angelica
Angelica sylvestris	Wild angelica
Apium graveolens	Wild celery
Bupleurum tenuissimum	Slender Hare's ear
Heracleum mantegazzianum	Giant hogweed
Heracleum sphondylium	Hogweed
Ligusticum scoticum	Scots lovage
Levisticum officinalis	Lovage
Pastinaca sativa	Wild parsnip
Petroselinum spp	Garden parsnip
Peucedanum palustre	Milk parsley

Peucedanum officinale	Hog fennel
Peucedanum ostruthium	Masterwort
Pimpinella major	Greater bumet saxifrage
Pimpinella saxifraga	Burnet saxifrage
Seseli libanotis	Moon carrot
Rutaceae	Rues (mostly cultivated)
Citrus spp	Citrus fruits
Moracae spp	Mulberry
Ficus carira	Fig

It is recommended that anyone who may be exposed to high levels of contamination from the plant should wear protective clothing. When cutting vegetation by hand this would include wearing a suitable pair of protective gloves. The general advice when using sharp edged tools is that gloves should not be worn, but the risks of ppd are greater than the risk of the tool slipping from the hand, so in this case gloves with rubber/latex grip on the palms should be used. It is also advisable to wear long trousers and sleeves of shirts rolled down and fastened around the wrist. When cutting these plants with a brushcutter or strimmer, in addition to any protective clothing recommended for the machine, or that noted above for hand cutting, a face shield of at least 10" depth of visor should be used.

Blue green algae can create blooms in hot weather which may be toxic. Avoid working close to this "scum" and wash it off immediately if it is in contact with skin.

B. Bracken

Bracken is prevalent across many parts of the UK, and conservation work often involves working close to or in dense stands of it. There are two main hazards to health associated with bracken - the possibility that certain parts of the plant may be carcinogenic, and Lyme Disease acquired from infected ticks living in bracken habitats. The latter is covered in Section 2.2.4.

There is some concern that inhalation or ingestion of bracken spores can be harmful, although insufficient research has been undertaken to form definitive conclusions (The Lancet, Dec 1990). The release of spores is at its greatest concentration in August and September, and in hot, dry, breezy conditions.

There is no evidence to suggest that there is a significant risk to those walking through stands of bracken. However, at times of greatest spore release, persons suffering from asthma, hay fever or other respiratory conditions may experience breathing difficulties.

Workers cutting bracken with hand tools should wear long trousers and keep their shirt sleeves rolled down - at least in part as a protection against ticks. Protective gloves should be worn, even when using swinging tools, and safe working distances increased accordingly (see section 4). Workers should wash their hands and face before eating, smoking or drinking. Regular breaks should be taken, and where possible, prolonged work in bracken during summer months should be avoided. If this is unavoidable, it is advisable to wear a simple face mask conforming to BS EN 149.

If clearance is done mechanically, using a strimmer or scrub cutter, the operator and anyone working downwind of them must wear a face mask conforming to BS EN 149 for respirable dusts.

C. Thorns and puncture wounds

Whilst thorns and puncture wounds are almost an accepted 'hazard' of working outdoors, sensible precautions should be taken to minimise the risk of infection. The thorns from blackthorn are particularly prone to turning septic, and any puncture wounds, whether the thorn is left in or not, should be cleaned immediately. Any thorn or splinter should be removed as quickly and cleanly as possible using tweezers. If this is impossible on site, cover the wound and visit a doctor as soon as possible after the event. If the area around the wound swells, also visit the doctor.

Further guidance

MAFF Book *Poisonous Plants and Fungi - An Illustrated Guide.*

2.3 Chemical factors

2.3.1 Dermatitis

Dermatitis is the most common of all occupational health problems. It is rarely contagious and there are two main types.

Contact dermatitis is an inflammation of the skin caused by repeated contact with irritant substances such as some chemicals, mineral oils, diesel fuel, some solvents, cleansers and certain plants. The inflammation appears in different forms of rashes, pimples and blisters and can affect exposed parts of the body such as hands, wrists and forearms. Turpentine, alkalis and certain proprietary cleaners may also cause skin problems.

