SHEA Cross-Country Pipelines

Programme Leader's Guide

Programme delivery guidance

This Programme Leader's Guide (PLG) is an essential tool in the delivery of SHEA programmes. Aligned to the SHEA Cross-Country Pipelines specification, it contains mandatory programme content and activities, and must be used (alongside the appropriate slide decks) in the design and delivery of the programme to individuals. You should **not** use the associated slide decks without the supporting PLG content and activities. You should also note that whilst the slides accompanying the PLG are reproduced in the PLG, only the final slide in each transition sequence is included. In preparation for delivery, trainers should both go through the slide decks (and each slide's transition) and the PLG to match image and accompanying information.

The PLG provides a close commentary on the slide deck, contains important supporting content and provides mandatory activities that you must use with individuals during the delivery of content. Whilst it is permissible to use the PLG step-by-step when you deliver individual programmes, we expect that a more realistic use of this document will be to serve as an initial aid whilst trainers are making choices around delivery and building confidence, and, thereafter, to act as a reference source for additional ideas and information.

It is permissible that you tailor how you undertake mandatory activities to suit individual needs, group size, training environment or time constraints. The activities represent a step in the logical coverage of a topic, and provided that the step is covered off in the programme, it is less important that it is performed to the letter of the PLG (e.g. completed in pairs, with yellow post-its, adhering to the timings etc.). Whilst we would not recommend this approach with every activity, there are certainly some activities where this would be straightforwardly achievable which would enable delivery economies, where time is limited, for example.

To enable stretch and challenge and provide trainers with a range of options for delivery, we have also provided a range of optional activities, supporting information ('Did you knows?') and resource links, which you can use selectively in relation to your delivery of content. Both mandatory and optional elements of the programme are clearly identified in the content below, and each module identifies the approximate amount of time involved in the delivery of that module.

There are additional support features built into the materials (both slides and PLG) designed to aid the Trainer and quality of the presentation. The icons used within the PLG (see below) are also used on the slides to indicate, for example, where a mandatory activity must be used. Also, the first slide of each module identifies the overarching learning outcomes of the module, and the last slide of each module is a "Recap" slide, where the Trainer consolidates the module's content. This should alert the Trainer that the last slide has been reached and indicate that it is time for the module assessment.

As a guide, the entire Cross-Country Pipelines materials (i.e. all 9 modules including mandatory activities) can be delivered in approximately 7 hours and 45 minutes. Allowing approximately 45 minutes for assessment purposes (i.e. assessment at the end of each

module) means that the entire Cross-Country Pipelines programme will take approximately 8 hours and 30 minutes to deliver. These figures are for guidance purposes only and, where circumstances vary, timings may be reduced or increased.

Equipment and support materials

The trainer will need the following equipment and support materials in order to deliver this programme:

- Room laid out in a U shape
- Laptop
- Projector
- Flipchart and flipchart pens
- Whiteboard
- Participant nameplates - optional
- Pens and blank A4 paper
- PowerPoint presentation
- Blu-tack
- Sticky notes – a mix of colours
- Selection of coloured pens
- Internet access for videos (required for optional videos only)
- Speakers required for video audio
- Batch form
- Registration Form
- EUSR Register
- Operative Cover Notes
- Your own register
- Answer Sheets
- Evaluation forms
- Organisation Accident Report
- Blank Fire Risk Assessment
- Filled in Fire Risk Assessment

Prior to starting the programme

The trainer will need to make the following appropriate adjustments to the training programme to meet the individual's needs upon reviewing their details requested prior to the day the programme is delivered.

Trainer to:

- establish the whereabouts of the facilities
- establish the whereabouts of the nearest fire exit
- establish whether a fire alarm is planned during the day
- establish first aid arrangements

- ensure any dietary requirements or allergies have been catered for
- confirm if a refreshments and lunch has been arranged, if applicable
- have all training aids, equipment and appendices they plan to use printed and available to use

Guide to icons used

The following icons are used throughout the PLG:

This symbol highlights when there is a **mandatory** activity associated with this area of the programme. This icon is also used in the slide decks to indicate an upcoming activity.	
This symbol highlights when there is an **optional** activity associated with this area of the programme.	
This symbol highlights when there is a video to be used within the programme. Where a video is a mandatory part of the programme, you must click on the link on the relevant slide to access it.	
This symbol highlights where there is additional information that a Trainer may use within the programme.	
This symbol highlights where there is the need for additional training to be deemed competent for a task. This icon is also used in the slide decks.	

The last animation on a slide will either have a red banner or full stop to indicate the end of the slide.

Programme structure – module titles

The programme consists of the following modules (and associated timings for delivery):

Module No	Module Name	Delivery Timing	PLG Page Number
1	Understanding our workplace responsibilities	40 mins	6
2	Understanding the effects of our work on the environment	40 mins	23
3	Cross-country environment	60 mins	36
4	Identifying and controlling risks	60 mins	51
5	Common hazards in the workplace	90 mins	67
6	Occupational health hazards	60 mins	102
7	Cross-country pipeline hazards	45 mins	126
8	Traffic management	30 mins	141
9	Responding to emergencies	40 mins	149

Understanding our workplace responsibilities

MODULE 1

This module aims to familiarise individuals with the underpinning legal frameworks and definitions and their application in the workplace setting, including the responsibilities for both the individual (as employee) and their employer.

There is 1 learning outcome for this module:

LO1: Understanding our workplace responsibilities

Within this module we will be looking at;

- Why it is important to manage health & safety at work
- Health and Safety at Work etc. Act (1974)
- Principles of Construction Design Management (2015)
- Environmental Legislation
- Employer Responsibilities, i.e. provide a safe place of work, workplace safety policy, safety management system, training, welfare facilities etc.
- Employee Responsibilities, i.e. comply with safe systems of work, behave appropriately
- How health & safety is managed in the workplace
- Consequences of getting it wrong
- Regulators, e.g. Health & Safety Executive (HSE) & Environment Agencies

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

- Why should we manage health, safety and the environment?
- Health and Safety at Work etc. Act (1974)
- Employer & employee responsibilities

RESOURCES

The following outlines the general resources underpinning delivery of this section. All other resources are embedded in the modules.

Video: Introduction to HSE: https://www.youtube.com/watch?v=FZO8R9qiCf0
HSE Prosecution Case Studies: http://www.hse.gov.uk/resources/casestudies.htm

Environment Agency enforcement, sanctions and offences:
https://www.gov.uk/government/publications/environment-agency-enforcement-and-sanctions-statement

UNDERSTANDING OUR WORKPLACE RESPONSIBILITIES

Approximate delivery time: 40 minutes

Slide 1 – SAFETY, HEALTH AND ENVIRONMENTAL AWARENESS WATER

Trainer shows slide 1 – Scheme Title Slide. Slide to be displayed as individuals arrive in preparation for the programme to begin.

When the group are all in attendance, trainer to welcome the group.

Trainer to reveal the next slide – pre-programme administration.

Slide 2 – PRE-PROGRAMME ADMINISTRATION | ADMINISTRATION

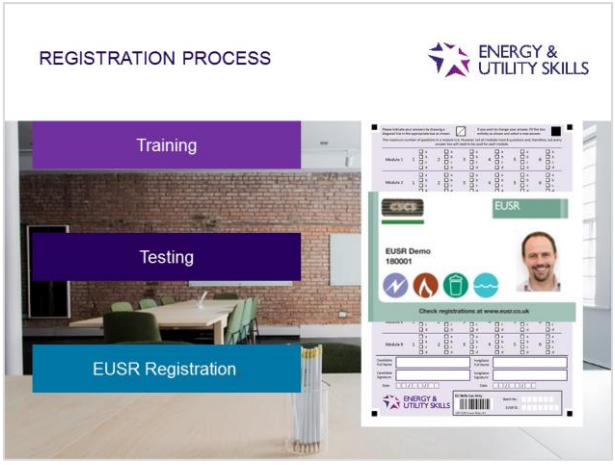
Trainer to introduce the pre-programme administration process.

Trainer to reveal the next slide.

Slide 3 – PROGRAMME ADMINISTRATION

Trainer to set expectations for the day including the use of mobile phones, location of welfare facilities, safety instructions relating to fire exits and fire alarm testing and the duration of the programme.

Trainer to reveal the next slide.



Slide 4 – REGISTRATION PROCESS

Trainer to click through to each heading and explain:

Training - how the programme content is divided into modules, how many modules there are in total and stress the importance of their full participation.

Testing – that there will be a multiple-choice test at the end of each module, explain the pass rate and the process for re-testing if this should apply to them.

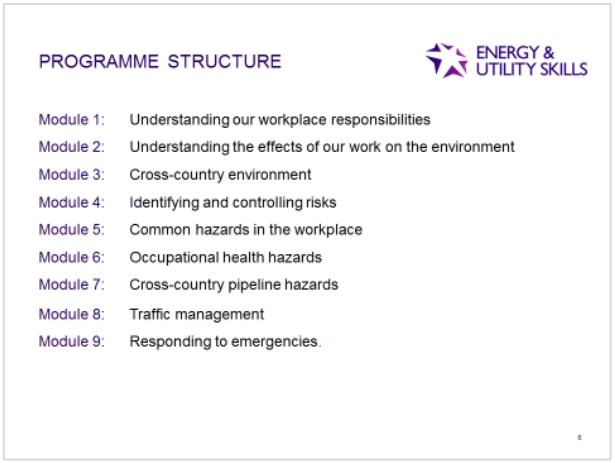
Registration – the process of registration and production of the EUSR card including the importance of notifying EUSR of any changes to personal information and responsibility for renewal.

Trainer to reveal the next slide.

Slide 5 – PROGRAMME

Trainer to explain why the scheme is important to them and its purpose across the utilities sector.

Trainer to reveal the next slide.



Slide 6 – PROGRAMME STRUCTURE

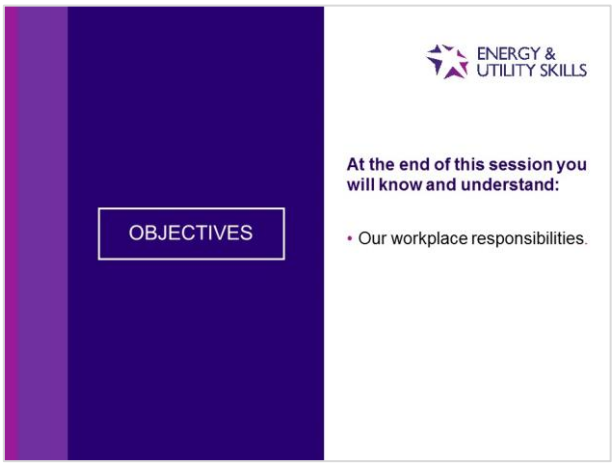
Trainer to provide a brief overview of the modules within the programme.

Trainer to reveal the next slide.

Slide 7 - UNDERSTANDING OUR WORKPLACE RESPONSIBILITIES

Trainer to explain that this module aims to familiarise individuals with the underpinning legal frameworks, definitions and their application in the workplace, including the responsibilities for both the individual (as an employee) and their employer.

Trainer to reveal the next slide.

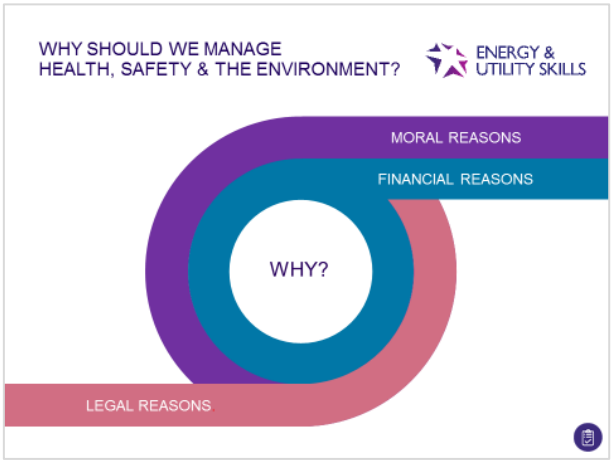


Slide 8 - OBJECTIVES

Trainer to briefly explain that individuals will learn about their responsibility and their employer's responsibilities in relation to health, safety and the environment from both a legal perspective and in general within the workplace.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.