Allergic dermatitis is caused by an allergic reaction to a 'trigger' substance and though less common, its effects can often be more serious. Allergic dermatitis may only be reduced by removing all contact with the trigger substance.

Dermatitis often begins around an abrasion or following a septic infection of the skin. Immediate first aid treatment should therefore be obtained for every injury, no matter how trivial. When handling substances likely to cause skin irritations, wear suitable gloves and use barrier creams to protect the hands and, if necessary, forearms. Read the manufacturers' hazard data supplied and make an assessment of the risks under the Control of Substances Hazardous to Health (COSHH) Regulations. This may lead to avoiding the use of certain substances or using a less irritating replacement.

Further guidance

HSE leaflet IND(G) 233L *Preventing Dermatitis at work*

2.3.2 Occupational asthma

Breathing in substances called respiratory sensitisers at work can cause occupational asthma.
A respiratory sensitiser is a substance which when breathed in can trigger an irreversible allergic reaction in the respiratory system. Once this sensitisation reaction has taken place, further exposure to the substance, even the smallest trace, will produce symptoms.
Sensitisation does not usually take place right away but generally happens after several months or even years of breathing in the sensitiser.

The symptoms are:

Asthma - attacks of coughing, wheezing and chest tightness

Rhinitis and conjunctivitis - runny or stuffy nose and watery or prickly eyes.

Once a person is sensitised, symptoms can occur either immediately they are exposed to the sensitiser or several hours later. If the symptoms are delayed, they are often most severe in the evenings or during the night, so staff may not realise it is work that is causing the problem.
Continued exposure can result in permanent damage to the lungs and increasingly severe symptoms.
People with rhinitis may go on to develop asthma. Asthma attacks are likely to become worse and can be triggered by other things such as tobacco smoke, general air pollution or even cold air.

The commoner sensitising substances likely to be encountered include:

Grain and hay dusts
Wood dusts
Cement dusts
Some glues/resins (particularly epoxy resins and isocyanates)

Hay, straw, grain and similar farm produce can go mouldy and produce the spores of the micro-organisms that cause farmer's lung. To protect yourself, you should, wherever possible:

- not create any more dust than necessary when working.
- wear a suitable dust respirator
- if working indoors, ensure that there is adequate ventilation.
- keep the work area clear of dust, using an industrial vacuum cleaner to clear walls, rafters and ledges.
- keep personal clothing and hair clean
- at the end of the day clean your working clothes and if possible leave them at work.

Further guidance

www.hse.gov.uk/asthma

2.4 Physical factors

2.4.1 Exhaustion and exposure

A. Hypothermia

Exposure is defined as 'severe chilling of the body surface leading to a progressive fall of body temperature with the risk of death from hypothermia'.

Anyone concerned with outdoor activities is at risk of hypothermia, whether on land, at sea or on inland waters. Hypothermia occurs when the body temperature falls below 35^0C (95^0 F) compared with the normal body temperature of 36.9^0C (98.4^0F). This leads to weakness, loss of will to survive and, if prolonged, can prove fatal. There are two main factors responsible for this condition.

1. Heat loss due to exposure to cold, wet and windy conditions. It is especially common in mountain and moorland areas and in winter on exposed headlands and lowlands.

2. Poor protective clothing failing to counteract heat loss, or impaired heat production due to fatigue or immobilisation through injury.

In extremely cold and wet conditions any two of the following points are known as visible symptoms of hypothermia and need attention.

- Complaints of feeling cold, tired or listless.
- Unreasonable behaviour or irritability.
- Increasingly slow physical or mental responses.
- Stumbling or falling.
- Slurring of speech and difficulty with vision.

- Physical resistance to help.
- Collapse or unconsciousness.

All cases should be treated immediately. Mild cases can rapidly become serious.

Immediately insulate the patient from further heat loss by covering the head, neck and face. Insulation from the cold ground is particularly important. A warm companion lying beside the patient is helpful and comforting.