Slide 9 – WHY SHOULD WE MANAGE HEALTH, SAFETY & THE ENVIRONMENT?

Trainer to pause after revealing the question 'Why?' **before clicking** the next transition. Complete **Mandatory Activity 1 –** Why should we manage health, safety and the environment.

Once the group has finished the activity, trainer to click through the transitions to reveal the three reasons, relating back to the answers provided by the group during the activity.

Trainer to reveal the next slide.

ACTIVITY 1 – Why should we manage health, safety and the environment? (10 minutes)

Resources: Flipchart & pen, blank paper

Trainer to prepare a flip chart in advance of the programme with questions to include – What does health and safety mean to you? Why should we manage health and safety? How does it affect us and others? How do we monitor its effectiveness? How do we make improvements?

Trainer to:

- Ask the group to volunteer answers to the questions.
- Trainer to write suggestions on the flipchart as they are called out.
- Encourage the group to take notes and write answers on the blank piece of paper provided.

Once finished, trainer to click through the animations on screen and summarise as per below.

Trainer's notes:

Moral reasons: the consequences of getting health and safety wrong or harming the local environment is ultimately that someone will get hurt or even worse: DIE! There is a duty on both employees and organisations to take reasonable care of their actions and the side-effects caused.

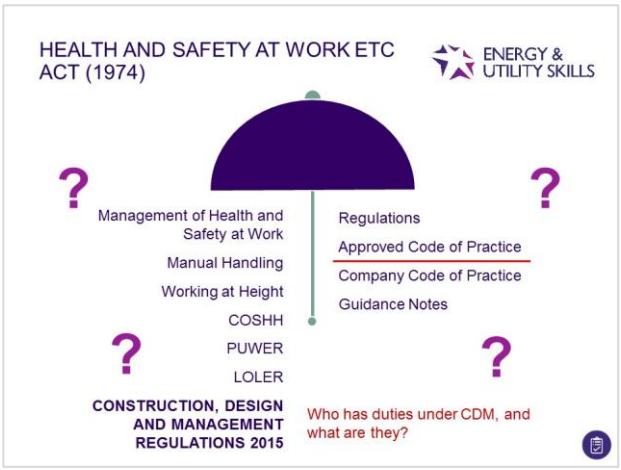
Legal reasons: if you get it wrong not only your organisation but you personally may end up with fines, or even go to prison.

Financial reasons: an organisation can lose money through poor management of health and safety (H&S) or environmental damage – being sued, paying to put things right etc., an employee can face prosecution too. Paying attention to H&S can also improve how productive people are. Sick days cost money, but imagine providing a fan on a hot summer day, or allowing more breaks or job rotations for repetitive jobs.

DID YOU KNOW?

You can have an impact on the cost of insurances in your company by helping to contribute to a safe working environment? One company had an insurance EXCESS of £100,000 in 2015. By 2017 due to their improved health and safety record this was reduced by 75% and their EXCESS is now only £25,000. You can make a difference.

Slide 10 – HEALTH AND SAFETY AT WORK ETC ACT (1974)



Trainer to display the umbrella with question marks and briefly describe the purpose of the Act. Trainer to complete **Mandatory Activity 2** – Health and Safety at Work etc. Act (1974) before revealing the transitions.

Once the activity is complete, trainer to reveal the transitions and compare the suggested answers from the group activity, as noted on the flip chart. Display the flip chart on the wall.

Trainer to reveal the last transition relating to CDM (2015) regulations and ask the group 'Who has duties under CDM and what are they?' Trainer to facilitate a discussion.

Trainer to reveal the next slide.

Trainer's notes:

Trainer to explain that the Health and Safety at Work etc. Act 1974 (HASAWA 1974) is an enabling act which allows regulations, Approved Codes of Practice etc. to be approved by Parliament, rather than having to receive Royal Assent, as was the case for previous Acts. There are many regulations which fall under the HASAWA 1974 – much like an umbrella. For example Workplace (Health, Safety and Welfare) Regulations 1992.

Trainer to ask individuals if they know why the Health and Safety at Work Act (1974) was enacted in 1974?

The Health and Safety at Work Act (1974) was due to be enacted in 1975 but in 1974 there was a massive explosion at a chemical factory (Nypro) in Flixborough Lincolnshire. It killed 28 people and injured 36, with the shock waves being felt all over Lincolnshire. The legislation was brought forward due to that explosion.

ACTIVITY 2 – Health and Safety at Work etc. Act (1974) (5 minutes)

Resources: Flipchart & pen, blank paper

Trainer draws an umbrella on the flipchart and writes the heading: HASAWA 1974.

Ask the individuals to call out any Regulations they know of that come under the umbrella of health and safety legislation – HASAWA 1974, writing the answers on the flipchart.

Expect to see:

RIDDOR 2013 (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations), PUWER 1998 (Provision and Use of Work Equipment Regulations), LOLER 1998 (Lifting Operations and Lifting Equipment Regulations) – often mentioned together, DSE 1992 (Display Screen Equipment Regulations), PPE 1992, Control of Noise at Work 2005, COSHH 2002 (Control of Substances Hazardous to Health), RRO 2005 (Regulatory Reform (Fire Safety) Order), First Aid 1981, Manual Handling 1992, Management of Health and Safety at Work Regulations 1999, CDM 2015 (Construction (Design & Management) Regulations), DSEAR

2015 (Dangerous Substances and Explosive Atmospheres Regulations) , Safety Signs and Signals 1996

Trainer to place the flipchart onto a wall in a place that everyone can see.

Trainer's notes:

Trainer explains that these regulations are all interconnected and relate back to the main HASAWA 1974. Trainer goes through the levels on the right-hand side of the umbrella and then shows some of the examples of the regulations that fall under the act, comparing the answers against the flip chart exercise answers.

Trainer brings up the final point on Construction, Design and Management (CDM) and asks the group the question. The trainer then explains that the CDM dictates duties on a range of people, including designer, contractors, clients and workers. Trainer provides a brief overview of the key duties for each role (described below.)

The CDM regulations govern the way all construction projects (no matter the size) are planned to reduce risk of harm to those working in the industry? Because the SHEA card aligns to the CSCS card, the trainer needs to cover off certain aspects of the CDM regulations in this programme.

CDM Duty holders | (Who are they?)	Main duties | (What they need to do)
Designers - organisations or individuals who as part of a business, prepare or modify designs for a building, product or system relating to construction work.	When preparing or modifying designs, their duties include to eliminate, reduce or control foreseeable risks that may arise during: • Construction. • The maintenance and use of a building once it is built. Provide information to other members of the project team to help them fulfil their duties.
Principal designers - designers appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role.	Plan, manage, monitor and coordinate health and safety in the pre-construction phase of a project. This includes: • Identifying, eliminating or controlling foreseeable risks. • Ensuring designers carry out their duties. Prepare and provide relevant information to other duty holders. Liaise with the principal contractor to help in the planning, management, monitoring and coordination of the construction phase.
Principal contractors – contractors appointed by the client to coordinate the construction	The principal contractor must consult and engage with the workforce to ensure that measures for their health, safety and welfare are developed, promoted and checked for effectiveness. Consultation must be carried out in a timely

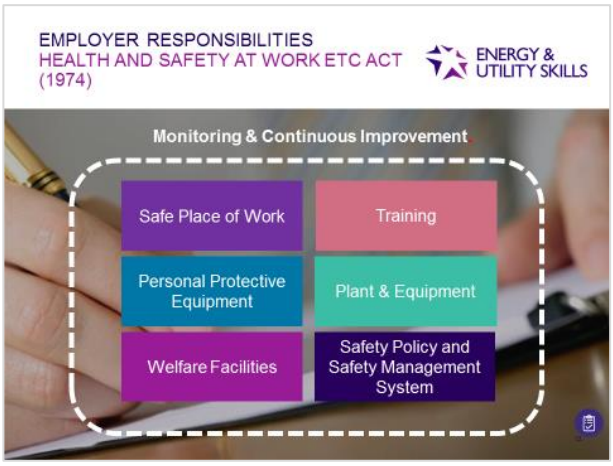
phase of a project where it involves more than one contractor.	manner. If consultation has already taken place through a direct employer, it is not required again.
Contractors – those who carry out the actual construction work, contractors can be an individual or a company.	Contractors and the workers under their control are those most at risk of injury and ill health. They can influence the way work is carried out to secure their own health and safety and that of others affected. They have an important role in planning, managing and monitoring the work (in liaison with the principal contractor, where appropriate) to ensure risks are properly controlled. The key to this is the proper coordination of the work, underpinned by good communication and cooperation with others involved.
Workers – those working for or under the control of contractors on a construction site.	Workers must: • Be consulted about matters which affect their health, safety and welfare. • Take care of their own health and safety, and of others who might be affected by their actions. • Report anything they see which is likely to endanger either their own or others' health and safety. • Cooperate with their employer, fellow workers, contractors and other duty holders.

Slide 11 – ENVIRONMENTAL LEGISLATION | WHAT'S COVERED?

Trainer to ask the question 'What's Covered?' which will appear in the slide header **before clicking** to the next transition. Trainer to ask each individual to provide one answer, working in a clockwise direction around the room.

Trainer to click through the transitions on the slide to bring up and summarise the answers.

Trainer to reveal the next slide.



Slide 12 – EMPLOYER RESPONSIBILITIES | HEALTH AND SAFETY AT WORK ETC ACT (1974)

Trainer to display the slide heading: EMPLOYER RESPONSIBILITIES. **Do not reveal the next transitions.**

Trainer to complete **Mandatory Activity 3** – Employer and Employee responsibilities.

When the activity is complete, trainer to reveal the transitions and discuss the 6 areas displayed, relating back to the group suggestions during Activity 3.

Trainer to emphasise the importance of monitoring and continuous improvement.

Trainer to reveal the next slide.

ACTIVITY 3 – Employer and Employee responsibilities (5 minutes)

Resources: Flipchart, pens and post-it notes

Trainer to:

- Write the heading 'Employer Responsibilities' on one sheet of flipchart paper, and 'Employee Responsibilities' on a second sheet of flipchart paper and display both on the training room wall.
- Hand out a set of post-it notes to each individual in the room.
- Ask individuals to imagine it is their first day on the job and to write on the post-it notes what they think are the employee responsibilities, and on a separate post-it note, what are the employer responsibilities in relation to health and safety.
- Instruct the individuals to place their post-it notes on the relevant flipchart as soon as they are ready.
- Instruct the group that they have 3 minutes to complete the activity.
- Stop the group after 3 minutes and reveal the 6 headings on the slide and relate the individual suggestions to the slide.

Expect to see:

Employer responsibilities: *Provides safe place to work PPE (Personal Protective Equipment), site tour, type of facilities, site rules, fire safety, first aid, accident/incident reporting, manual handling training, H&S videos, assessments, hazards on site, vehicles and walkways, reporting structure, policy; training, competency checks, Safe Systems of Work (SSOW).*

Employee responsibilities: *Wear PPE, follow the risk assessment and method statements, keep those around you safe, report things that are not right.*

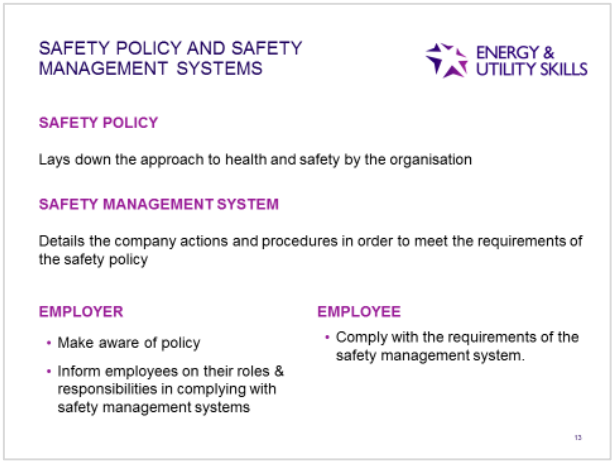
Trainer's notes:

Once complete, the trainer talks through the 6 sections on the slide, to summarise the core employer responsibilities and link back to the answers provided.