Do give warm foods or warm sugary drinks if the patient is conscious.

Do not rub the patient to restore circulation

Do not allow further exertion as this will use up valuable energy.

Do not give alcohol.

B. Hyperthermia or heat exhaustion

Field staff may suffer heat exhaustion when undertaking vigorous work during the summer months. On very hot days it is advisable to avoid working during the hottest part of the day.

Should someone suffer heat exhaustion, reduce their temperature by:

- moving them into cool shade
- splashing on cold water
- helping respiration by increasing air movement - fanning
- giving plenty of liquid (if possible a salt solution).

C. UV light and sunburn

The sun gives out a range of different forms of energy, but it is the ultra-violet radiation which is of importance. Two bands - UVA and UVB are of increasing concern to outdoor workers.

UVB is partially absorbed by the ozone layer, but some does reach the earth's surface. UVB penetrates the skin, and in the short term causes sunburn. In the long term, UVB is associated with skin cancer. UVA is relatively unaffected by the ozone layer, and penetrates deeper into the skin, causing more lasting damage. It may act with UVB, leading to the development of skin cancer.

UV levels depend on a number of factors:

- time of day. UV levels are highest in the hours around noon, the rays having less distance to travel.
- time of year. UV levels are highest in the summer months, but early spring is also important.
- altitude. UV intensity increases with altitude.
- weather conditions. UV is at its strongest under a cloudless sky, even if the temperature is low or wind makes people feel cool.

Skin cancer

This is now the second most common cancer in the UK. There are several types, but the important distinction is between malignant melanoma and non-melanoma skin cancer.

Malignant melanoma is the least common but most dangerous. It is thought to be linked to occasional exposure to short periods of intense sunlight. It is more common in indoor workers than outdoor, and people at risk may be volunteers who take on work at weekends or in their holidays.

Non-melanoma skin cancers are not usually fatal, but may be very disfiguring as they commonly occur on the face, forearms and hands. They are most often found in outdoor workers and in the over-50's, caused by a lifetime of exposure to the sun.

Precautions

- Watch out for any moles that change shape or colour, become bigger or itchy or that weep or become inflamed. In these cases check immediately with a doctor.
- Avoid working in direct sunlight between 11am-3pm during the summer months if possible.
- Cover up with tightly woven clothing, a wide brimmed hat and sunglasses.
- Use a sunscreen, but in combination with other methods. Physical barriers in the sunscreen reflect the harmful UV rays away from the body, and a sun block is a sunscreen containing a physical barrier only. As they block perspiration as well, their use should be limited to sun-sensitive areas such as nose, lips and ears.
- Chemical absorbers in the sunscreen soak up UV radiation, and allow a proportion of the UV to reach the skin. The SPF (sun protection factor) is a measure of how much radiation is allowed through.

When using a sunscreen, apply it thickly and evenly, paying particular attention to those parts of the body not usually exposed to the sun, plus sensitive areas such as the nose, ears, lips and bald patches. Choose a broad spectrum sunscreen protecting against UVA and UVB rays with an SPF of at least 20, and re-apply frequently.

Further guidance

HSE leaflet IND(G) 147 L *Keep your top on*

2.4.2 Noise and hearing protection

At first glance, work in nature conservation appears to involve little risk from excessive noise and hearing impairment. Compared to manufacturing or construction industries and agriculture this is true, but there are many sources of excessive noise against which conservation workers need to be protected.

Noise is more than a mere annoyance, it is dangerous. Excessive or prolonged noise will damage hearing and could cause deafness. It may also contribute to other accidents by hindering the good communications essential for safe working.

Workers often underestimate the threat from noise and become so used to excessive noise that they accept it as normal for their working environment. It is likely that they are beginning to lose their hearing.

Tractors, tractor powered machinery, woodchippers, chainsaws, circular saws, brush cutters and strimmers are some of the damaging noise sources associated with conservation work.

Reducing the risk

As a rough guide, a noise hazard probably exists if it is difficult to hear normal conversation. If this is the case then ear protectors must be worn.

The law also requires that attempts should be made to reduce noise at source.