- Employers have a duty to protect the health, safety and welfare of their employees and others who may be affected by their business, and must do whatever is reasonably practicable to achieve this. In the energy and utility industries, employers protect their workers with PPE, induction training, toolbox talks, controlling risks through risk assessments, instructions for the safe movement of people on sites, either pedestrians or vehicles, Safe Systems of Work (SSOW).
- Employers have a duty under health and safety law to assess risks in the workplace and must give employees information about those risks. Employers also have a legal duty to display the approved poster in a prominent position in each workplace, or to provide each worker with a copy of the approved leaflet – 'Health and Safety Law: What you need to know'. Optional – trainer can show a copy of an approved poster or hand out a copy of the 'Health and Safety Law: What you need to know' leaflet to each individual.
- 'Health & Safety Law What you need to know' Leaflet available from HSE: http://www.hse.gov.uk/pubns/books/lawposter.htm
- Employers must also instruct and train you on how to deal with risks. This can be done through specific health and safety training, toolbox talks, etc. There are many relevant regulations including PUWER and LOLER and CDM regulations – more about those shortly.
- Employers must consult employees on health and safety issues either directly, or through a safety representative that has been elected by the workforce, or appointed by a trade union. NOTE: employers are a good source of information as they are on the ground and can inform the company policy.
- Company policy – if employers employ five or more people they MUST have a company policy and they must publish, circulate, communicate, monitor and review it.
- HSE has a booklet called 'Health and safety made simple' – a copy of which is available for you to look at. Optional – trainer can hand out a copy of the 'Health and safety made simple' booklet.
- 'Health & Safety Made Simple' booklet available from HSE: http://www.hse.gov.uk/simple-health-safety/
- Employers must provide adequate welfare facilities including:
    - Access to hot water and/or provision of appropriate hand cleanser.
    - Food storage facility.
    - Seating, away from the workplace.
    - Toilet facilities.
    - Ability to heat food and drink (construction site).
    - Note: These may be limited due to the types of works.

DID YOU KNOW?

Everyone focusses on health and safety in the workplace, and welfare becomes a secondary consideration. They forget about the poor person out driving in the rain, on their own all day. Welfare is as important as health and safety, although health and safety remains the highest priority. However, in 2015/2016, 30.4 million days were lost due to self-reported illness or injury. Stress, depression or anxiety counted for the majority of days.



Slide 13 – SAFETY POLICY AND SAFETY MANAGEMENT SYSTEMS

Trainer to summarise the output of the previous exercise by clarifying the purpose and importance of the Safety Policy and Safety Management Systems, reiterating the importance of complying with the systems in place.

Trainer to reveal the next slide.

DID YOU KNOW? THIS IS A LEGAL REQUIREMENT!

Health and safety law states that organisations must:

- Assess risks to employees, customers, partners and any other people who could be affected by their activities.
- Arrange for the effective planning, organisation, control, monitoring and review of preventative and protective measures.
- Have a written health and safety policy if they employ five or more people.
- Ensure they have access to competent health and safety advice.
- Consult employees about their risks at work and current preventive and protective measures.

Failure to comply with these requirements can have serious consequences – for both organisations and individuals. Sanctions include fines, imprisonment and disqualification.

Slide 14 – EMPLOYEE RESPONSIBILITIES

Trainer to reveal the employee responsibilities and link the answers back to Activity 3.

Trainer to reveal the final transition question and ask the group 'What kind of behaviours are positive within a work environment?'

The trainer to ask each individual for one answer moving in an anti-clockwise direction around the room.

The expected answers should be:

- Have a positive attitude.
- Don't take short cuts.
- Don't walk by.
- Challenge when you see something wrong.
- Set a good example to others.
- Be aware of what is happening around you.

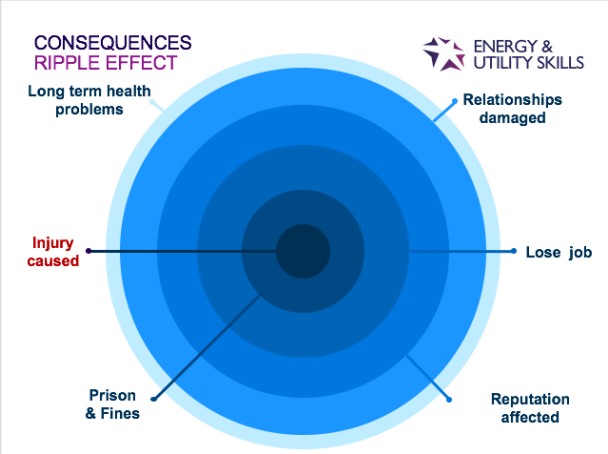
Trainer should expand on answers with follow-up questions until all of the points listed above have been discussed.

REMEMBER:

- Make sure risk assessments are put in place and follow them.
- Never use plant or machinery you haven't been trained on.
- Know and use the correct PPE and report any defects or missing parts.
- Report any hazards you may see.

Trainer to reveal the next slide.

Slide 15 – CONSEQUENCES | RIPPLE EFFECT



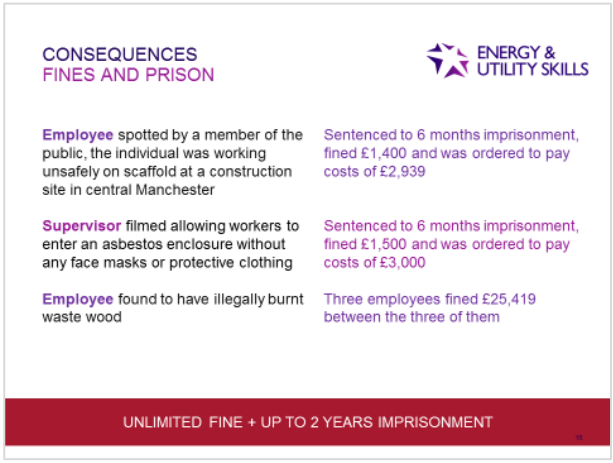
Trainer to:

- Display 'injury caused' on the slide.
- Explain that not following the rules, either deliberately, due to recklessness or negligence, can have a huge impact on lives, in and out of work.
- Provide an example relevant to the individual's work to describe how they may have caused an injury, e.g. worker is using a grinder but can't be bothered to use his eye protection or dust mask, a piece of debris flies up and hits him in the face.
- Ask the group, 'What do you think the consequences of this could be?'
- Ask the group, 'What are the WORST consequences of poor health and safety?'

DEATH!

- Click to reveal the animated ripple effect in the diagram to show some potential issues.
- Ask the group if they have any experience where someone's life has been affected due to a workplace incident, discuss and emphasise the consequences.
- Reveal the next slide.

Slide 16 – CONSEQUENCES | FINE AND PRISON



Trainer to:

- Explain that, as previously explored, getting health and safety wrong can have legal consequences.
- Outline the actions listed on the left-hand side of the slide.
- Ask the group ‘what do you think was the consequence?’
- Reveal the consequences and the prosecutions, highlighting and emphasising that employees can be prosecuted.
- Advise that, as the slide shows, there does not need to be a specific injury or demonstrable environmental damage for the consequence to apply.
- Ask the group: ‘can anyone share any examples that they have come across?’
- Reveal the red banner and explain that you can receive up to 2 years imprisonment and unlimited fines, although the total cost can be much greater overall.
- Explain that the law has recently been tightened up and more people are being prosecuted each year.
- Advise that ‘AS AN EMPLOYEE, YOU CAN BE FINED UP TO 700% OF YOUR WEEKLY WAGE’.
- Reveal the next slide.

Slide 17 – ENFORCEMENT

Trainer to:

- Outline the Health and Safety Executive (HSE) as the main regulator for health and safety, and depending on where you are in the UK, different environment agencies will enforce the environmental legislation. There are other relevant authorities working to ensure that working practices are adhered to, for example the Office of Rail and Road.
- **Optional Video:** Play the video introducing the HSE:
  - https://www.youtube.com/watch?time_continue=23&v=FZO8R9giCf0
- Outline the various functions of the regulator, expanding on the powers of enforcement inspectors and describing the different type of enforcement notice.
- Explain that there will be more on this later in Module 9.
- Clarify that HSE inspectors may:
  - Offer advice (either verbal or in writing).
  - Give you a notification of contravention.
  - Give you an improvement notice.
  - Give you a prohibition notice.
  - Or, prosecute you for breaching health and safety laws.
- Reveal the next slide.

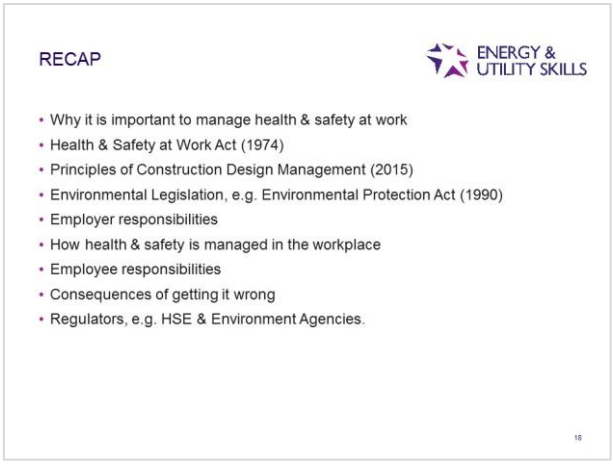
DID YOU KNOW?

That HSE Inspectors can enter your premises at any "reasonable time"? That means that if your organisation works 24 hours a day they could (reasonably) enter your premises at 3am. They could also take along a police officer if they felt it was required.

They can also:

- Order areas to be left undisturbed, take measurements, photographs and recordings, take samples and take possession of, and carry out tests on, articles and substances that appear to have caused (or be likely to cause) danger.
- Require the production of, inspect and take copies of relevant documents.
- Require anyone they think might give them relevant information to answer questions and sign a declaration of the truth of the answers.

- Require facilities and assistance to be provided; and
- Seize and make harmless (by destruction if necessary) any article or substance which they have reasonable cause to believe is a cause of imminent danger of serious personal injury.
- If you are found to be in material breach of health and safety law, you will have to pay for the time it takes the HSE to identify the breach and help you put things right. This includes investigating and taking enforcement action and is called a fee for intervention (FFI).



Slide 18 - RECAP

Trainer to summarise the topic areas covered in Module 1.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to remind the group to place any notes out of sight.

Trainer to administer the assessment for Module 1.

Slide 19 - MODULE COMPLETE

Trainer to exit the module presentation, navigate towards the 'training material' menu and initiate the module assessment.

Understanding the effects of our work on the environment

MODULE 2

This module aims to develop individuals' understanding of the key environmental considerations in the workplace, and the impact employees have on the sustainability of their environment.