Measurement of noise

Noise is measured in 'A' weighted decibels dB(A). Each increase of 10 dB(A) gives the subjective impression of only doubling the noise level, but it actually increases its potential to damage hearing by 10 times.

Noise levels

The Control of Noise at Work Regulations 2005 place a duty on employers to carry out an assessment where workers are exposed to noise levels of 80 dB(A) or above during a working day. Exposure above 85 dB(A) requires employers to take action to reduce the risk. Higher levels can cause some permanent hearing loss. The potential for hearing loss increases dramatically at higher noise levels and the time this takes roughly halves for every rise of 3 dB(A) intensity (see table 2.4.1 below). It is therefore easy to see why an operator of a chainsaw running at 105 -110 dB(A) without adequate hearing protection is likely to suffer damage after only 15 minutes. Anyone standing close by may also need protection.

Table 2.4.1

dB (A)	90	93	96	99	102	105	108	111	114	117	120
Duration	8 hr	4 hr	2 hr	1 hr	30 min	15 min	7.5 min	3.75 min	112 sec	56 sec	28 sec

Ear protectors

No protector is of any value if it is not worn, so it is important to minimise the discomfort of the wearer. All protectors are likely to cause some discomfort, especially in hot, sweaty conditions. Also, protectors should be compatible with other protective equipment or clothing issued. There are two main types of ear protector available. A choice can be made between ear muffs and ear plugs, so individuals should be offered a choice of protectors.

Ear muffs

These are generally the most effective type of ear defender. Correctly fitted, they not only reduce noise levels, but allow the wearer to hear verbal messages or machine warning signals. They should meet British Standard BS EN 352

Ear plugs

Ear plugs must be the correct size and fit. It is wise to seek a doctor's advice before wearing them. Ear plugs are not a suitable defence against continuous noises produced by farm or other machinery. They are most suitable for those occasions when it is necessary to hear normal speech but stop the harmful effects of sudden impact or impulsive noises.

Sometimes ear plugs will cause discomfort. This should disappear after regular use, but if it continues seek medical advice and try an alternative type of ear defender. Ear plugs are probably not suitable for persons suffering from ear infections. They should seek medical advice before wearing.

Headsets supplied with personal stereos usually provide little or no attenuation of noise. Cotton wool should never be used. It is useless as an ear defender.

Further guidance

HSE INDG 632 *Noise at Work a brief guide to controlling the risk*
HSE L108 Controlling noise at work

2.4.3 Hand-arm vibration

People who regularly use some hand-held power tools and machines which produce high levels of vibration may suffer from a condition known as hand-arm vibration syndrome (HAVS). Vibration can cause damage to blood vessels, nerves, bones and muscles. The most common form is called "vibration white finger" (VWF), and is characterised by numbness, "pins and needles", loss of sensitivity, whitening of the fingers, and pain as blood supply to the fingers is restored. If allowed to develop, it can lead to permanent loss of feeling, grip and flexibility.

The main cause is prolonged use of vibrating power tools. In countryside work, this includes chain saws, brush cutters and strimmers, mowing machines, and any other vibrating power tool which causes tingling or numbness in the fingers after a few minutes of use. However, the extent to which an individual is at risk depends on a range of factors:

the amount of vibration produced by the tool;
the frequency and duration of use;
the way the tool is used;
whether the tool has been properly maintained;
weather conditions (VWF is more likely to arise in cold conditions, when blood flow is reduced);
whether an individual smokes (smoking reduces blood flow);
individual susceptibility.

Employers have responsibilities for identifying those at risk, assessing the extent of that risk, and taking measures to reduce those risks as far as possible. These measures can include:

asking about vibration levels when purchasing equipment, and choosing low-vibration tools;
adopting methods of work which avoid or reduce the need for using vibrating tools;
selecting the right tool for the job;
ensuring tools are properly maintained;
changing the pattern of work to avoid long periods of uninterrupted exposure;
providing suitable clothing for work in cold weather;
arranging routine health surveillance of those identified as being at risk;
providing information for workers on the risks of HAVS and the steps that individuals should take to reduce the risk.