There are 3 learning outcomes for this module:

LO1: Understanding our workplace environment
LO2: Managing waste
LO3: Sustaining our workplace environment

Within this module we will be looking at;

- Awareness of how work activity can impact the environment
- The common causes of environmental damage, e.g. noise, dust, energy use, etc., and their impact
- The approach to take to prevent harm to the environment
- The different types of waste, what they are and how we manage them
- The Environmental Protection Act (1990) and its purpose
- High risk areas for hazardous materials and substances
- Good and poor environmental management and its impact

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

- Our Environment – What is affected

Optional activities

- Our Environment
- Waste Hierarchy

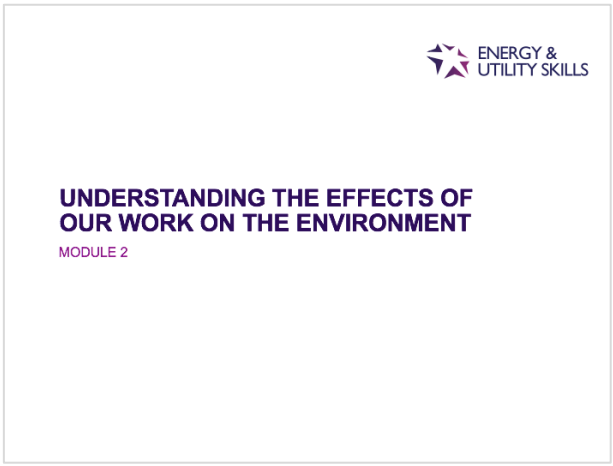
RESOURCES

The following outlines the general resources underpinning delivery of this section. All other resources are embedded in the modules.

Video: Dear Future Generations Sorry: https://www.youtube.com/watch?v=eRLJscAlk1M
Video: Environment Agency targeting misuse of waste: https://www.youtube.com/watch?v=FgkxHIDZmqo

UNDERSTANDING THE EFFECTS OF OUR WORK ON THE ENVIRONMENT

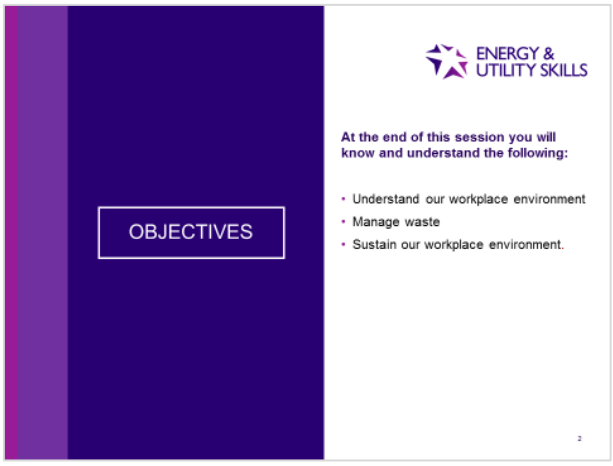
Approximate delivery time: 40 minutes



Slide 1 - UNDERSTANDING THE EFFECTS OF OUR WORK ON THE ENVIRONMENT

Trainer to reveal the module title slide and explain that this module aims to develop individuals' understanding of the key environmental considerations in the workplace, and the impact employees have on the sustainability of their environment.

Trainer to reveal the next slide.



Slide 2 - OBJECTIVES

Trainer to briefly explain that individuals will learn about the environment that they work in, the principles of managing waste in a safe manner and the importance of sustaining our work place environment.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.

Slide 3 - OUR ENVIRONMENT

Trainer to:

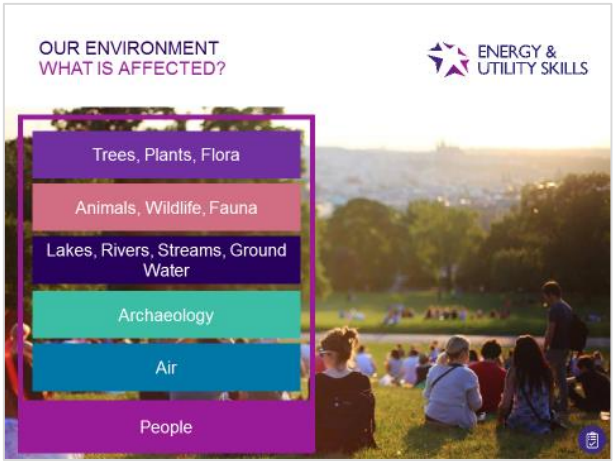
- Click the title slide to reveal the question.
- Ask the group 'how does your work affect the environment?'
- Complete **Optional Activity** – Our environment, depending on the needs of the group.
- Facilitate a discussion.
- Reveal the next slide.

OPTIONAL ACTIVITY – Our environment (5 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Instruct individuals that they have 2 minutes to work with the person on their right to list as many ways they can think their work affects the environment.
- Stop the group after 2 minutes.
- Ask each pair to feedback to the group what they have listed.
- Write the responses onto a flipchart (bullet points) and display the flipchart on the wall in the training room.



Slide 4 - OUR ENVIRONMENT | WHAT IS AFFECTED?

Trainer to:

- Ask the group 'what is affected?'
- Reveal each transition and ask the group how work operations can affect each element of the environment.
- Ensure that everyone has contributed an answer.
- Complete **Mandatory Activity 4** - Our environment – what is affected?
- Reveal the next slide.

ACTIVITY 4 – Our environment, what is affected? (10 minutes)

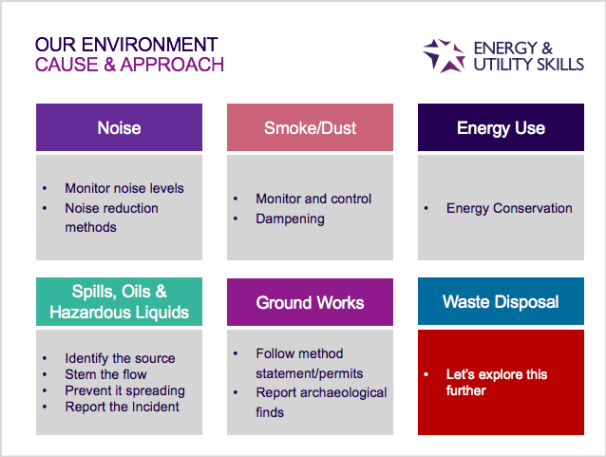
Resources: Flipchart, pens and paper

Trainer to:

- Split the group into groups of 3 or 4 individuals depending on the size of the group.
- Provide each group with a sheet of flipchart paper and pens.
- Ask each group to draw a vertical line down the centre of the flipchart paper and on one side list 5 work activities that could impact the environment. On the opposite side write how they can minimise the risk of each work activity impacting the environment.
- Instruct the group that they have 5 minutes in their respective groups to discuss and write their responses on the flipchart.
- Stop the group after 5 minutes.
- Ask for a volunteer within each group to feedback their suggestions to the rest of the group.

Expect to see: *Spillages, Dust, Oils, Noise, Litter, Driving etc.*

Trainer to display each flipchart on the training room wall clearly differentiating the cause of pollution from the approach to be taken.



Slide 5 - OUR ENVIRONMENT | CAUSE & APPROACH

Trainer to:

- Reveal each transition and summarise the common causes of environmental pollution and the actions taken to mitigate the risk, linking back to the answers provided by the group during **Mandatory Activity 4**.
- Highlight any other areas that were noted by the group in Activity 4 but not listed on the slide.
- Ensure that the group are clear on the process for managing spills.
- Reveal the next slide.

DID YOU KNOW?

The BBC reported on 20th October 2017 that “In the UK about 8% (or 50,000) deaths are estimated to be linked to pollution, placing UK in 55th place out of the 188 countries measured, placing us behind the US and many European countries, including Germany, France, Spain, Italy and Denmark”.

“The Department for Environment, Food and Rural Affairs (Defra) said a £3 billion plan had been put in place to improve air quality and reduce harmful emissions.”

A spokesperson said: "We will also end the sale of new diesel and petrol cars by 2040, and next year we will publish a comprehensive Clean Air Strategy which will set out further steps to tackle air pollution."

Source: http://www.bbc.co.uk/news/health-41678533

DID YOU KNOW?

Telecoms and the Environment

The very existence of telecommunications, with the rapid growth and development in technology that we have seen in recent years, has had beneficial impacts. Telepresence and the adoption of unified communications are slowly replacing the need for global travel, as demonstrated by the recent plans of Antonio Horta-Osorio, the new chief executive of Lloyds Banking Group, who has banned employees from travelling for a week every month for the rest of the year, expecting them instead to make more use of video conferencing. Virtualisation and cloud computing are much more environmentally friendly than the alternatives.

Nevertheless, environmental issues are playing a massive role in wholesale telecoms. For Barry Kingsland, director for energy and sustainability at Cable & Wireless Worldwide, green issues are driving significant developments in global energy markets, and in turn within the telecoms sector: "The whole smart utilities agenda is ramping up massively, driven by carbon reduction commitments. There’s an expectation that the industry will spend something like £200 billion over 10 years, in fundamentally changing the way the energy sector works."

The true cost of energy

At present, according to research by Emerson Electric, the telecoms industry alone is estimated to use 164 terawatt hours per year, making it responsible for 1% of all global power consumption. It is also responsible for generating 110.7 million tons of CO2, equivalent to the emissions of 29 million cars.

Everything in telecoms uses power, from the major power plants and cooling systems harnessed by the biggest data centres, down to the embedded power suppliers required by servers. And, as everyone knows, the price of energy is rising, creating a strong financial impetus for telecoms to reduce their total power usage.

Gas and the Environment

Natural gas is a fossil fuel, though the global warming emissions from its combustion are much lower than those from coal or oil.

Natural gas emits 50 to 60 percent less carbon dioxide (CO2) when combusted in a new, efficient natural gas power plant compared with emissions from a typical new coal plant. Considering only tailpipe emissions, natural gas also emits 15 to 20 percent less heat-trapping gases than gasoline when burned in today's typical vehicle.

Emissions from smokestacks and tailpipes, however, do not tell the full story.

The drilling and extraction of natural gas from wells and its transportation in pipelines results in the leakage of methane, primary component of natural gas that is 34 times stronger than CO2 at trapping heat over a 100-year period and 86 times stronger over 20 years. Preliminary studies and field measurements show that these so-called "fugitive" methane emissions range from 1 to 9 percent of total life cycle emissions.

Whether natural gas has lower life cycle greenhouse gas emissions than coal and oil depends on the assumed leakage rate, the global warming potential of methane over different time frames, the energy conversion efficiency, and other factors. One recent study found that methane losses must be kept below 3.2 percent for natural gas power plants to have lower life cycle emissions than new coal plants over short time frames of 20 years or fewer. And if burning natural gas in vehicles is to deliver even marginal benefits, methane losses must be kept below 1 percent and 1.6 percent compared with diesel fuel and gasoline, respectively. Technologies are available to reduce much of the leaking methane, but deploying such technology would require new policies and investments.

Water and the Environment

The UK has less available water per person than most other European countries. London is drier than Istanbul, and the South East of England has less water available per person than the Sudan and Syria (Waterwise).

In the UK, systems are in place to remove harmful toxins from water before it is returned to the drinking water supply. However, both the pumping and cleaning of water requires energy. As the majority of energy used in water sanitation comes from fossil fuels, these resources are also depleted, while additional greenhouse gases are emitted which further contributes to climate change. The water industry is one of the most energy intensive sectors in the UK. In 2008/9 the UK water industry used 8,650 GWh of energy (Water UK Sustainability Indicators, 2008-9) the equivalent of running 5.5 million TVs non-stop for a year! For hot water in businesses and homes, the carbon emissions are even higher – as the energy used to heat the water must also be considered.

Pollution effects

Any use of water can affect the water quality locally. This means that the process of cleaning and purifying water is more difficult and requires more energy. There are strict guidelines regarding how, where and when discharges into watercourses can be made.

Sewage in the UK is often released out to sea. This can cause diseases, as well as washed up items damaging beaches. A major problem in the UK is the disposal of non-sewage items into water such as nappies, medical equipment, oils and fats. These items can cause blockage problems to sewers damaging the infrastructure, and potentially causing problems to human health.

In more extreme cases disposal of chemicals into watercourses can destroy biodiversity (see below), and make the process of purifying water almost impossible.

Biodiversity

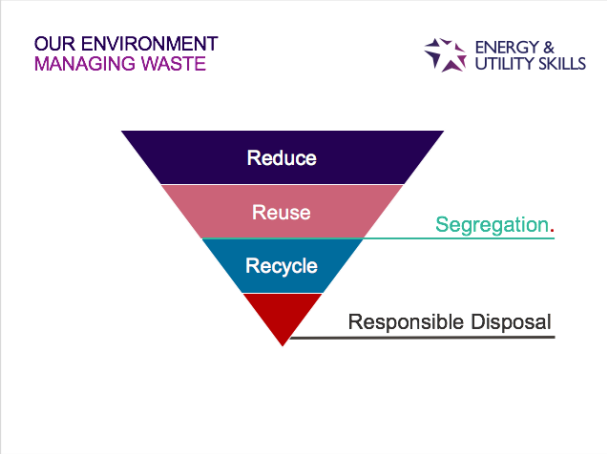
Water pollution can have extreme effects on water dwelling animals, including fish, mammals and invertebrates. High concentrations of pollutants can wipe out all life in water systems, but even lower levels of pollution can be damaging to aquatic life. Pollution effects are magnified higher up the food chain. Even low levels of contaminants in low food chain can accumulate in higher predators such as fish, birds and mammals. For animals that become part of the human food chain (such as fish species like tuna) these pollutants can build up in humans.

Power Industry and the Environment

Although electricity is a clean and relatively safe form of energy, the generation and transmission of electricity has environmental impacts. Nearly all types of electric power plants have an effect on the environment. Some power plants have a bigger effect than others.

The variety of fuels used to generate electricity all have some impact on the environment. Fossil fuel power plants release air pollution, require large amounts of cooling water, and can mar large tracts of land during the mining process. Nuclear power plants are generating and accumulating copious quantities of radioactive waste that currently lack any repository. Even renewable energy facilities can affect wildlife (fish and birds), involve hazardous wastes, or require cooling water.

Slide 6 - OUR ENVIRONMENT | MANAGING WASTE



Where appropriate, trainer to complete **Optional Activity** – Waste Hierarchy before revealing the slide transitions **or** click through the slide transitions and expand on each approach within the hierarchy as they are revealed:

- Reduce – using less material in work activities to reduce the amount of waste created or left over.
- Re-use – repairing, refurbishing, cleaning and checking items (either whole or spare parts).

- Recycling – turning waste into something new; either the same product or something different, also includes composting.
- Responsible Disposal – landfill and incineration without energy recovery.

Trainers to discuss with the group ways in which each of these levels can be contextualised for the industries represented in the group, e.g. Telecoms, Gas, Power, Water etc.

Trainer to ask each individual in the room to identify at least one way in which their industry addresses each of the layers of the waste hierarchy.

Trainer to reveal the next slide.

OPTIONAL ACTIVITY – Waste Hierarchy (10 minutes)

Resources: Flipchart & pen, blank paper

Trainer to draw an inverted triangle on the flipchart and ask for volunteers to fill in the first line, i.e. to create the layers of the waste hierarchy for themselves. Repeat until the triangle has been filled in completely (correctly).

Expected results:

REDUCE: *Prevent, Eliminate, Reduce, Minimise*

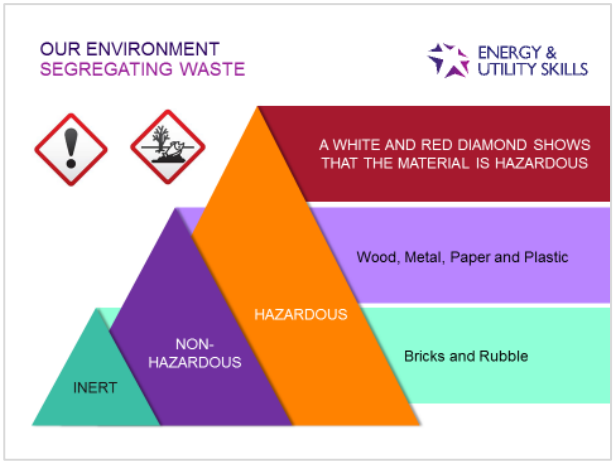
REUSE*: Reuse, Fix it*

RECYCLE*: Recycle, Turn it in to something else*

RESPONSIBLE DISPOSAL: *disposal, send to landfill, incinerate it, put it in the bin*

Trainer to reveal the slide transitions showing the waste hierarchy triangle and invite the group to talk about the different levels, starting at the top and giving examples.

Slide 7 - OUR ENVIRONMENT | SEGREGATING WASTE



Trainer to click to reveal each slide transition (except the last transition showing the hazardous waste signs) and explain the different types of waste:

Inert waste is waste which is neither chemically or biologically reactive and will not decompose.

Non-hazardous waste is either compostable or recyclable and includes woods, metals, papers and plastics.

Hazardous waste is a waste that poses substantial or potential threats to public health or the environment and has unique characteristics.

These characteristics include substances that are:

- Explosive - able or likely to shatter violently or burst apart.
- Flammable - easily set on fire.
- Poisonous - causing or capable of causing death or illness if taken into the body.
- Hazardous to the environment – can endanger ecosystems.
- Corrosive – may burn skin or materials.

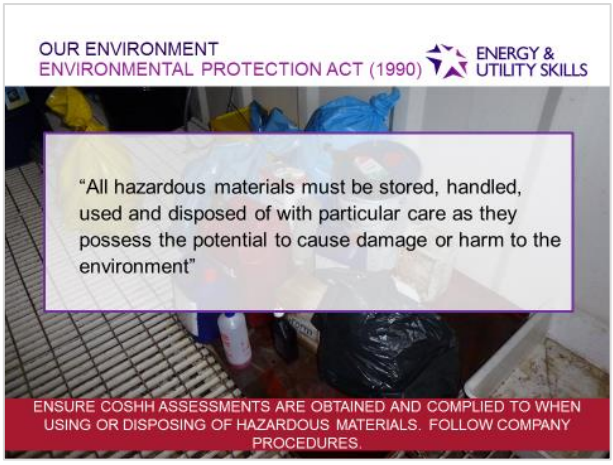
Trainer to ask the group how they can identify hazardous waste.

The final click will bring up the sample hazardous waste signs.

Trainer might want to consider the ways in which each of these types of waste can be tailored for the industries represented by the group, and ask individuals in turn to identify at least one example of a type of waste that is specific to their industry.

Signs and symbols activity to follow in Module 5 to define different COSHH symbols.

Trainer to reveal the next slide.



Slide 8 - OUR ENVIRONMENT | ENVIRONMENTAL PROTECTION ACT (1990)

Trainer to explain how hazardous materials should be stored and the importance of storing them correctly.

Trainer to briefly introduce the principles of risk assessment.

Trainer to reveal the next slide.

Trainer's notes:

Storage

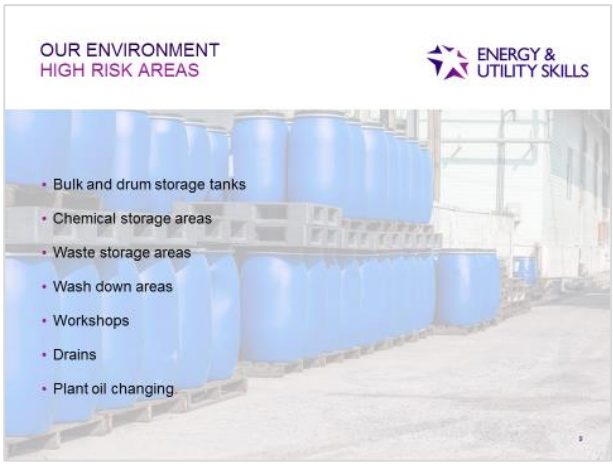
- All hazardous materials should be stored safely and so that any leakage is contained.
- Drip Trays should be positioned underneath all pumps, generators, welding sets and the like.
- Drums should be positioned within bunds or on drip trays such that leaks cannot overshoot the bund or drip tray.
- Spill kits should be immediately available both at the storage and dispensing locations.

Handling and disposal

- Personnel should whenever possible use drip trays to help prevent spills.
- All containers should be labelled with their contents.
- All old labelling should be removed before re-using any containers.
- No re-fuelling within 30m of any watercourse (Think).

- Any plant maintenance work should be undertaken either above drip trays on hardstanding or in areas underlain by geo-membranes.

Slide 9 - OUR ENVIRONMENT | HIGH RISK AREAS



Trainer to advise the group that several site areas and activities are considered to have a high environmental risk, as they are associated with hazardous materials or the release of materials to the environment.

Trainer to talk through the examples below:

- Bulk and drum storage tanks
- Chemical storage areas
- Waste storage areas
- Wash down areas
- Workshops
- Drains
- Plant oil changing.

Trainer asks the group ‘how they would protect these areas?’

Top tips for materials storage:

- Storage areas - designate storage areas for plant, materials, waste, flammable substances e.g. foam plastics, flammable liquids and gases such as propane and hazardous substances e.g. pesticides and timber treatment chemicals.
- Pedestrian routes – do not allow storage to ‘spread’ in an uncontrolled manner on to footpaths and other walkways. Do not store materials where they obstruct access routes or where they could interfere with emergency escape.
- Flammable materials - will usually need to be stored away from other materials and protected from accidental ignition.
- Storage at height - if materials are stored at height e.g. on top of a container, make sure necessary guard rails are in place, as people could fall when stacking or collecting materials or equipment.

- Tidiness - keep all storage areas tidy, whether in the main compound or on the site itself; and
- Deliveries - plan deliveries to keep the amount of materials on site to a minimum.

Trainer to reveal the next slide.

Slide 10 - OUR ENVIRONMENT | WHAT IS WRONG IN THIS PICTURE?

Trainer to:

- Ask the group what they consider to be wrong in the photo and what would they do to minimise the rubbish?
- Click on the slide transition to reveal the 'Dos and Don'ts' of dealing with waste.
- Summarise the broader points in the notes below.
- Reveal the next slide.

Trainer's notes:

All waste produced can also present a real safety hazard to workers on site if it is not properly managed throughout the project. Any organisation needs to decide at an early stage:

How - wastes produced during work will be managed in a timely and effective way; and

Who – is responsible for collecting and disposal of specific wastes produced on site. Problems often arise when company and individual duties are not made clear before work starts.

Top tips for waste management

Flammable materials - make sure that all flammable waste materials (such as packaging and timber offcuts) are cleared away regularly to reduce fire risks.

Work areas - make clearing waste a priority for all trades. Check that everyone is aware of what is required that it is being done.

Skips - waste materials need storing safely before their removal from the site so make sure that you allow sufficient space for waste skips and bins etc. Plan where the skips can be positioned and how often they will need to be collected.

Waste within buildings - consider waste generated inside the building and whether you need to provide wheeled bins or chutes etc. to enable it to be brought out of the building safely.

Emphasise that poor environmental management can harm the environment as discussed previously within the module.

Slide 11 - OUR ENVIRONMENT | THE IMPORTANCE

Trainer to talk through the benefits of good environmental management at work and reiterate the social aspects/consequences of getting it wrong.

Trainer to ask the group if they can think of any other benefits that have not already been discussed.

Other benefits include:

- It helps achieve real cost savings - direct efficiencies in energy, water, waste, purchasing and transport.
- It's a valuable engagement process for staff and stakeholders.
- It effectively demonstrates the commitment and responsibility to key clients, regulators and the public.
- Leading schemes have been structured to be compatible and complementary with other mainstream standards (e.g. ISO 9001 Quality Standard).
- It's increasingly valuable as a pre-requisite for doing business – EMS accredited certification helping to demonstrate your business's compliance with supply chain requirements.

Trainer to reveal the next slide.

DID YOU KNOW?