Workers themselves can also play their part, by taking the following steps:

keep warm at work, particularly in cold weather, and particularly the hands;
exercise the hands and fingers to improve blood flow;
avoid smoking before and whilst operating powered tools;
use the right tool for the job;
avoid using excessive force or grip;
avoid using powered tools for long periods without a break;
keep tools in good working order and properly maintained;

do not ignore the symptoms - if you think that you are affected, contact your GP, and follow their advice.

Further guidance

HSE leaflet IND(G)175(L) *Hand-arm vibration at work – a brief guide*
HSE INDG296 *Hand-arm vibration – a guide for employees*
HSE L140 *Hand-arm vibration*

2.4.4 Whole body vibration

Some workers who regularly drive tractors and other agricultural and forestry machinery may be at risk of back injury arising from the vibration produced by the machinery. Whole body vibration is the term given to vibration which passes through the seat of a vehicle into the driver's body through the buttocks - or alternatively from the platform of a machine into the operator through the feet. Regular and prolonged exposure to this type of vibration over many months and years can cause subsequent damage to the vertebrae and discs in the back. However, back pain can arise from other aspects of driving vehicles and operating machinery, e.g. poor driving posture, poor driving visibility, the location and design of controls, and from other work activities, e.g. manual handling.

Hazardous exposure to whole body vibration can arise through excessive speed on rough roads and tracks, and through driving on poor surfaces in vehicles with poor suspension.

Employers have responsibilities for identifying those at risk from whole body vibration, assessing the extent of that risk, and taking measures to reduce those risks as far as possible. These measures can include:

ensuring that vehicles and machinery are properly maintained, particularly suspension components;
checking that the driver's seat is in good repair and gives good support;
checking whether it is practicable to fit a suspension seat suited to the vibration characteristics of the machine, consulting the supplier or manufacturer if necessary;
if a suspension seat is fitted, checking it is correctly adjusted to the operator's weight, in accordance with the manufacturer's instructions;
adjusting equipment and controls in the cab, as far as possible, to suit the size and reach of the driver;
choosing the right vehicle or machine for the work to be carried out and the surfaces likely to be encountered;
checking that vehicles have the right tyres, and that they are correctly inflated;
identifying vehicles with the highest levels of vibration, and managing their use so that individuals do not spend excessive time driving them;
getting drivers to reduce their speed when travelling over rough surfaces;
if possible, improving ground surfaces over which vehicles travel regularly, e.g. by repairing potholes;
providing information to employees on the risks from whole body vibration, and training in the measures which they can take to reduce the risk.

Workers themselves can also play their part, by taking the following steps:

keeping speed low when travelling on uneven surfaces or terrain;
driving so as to avoid potholes and objects;
varying the pattern of their work so as to avoid long periods of uninterrupted driving;
adjusting the seat for maximum support and comfort;
ensuring tyre pressures are correct;
reporting instances of back pain to their supervisor.

Further guidance

HSE leaflet INDG 242 *Control back-pain risks from whole-body vibration*
HSE INDG404 *Drive away bad backs*

2.4.5 Manual handling

Work carried out by conservation field workers frequently involves the manual handling of loads. This may be the regular lifting of light weights or the occasional lifting of heavier objects, e.g. sawn logs, fence and gate posts, stone for walls, barrows of earth, the loading and unloading of trailers.

By its very nature, conservation field work is often physical. Staff and volunteers must be aware of the risks involved and the potential for personal injury in lifting and carrying.

Over 25% of the accidents reported to the enforcing authorities each year are injuries sustained during lifting and carrying operations. The cost of back pain to industry generally is estimated by the Office of Health Economics at over £1,000 million of lost production each year.

Lifting and carrying, if not done properly, can lead to ruptures, strains and back injuries which may mean that staff are unable to work for weeks and even months. Safe lifting is a skill rather than simple brute force. Excessive loads can severely strain even the strongest and most experienced worker.