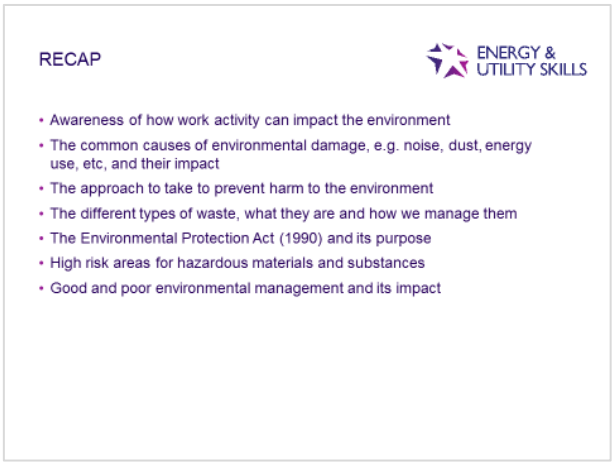
Business activity and environmental sustainability are still often in conflict. Some recent examples from the Water industry …

A large water company has been fined £666,000 and costs of £32,000 over a 'negligent' leak of more than four million gallons of human waste into a river. The water company, which has 205 convictions, including three major fines in the last three years, allowed the equivalent of more than eight Olympic sized swimming pools to leak into a brook and river over three days in October 2014, killing up to 100 fish.

On the 21st February 2017, another water company was fined £185k for polluting an estuary.

In March 2017, a large water company was hit with a record fine of £20.3m after huge leaks of untreated sewage into a large river, its tributaries and on to land. The prolonged leaks led to serious impacts on residents, farmers, and wildlife, killing birds and fish.

On the 10th August 2017, a large water company was fined £142k for polluting streams.



Slide 12 - RECAP

Trainer to summarise the topic areas covered in Module 2.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to remind the group to place any notes out of sight.

Trainer to administer the assessment for Module 2.

Slide 13 - MODULE COMPLETE

Trainer to exit module presentation, navigate towards the 'training material' menu and initiate module assessment.

The cross-country environment

MODULE 3

This module helps the individual to understand the role and importance of wayleaves and contracts in the operation and management of cross-country sites, as well as reinforcing the need for environmental protection of the land, and the management of archaeological finds and protected/invasive species of animal and plant life.

There are 3 learning outcomes for this module:

L01: Understanding legal considerations

L02: Understanding what's hidden underground

L03: Understanding protected and invasive species

Within this module we will be looking at:

- Wayleaves and contractual obligations
- Re-instatement and restoration
- Pollution of rivers and other water courses
- Archaeological remains and unexploded ordnance
- Protected species and invasive plants
- The potential consequences of non-compliance

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

- Restoration and Re-instatement

RESOURCES

The following outlines the general resources underpinning delivery of this section. All other resources are embedded in the module.
https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications
https://www.gov.uk/topic/environmental-management/wildlife-habitat-conservation
http://www.nonnativespecies.org/home/index.cfm
https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants
https://www.gov.uk/government/publications/the-great-britain-invasive-non-native-species-strategy

THE CROSS-COUNTRY ENVIRONMENT

Approximate delivery time: 60 minutes

Slide 1 - THE CROSS-COUNTRY ENVIRONMENT

Trainer to reveal the module title slide and explain that this module aims to develop individual's understanding of the environment as it applies to cross-country pipeline operations; meeting legal requirements relevant to the environment, including silt run off; archaeology; unexploded ordinance; protected species and invasive plant life.

Trainer to reveal the next slide.

Slide 2 – OBJECTIVES

Trainer to briefly explain what will be covered in this module.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.

Slide 3 – PREPARATORY ESSENTIALS

Trainer to:

- Click to reveal the slide transition and discuss the headings.

- Ask the group 'What do you know about Wayleaves and Easements? What are they?' Further details are included in the Trainer's Notes below.
- Also initiate discussion on how contracts are used to establish what will be done and who is responsible for specific aspects.
- Pose the question – '*what might a landowner insist on being included in a contract, when a pipeline is crossing his/her land?*'
- Expected answers include: *Reinstatement and Restoration of existing features such as hedges, fences, dry stone walls, crops etc. Also, there may be some inclusion of access road improvements or even construction of new access, gates and or fencing etc. once the land is restored.*
- Introduce **Mandatory Activity 5 - Restoration and re-instatement**.
- Address issues of re-instatement/restoration best practice through the activity that follows.
- Reveal the next slide.

Trainer's notes:

Pipeline Design Specification

A pipeline will be constructed following a detailed analysis of the demand expected over a long period of time. For example, if a major new town is to be built, but the existing gas distribution infrastructure is insufficient to meet the supply needs, a new pipeline might be needed, either to supply the new load directly (such as a power station or major industrial process plant) or to reinforce the network to facilitate the increase in demand. Once the need for a pipeline from A to B has been determined, then the route planning takes place, taking into account all the work needed for every option. The result of all that analysis and work is the Pipeline Design Specification. Cross-country routing is obviously much more economical than trying to take a large pipeline through populated areas.

Wayleaves and Easements

These legal rights provide utility companies with access to private land to install and maintain pipelines and other utilities in return for some form of payment. For pipeline projects, where the assets need to cross adjoining land, not owned by the pipeline asset owner, a wayleave or easement agreement must be negotiated directly with the landowner.

Wayleaves

A Wayleave is a means of providing rights for a company to install and retain their assets across private land in return for annual payments to the landowner. A Wayleave is normally a temporary arrangement and does not automatically transfer to a new owner or occupier.

Annual Wayleave payments, made directly by utility companies, normally amount to no more than a few pounds in value. These standard payments are calculated from base figures agreed with various national land authorities. However, for underground work and for continuous access, companies normally seek an Easement as described below. Gas network operators also prefer Easement agreements and not Wayleaves.

Easements

An Easement (also known as Deed of Grant) provides similar access rights for installing and maintaining infrastructure equipment, but for a one-off payment, and it provides permanent access. An Easement can also be registered at the Land Registry in order to ensure that future owners of the land adhere to it.

Easement payments made directly by utility companies are relatively small and usually about 20 times the equivalent Wayleave payment. However, when developers need permission to cross

adjoining land, to bring in service pipes or cables, this can cost several thousand pounds to reach an agreement, subject to open negotiation between the landowner and developer.

Landowners can ask for a previously agreed Wayleave to be replaced with a one-off payment through an Easement, but not the reverse.

ACTIVITY 5 – Restoration and re-instatement (12 minutes)

Resources: Printed copies of the activity sheet (one activity sheet per group), pens.

Trainer to:

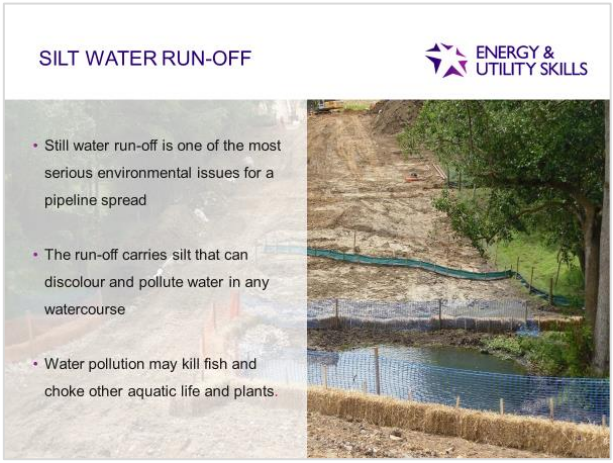
- Split the individuals into pairs or groups of 3.
- Hand each group an activity sheet and pen.
- Explain to the group(s) that the activity sheet identifies 6 features commonly found on cross country pipeline sites, and that there are 15 possible good practice re-instatement and restoration options relevant to each feature.
- Explain that although the activity sheet has four boxes next to each feature, this does not mean that there are four answers, some may have only two or three examples of good practice.
- Instruct the groups that they have **5 minutes** to match the features with good practice re-instatement and restoration options.
- Provide a prompt regarding how many correct answers there are for each feature, depending on the needs of the group.
- Stop the group after **5 minutes.**
- Ask each group to feedback what they have written against each feature.
- Refer to the correct answers below and facilitate a discussion around the rationale for each element of good practice.
- Allow no more than **6 minutes** for feedback and discussion.

Answers:

Hedges:	Cut Back; Dig Out; Re-plant; Store
Fences:	Dismantle; Roll (Chain Link); Dry Store
Stone Walls:	Dismantle (Dry Stone); Mark if required, Store
Crops:	Pick (if in season), Record Type and area covered
Topsoil:	Dig out carefully, Store separately
Mixed soil and aggregate:	Remove, store separately for re-use

Activity 5 - Activity Sheet

On Site Feature	Good methods to adopt during Site Clearance					
Hedges						
Fences						
Stone Walls						
Crops						
Topsoil						
Mixed Soil and Aggregate						



Slide 4 – SILT WATER RUN-OFF

Trainer to:

- Click to reveal the slide transition.
- Explain that silt water run-off is one of the most serious environmental issues for a pipeline spread. The run-off carries silt that can discolour and pollute water in any watercourse. Water pollution may kill fish and choke other aquatic life and plants.
- Highlight the problems caused by silt water and provide some example situations as detailed in the Trainer's Notes below.
- Reveal next slide.

Trainer's notes:

Drainage channels: Where channels are used it is essential that silt does not enter waterways.

Direct run-off: Spread design considers prevention of run off, this may occur in severe weather conditions.

Pumping systems: Where pumping systems are used it is essential that there is no interference with the silt controls in place.

Slide 5 – SILT WATER | CONTROL MEASURES

Trainer to:

- Click to reveal the slide transition (image)
- Ask the group 'What control measures should be in place to minimise the risk of silt water run-off?'
- Click to reveal the control measures.
- Highlight essential aspects that will collectively minimise the risk of silt water spillage and/or contamination and pollution. Further detail is provided in the Trainer's Notes.
- Click to reveal the final slide transition (red banner) and emphasise its importance.
- Reveal the next slide.

Trainer's notes:

Planning: The spread or site will be surveyed, and plans put in place to protect watercourses from silt run-off and several alternative methods are used to achieve this.

Permit to pump: Pumps are sometimes used and are subject to permissions and systems in place to filter solids etc.

Silt Fencing: Used to control where silty water flows. Silt fencing enables the run-off to be directed and handled without causing pollution.

Lagoons: Used to collect and control run off and includes filtering methods.

Procedures: There are procedures applied to all control methods and operatives should not interfere with any system in place without the appropriate permissions.

Vigilance: Pollution caused by silt run off results in prosecution and a requirement to repair any damage. This is very expensive and has a detrimental effect on project costs and reputations.

Slide 6 – HIDDEN UNDERGROUND | ARCHAEOLOGY CONTROL MEASURES

Trainer to:

- Reveal the title slide only.
- Emphasise potential discoveries that might be unearthed when groundworks or excavation takes place.
- Ask if the group "has anyone had any actual experiences of unusual finds?"
- Click to reveal the slide transition.
- Ensure emphasis is on reporting and protective actions.
- Refer to Trainer Notes for further guidance.
- Reveal next slide.

Trainer's Notes:

A wide range of items may be hidden underground including: evidence of old habitations, ruins, forts or living quarters, ceramic pots or bottles and coins with historic value. Also common are items dating back to previous battles or campaigns that may have been fought over the territory concerned.

Dealing with an archaeological find:

The spread must be surveyed prior to work commencing with the aim of identifying possible archaeology. Despite the survey there is no guarantee that all archaeology will be identified and explored at this stage.

Reporting & Recording: Where archaeology is found or suspected, all work must cease, and the supervisor informed. No work can continue at the location until the find has been confirmed

and removed. Often an exclusion zone is enacted if the find is considered important or thought to cover a large area.

Exclusion Zones: Disturbance within exclusion zones is not permitted except under the guidance of an archaeologist commissioned to examine any discoveries.

DID YOU KNOW?

The Staffordshire Hoard is the largest collection of Anglo-Saxon gold and silver metalwork ever found, anywhere in the world.

Discovered in a field near the village of Hammerwich, near Lichfield, in Staffordshire, England on 5 July 2009, it consists of around 4,000 items that are nearly all martial or warlike in character.

The Staffordshire Hoard totals 5.094 kilos of gold, 1.442 kilos of silver and 3,500 cloisonné garnets. There is nothing comparable in terms of content and quantity in the UK or mainland Europe.

It is remarkable for being almost exclusively war-gear, with an extraordinary quantity of weapon hilt fittings, that is, decorative items from the handles of swords and knives. Many feature beautiful garnet inlays or animals in elaborate filigree.

The hoard was discovered very near Watling Street, one of the major thoroughfares of Roman Britain. It ran for about 250 miles from Dover past Wroxeter, and was probably still in use when the hoard was buried.

DID YOU KNOW?

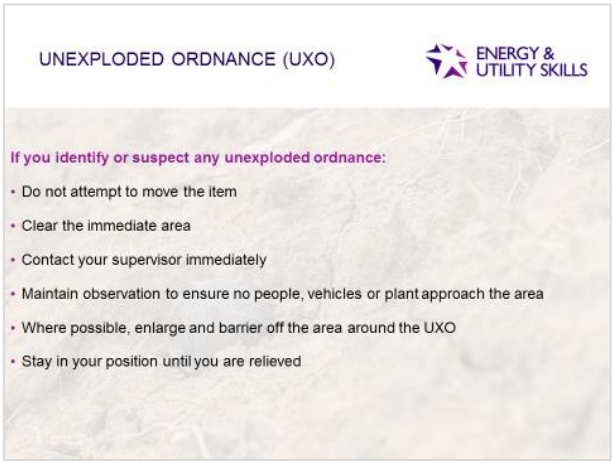
Our physical environment is transforming, faster than at any time in human history. Environmental change is affecting where and how we live: our cities are growing and the way we travel and produce energy is being revolutionised through major infrastructure projects. We need our economy to grow, and we also face pressure for space, global competition, technological, cultural and social change.

Archaeologists understand how these kinds of challenges have been met in the near and distant past, how our modern society has evolved, how we built the places we live in, why they succeed and why they fail. Archaeologists investigate the evidence of the past and produce crucial data to inform new development, to enhance the design of new and old places, to educate us and to help provide sustainable and desirable places for us to live in, work in and enjoy.

Archaeological evidence is uniquely able to illuminate the impact of human interaction with our environment through time. This 'historic' environment is made up of buildings, monuments, settlements, buried sites or landscapes. They can be on land or underwater and can range from the extraordinary to the everyday. Archaeologists have a clear identity among the many other disciplines that work in the historic environment in that it is their job to unravel this evidence, to characterise it, to explore its meaning, and to assess its value for society.

Source: http://www.archaeologists.net/find/clientguide/intro

Slide 7 – UNEXPLODED ORDNANCE (UXO)



Trainer to:

- Ask the group 'If you identify or suspect any unexploded ordnance, what should you do?' Facilitate a discussion.
- Click to reveal the next slide transitions (bullet points) and read each bullet as it appears.
- Highlight the need to clear the area and establish an exclusion zone.
- Emphasise the need to follow the reporting procedure as soon as possible. Someone must remain in situ until relieved, to ensure that no-one encroaches into area.
- Reveal the next slide.

Slide 8 - PROTECTED SPECIES

Trainer to:

- Ask the group 'Why are some species of wildlife protected?'
- Explain that the usual reason is that they are threatened by extinction and their habitats must therefore be retained.
- Click to reveal the slide transitions listing various protected species. (Refer to Trainer Notes and Did You Know?)
- Click to reveal the slide transition categorising the species as protected.
- Ask if anyone has any examples of works being suspended or amended because of the potential impact on a protected species habitat.

- Ask the group if they know 'what legislation is in place to protect wildlife?'
- Reveal the final slide transition and reinforce the action they should take if protected species are suspected or identified.
- Reveal next slide.

Trainer's notes:

A protected species is any plant or animal a government declares by law to warrant protection. Most protected species are considered either threatened or endangered. In these cases, a government establishes certain rules regarding the species that, if violated, can result in fines or criminal prosecution.

DID YOU KNOW?

These are examples of UK protected species that a pipeline project may threaten:

Bats:

Approximately 25% of the world's bats are threatened with extinction. In the UK, bats face threats ranging from predation to crime and loss of habitat.

All UK bat species use echolocation to navigate and hunt for insects in the dark.

A tiny pipistrelle can eat up to 3,000 insects in a night.

Bats usually only have one baby a year and can live for up to 30 years.

Otters:

The otter is one of Britain's best known and loved wild animals. Up until the 1970s otters were found throughout Britain. They subsequently all but disappeared from most counties in England, primarily due to water pollution and loss of habitat. In the last few years conservation efforts have started to show very encouraging results and they are staging a strong comeback, being spotted more and more often.

Adders:

Adders are protected by law against being killed or injured through human activity. They are relatively common in areas of rough, open countryside and are often associated with woodland edge habitats. They are less inclined to disappear into the surrounding undergrowth when disturbed and so are probably the most frequently seen of British snakes.

The adder is the only venomous snake native to Britain. Adders have the most highly developed venom injecting mechanism of all snakes, but they are not aggressive animals. Adders will only use their venom as a last means of defence, usually if caught or trodden on. No one has died from an adder bite in Britain for over 20 years. With proper treatment, the worst effects are nausea and drowsiness, followed by severe swelling and bruising around the bite. Most people who are bitten were handling the snake. The moral of the tale is: treat adders with respect and leave them alone.

Great crested newt:

Great crested newts are usually bright-coloured semi aquatic amphibians. They are the largest of the three Newt species indigenous to Britain and are the most threatened newts in Britain.

The Great Crested Newt is widely distributed throughout Britain, Scotland and Wales. Britain is home to the largest known populations of the Great Crested Newts in the world. They are pre-dominantly found in Northern Europe, from France in the west to the Urals in the east. The Great Crested Newt is found in lowland habitats. It is found in large sized ponds, typically on

farmlands. They need plenty of ground, covered area to search for food, shelter and hibernation. This usually takes the form of undisturbed rough grassland, scrub or woodland.

The Great Crested Newt is included in the “Least Concern” category by the IUCN. But they are threatened in Britain and so legal actions have been taken to save them from extinction.

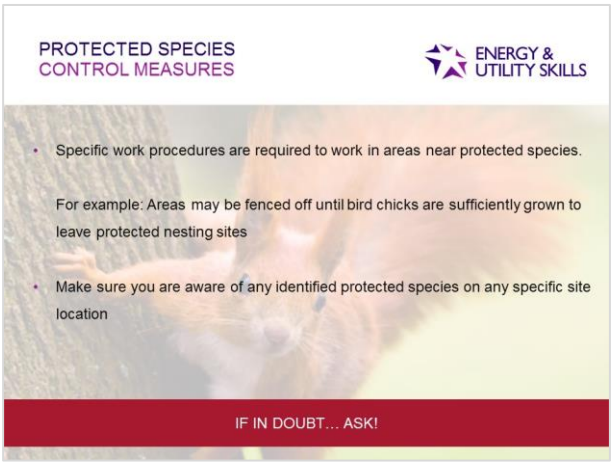
Great crested newts are a European protected species. The animals and their eggs, breeding sites and resting places are protected by law. You may be able to get a licence from Natural England if you're planning an activity and can't avoid disturbing them or damaging their habitats (ponds and the land around ponds

Water vole:

Water voles have undergone one of the most serious declines of any wild mammal in Britain during the 20th century. The intensification of agriculture in the 1940s and 1950s caused the loss and degradation of habitat, but the most rapid period of decline was during the 1980s and 1990s as American mink spread. Between 1989 and 1998, the population fell by almost 90 per cent!

Water voles are fully protected under section 9 of the Wildlife and Countryside Act 1981(as amended). Schedule 5 of this Act makes it an offence to intentionally damage or obstruct access to water vole burrows.

Slide 9 – PROTECTED SPECIES - CONTROL MEASURES



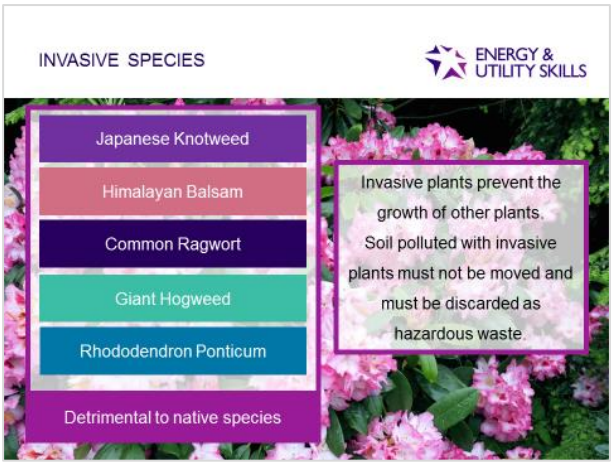
Trainer to:

- Click to reveal the first slide transition (image of squirrel)
- Ask the group ‘What control measures should be in place before work can commence in areas near protected species?’
- Click to reveal the slide transition and discuss.
- Explain that the site will be surveyed prior to job commencement and actions decided. However, it is possible that protected species may be spotted and identified after the job has started.
- Explain that environmentalists will, in discussion with the project management team, decide what actions are required. In exceptional circumstances the pipeline route may be adjusted to protect species habitat or work schedules adjusted to consider the species life cycle.
- Explain that the role of site personnel is to report any identification of any protected species suspected or found within the site areas through the Supervisor. Await a

competent person to investigate and decide on actions. You may be asked to support any actions agreed by operating differently in locations or avoiding areas.

- Click to reveal the final slide transition (red banner) and emphasise its importance.
- Reveal the next slide

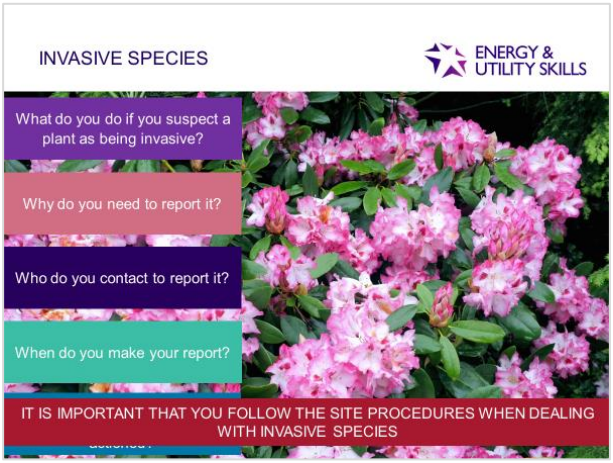
Slide 10 - INVASIVE SPECIES



Trainer to:

- Display the title slide only (Invasive Species) and ask the group: 'Who can give me some examples of invasive plant species?'
- Click to reveal the slide transitions listing invasive plants and acknowledge what was suggested by the group. Refer to Trainer Notes and Did You Know? for more information.
- Click to reveal the slide transition categorising the invasive plant species.
- Click to reveal the final slide transition.
- Explain that invasive plants prevent the growth of other plants.
- Note that soil polluted with invasive plants must not be moved and must be discarded as hazardous waste.
- Explain that there will be site specific procedure in relation to this. Beware, as things change from site to site so it is important for you to be aware of any procedures or processes applied to this particular site.
- Reveal the next slide

Slide 11 - INVASIVE SPECIES



Trainer to:

- Display the title slide only 'Invasive Species'
- Instruct the group that they are about to be asked a series of questions which they should all be able to answer.
- Click through the slide transitions and ask the questions as they appear and clarify the correct response:
    1. What do you do if you suspect a plant as being invasive?
    2. Why do you need to report it?
    3. Who do you contact to report it?
    4. When do you make your report?
    5. What actions should you take on site whilst the report is being actioned?
- Expect to see the following answers:
    - Upon suspicion of an invasive species, it is essential that you contact your supervisor immediately and report what you think you have found. Pending action, steps must be taken on site to prevent any part of the identified plant(s), or the soil they were growing in, being moved until external advice has been received.
- Explain that soil can become contaminated with propagules and seeds, and so care must be taken during excavation and contaminated soil should not be introduced to other sites.
- An exclusion zone should be established with barriers to prevent seeds etc. being transferred on boots or vehicles.
- Click to reveal that final slide transition (red banner) and emphasise its importance.
- Reveal next slide.