A. Six point action list for manual handling and lifting

i) Correct grip
Avoid lifting with the finger tips. Use the palm of the hand and the roots of the fingers and thumbs.

ii) Straight back
Approach each load by flexing hips, knees and ankles with the load close to the body. Lift using the leg muscles, not the back, which should remain comfortably upright.

iii) Look up
Raise the top of the head and look forward. Looking down encourages bending over and extends the spine.

iv) Feet position
Keep feet apart, with one foot in front of the other and pointing in the direction intended to travel. Make sure feet are not wider apart than the hips.

v) Arms
Keep them close to the body to minimise the work of chest, shoulder and upper back muscles.

vi) Body weight
Kinetic handling uses the body as a counter weight to the load. This usually feels uncomfortable before the movement starts.

Workers should remember to size up the job before attempting to lift any object. If it is too heavy or cumbersome, find an alternative to lifting it by hand, or get help.

Wear suitable protective foot wear, industrial gloves and other protective clothing when injuries are considered possible. Take particular care when moving chemicals.

B. Manual Handling Operations Regulations 1992

The Manual Handling Operations Regulations were introduced on 1 January 1993. The regulations place a duty on employers to reduce manual handling operations which involve a risk of injury. Where there is a risk of injury from a manual handling operation, question:

Whether the handling operation can be eliminated altogether?
If not, whether it can be achieved by any other means?
If not, can the operation be altered or mechanised, eliminating the need for manual handling? This may simply involve using a wheelbarrow or a sackbarrow.

If the risk of injury cannot be dismissed as trivial, then make an assessment of the risks, taking into account the task, the load, the working environment and the individual's capacity. In general, the assessment should be recorded and kept readily accessible as long as it remains relevant.

The assessment need not be recorded if:

- it could very easily be repeated or explained at any time because it is simple and therefore obvious; or

- the manual handling operation is quite straightforward, of low risk, or is going to last only a very short time and the time taken to record it would be disproportionate.

The regulations recognise the fact that not all manual handling operations arise in the course of routine, unvarying work. They cite agriculture as one industry in which the work is varied both in itself and in the circumstances in which it is performed.

Many operations performed in the conservation industry are the same as those in agriculture.

It would be unrealistic to attempt to assess every single instance of manual handling. Instead, the assessment should identify each type or category of manual handling operation and establish the range of risks that each creates. Remedial measures can then be determined on a broader basis for each type of task.

Employers are responsible for making sure that assessments are carried out. In most cases a meaningful assessment can be made through practical understanding of the type of task to be performed, the loads handled and the working environment in which the tasks are carried out.

This will inevitably mean that field staff will need to carry out the assessment. They will need to be familiar with the main requirements of the regulations and know how to complete assessments properly. Therefore some training or instruction will be necessary.

Broadly speaking the following points need to be considered when making an assessment.

☐ The task. Does it involve

Holding the load away from the body?
Twisting?
Stooping?
Lifting and lowering?
Carrying for long distances?
Excessive pushing and pulling?
Sudden movement of the load?

Handling while seated?
Awkward posture?
Team handling?

☐The load. Is it

Heavy?
Bulky or unwieldy?
Difficult to grasp?
Unstable?
Sharp, hot or potentially damaging?

☐The environment. Are there

Space constraints. preventing good posture?
Uneven, slippery or unstable floors?
Rough surfaces?
Steps?
Poor lighting?

☐Individual capacity. Does the task

Require more than average strength?
Put at risk people who are pregnant or who have a health problem?
Require staff to have special training or knowledge?

Additionally the regulations stipulate that every effort should be made to reduce the risk of injury by improving the working environment. It may be difficult to change the load or the workplace in conservation work, so the emphasis must be on making the load easier to handle.

Effective training is particularly important to ensure that staff use safe handling techniques and recognise the need to avoid or modify hazardous handling operations.

Further guidance

HSE leaflet IND(G) 143 *Manual Handling at work a brief guide*
HSE INDG 398 *Making the best use of lifting and handling aids*
HSE INDG 383 *Manual Handling Assessment Tool Chart (the MAC tool)*