Trainer's notes:

Invasive non-native species are thought to be one of the biggest threats to global biodiversity, second only to habitat loss.

There are almost 2,000 established non-native species in Great Britain.

Invasive non-native species cost Great Britain around £1.7 billion annually.

Invasive species have been introduced to the United Kingdom from every continent in the world apart from Antarctica.

What is an invasive species?

An invasive species is a species, which has been introduced to an area outside its natural range and can cause a multitude of ecological, economic and public health problems within the new habitat as its population grows. Invasive species may belong to any taxonomic group, with mammals, reptiles, birds, amphibians, plants, invertebrates, fish and viruses all having invasive populations around the world. The extinctions of numerous species around the world can be attributed to the negative effects of invasive species.

DID YOU KNOW?

Japanese Knotweed:

Is now widely established across most of Great Britain and is notorious for forming dense stands which are extremely hard to control. It is estimated the Japanese knotweed costs the economy £166 million a year. Its habitats include: disturbed ground in urban areas, by water courses, canals and on waste ground, usually in full sunshine. It is shade tolerant and occasionally invades woodland. Sometimes it is found established on the edges of arable fields and other places where garden waste or topsoil has been dumped.

Eradicating it from construction sites can cost well over £1,000 per square metre and, as a controlled waste, it can be expensive to dispose of the 'contaminated' topsoil.

Himalayan Balsam:

The Himalayan Balsam is the tallest annual plant in Europe with its flowers often compared to the shape of a British policeman's helmet. The explosion of the Himalayan Balsam's fruit capsule can fire seeds up to seven metres.

It is a major weed problem, especially on riverbanks and wasteland, but can also invade gardens. It grows rapidly, spreads quickly and is listed on Schedule 9 of the Wildlife and Countryside Act 1981 with respect to England and Wales, which makes it an offence to plant it or introduce it to the wild.

Common Ragwort:

Common Ragwort is a weed of wasteland and pasture that occurs in every county in the UK. The natural habitat is sand dunes, but it is prevalent on light, low fertility soils and on grassland that is overgrazed. It frequently infests horse pastures and is often seen along roadsides, railways and on rubbish tips. It is not found on acid peaty soils. Common ragwort does not tolerate regular soil cultivation and is rarely a problem in arable fields.

In the UK, The Ragwort Control Act 2003 has led to the provision of a code of practice, published by DEFRA, which gives guidance on preventing the spread of ragwort in situations where it is likely to be a danger to horses and other livestock. The code does not seek to eradicate ragwort but only to control it where there is a threat to the health and welfare of animals. Guidance on the disposal options for common ragwort has been prepared to supplement the advice given in the Code of Practice and should be read in conjunction with it.

Giant Hogweed:

Giant Hogweed is widespread in lowland GB and is invasive by lowland rivers and on wasteland. Aptly named 'giant', this plant has flowering stems typically 2-3 m high bearing umbels of flowers up to 80 cm in diameter. The basal leaves are often 1m or more in size. It is especially abundant by lowland streams and rivers, but also occurs widely on waste ground and in rough pastures. It

grows on moist fertile soils, achieving its greatest stature in partial shade. In more open grassland, flowering may be delayed by repeated grazing.

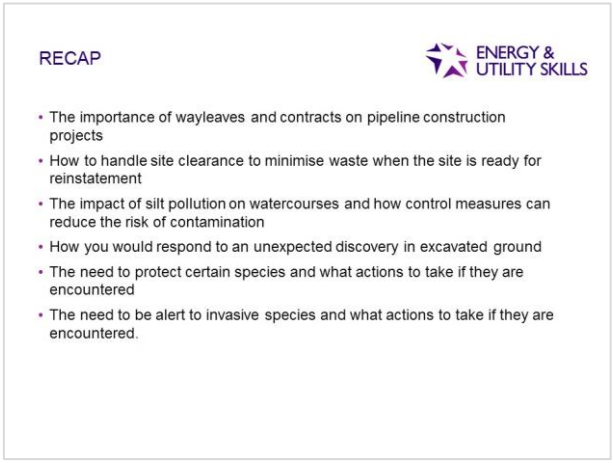
The plant produces phytotoxic sap. The sap contains photosensitizing furanocoumarins, which in contact with human skin and combined with UV radiation cause skin burnings. The intensity of the reaction depends on individual sensitivity. The danger to human health complicates eradication efforts.

Rhododendron:

This evergreen shrub is densely branched growing to 5m. Flowers, borne in racemes of 10-15, are violet to purple. Pollination by insects results in the production of numerous small seeds within a woody capsule. Once rhododendron has invaded an area, few native plants survive. In woodlands, only those trees which manage to grow above the level of the rhododendron canopy will persist. When such trees die, they cannot be replaced because seedlings cannot become established under the lightless canopy. At this point, the rhododendron completely dominates the area. Stands accumulate thick litter layers.

Anecdotal information suggests that honey from rhododendron is toxic to humans. This is known as 'Honey intoxication' and results in relatively short-lived intestinal and cardiac problems but is rarely fatal. The severity of symptoms depends on the amount of contaminated honey consumed.

It is a problem in commercial forests and it invades moorlands managed for gamebirds. A potentially major impact is its effect on oak and beech and nursery stock through disease organisms harboured by rhododendron.



Slide 12 - RECAP

Trainer to summarise the topics covered in Module 3.

Ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to reveal the next slide.

Slide 13 - MODULE COMPLETE

Trainer to remind the group to place any notes out of sight.

Exit the module presentation, navigate towards the 'training materials' menu and initiate the Module 3 assessment.

Identifying and controlling risks

MODULE 4

This module helps individuals to identify potential risks and hazards, and understand their role in preventing them through a range of positive and proactive health and safety behaviours.

There are 2 learning outcomes for this module:

LO1: Identifying risks
LO2: Controlling risks

Within this module we will be looking at:

- What we mean by a hazard, risk, 'near miss', accident and other relevant safety terms
- Hazard identification associated with resources, behaviours, equipment, materials, working environment, natural environment
- Principles behind risk reduction methods
- The 5-step approach to risk assessment and management of systems
- The hierarchy of control
- Safe systems of work, e.g. risk assessment, method statement and permits to work
- The reasons for and features of good housekeeping, i.e. clear up spillages promptly, keep noise to a minimum etc.
- Signage used in the working environment, i.e. prohibition, warning, mandatory and information
- Employer and Employee responsibilities relating to Personal Protective Equipment (PPE) i.e. assess suitability, maintain, provide information and training, look after it and use it etc.

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

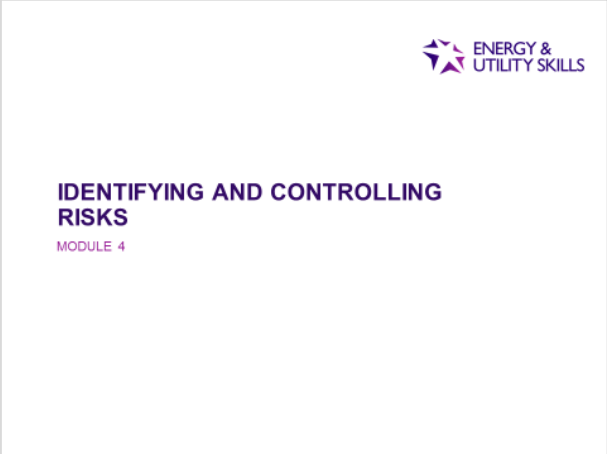
Mandatory activities

- Hazard Identification
- Assessing Risk
- 5 Steps to Risk Assessment

Optional activities

- Administrative Warning Signs
- Types of PPE

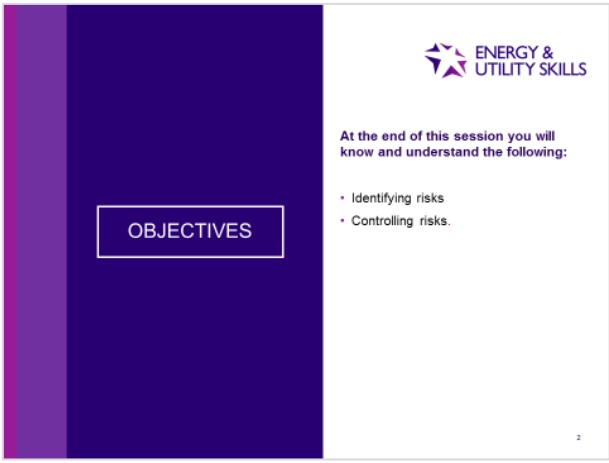
Approximate delivery time: 60 minutes



Slide 1 - IDENTIFYING AND CONTROLLING RISKS

Trainer to reveal the title slide and explain that the aim of Module 4 is to help individuals identify potential risks and hazards, and understand their role in preventing them through a range of positive and proactive health and safety behaviours.

Trainer to reveal the next slide.

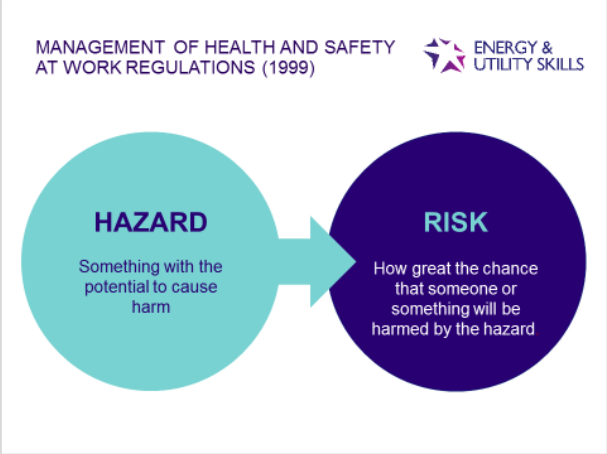


Slide 2 - OBJECTIVES

Trainer to briefly explain this module will introduce individuals to the principles of risk assessment, helping them understand the steps involved in carrying out what is a legal requirement.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.



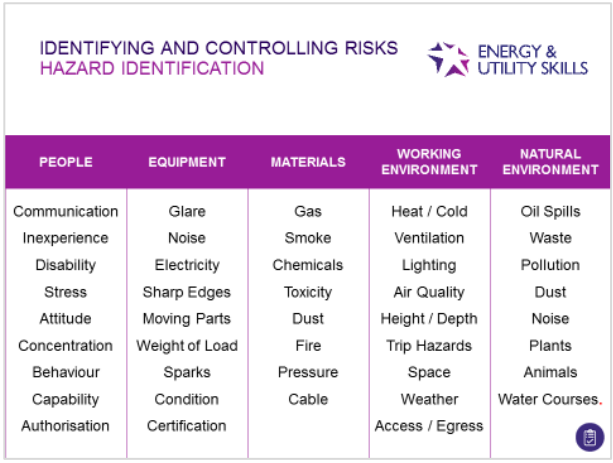
Slide 3 - MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS (1999)

Trainer to explain the difference between a hazard and a risk.

Trainer to explain that the Management of Health and Safety at Work (1999) applies to every work activity and workplace, and requires all risks to be assessed and, where necessary, controlled.

Trainer to reveal the next slide.

Slide 4 - IDENTIFYING AND CONTROLLING RISKS | HAZARD IDENTIFICATION



Trainer to:

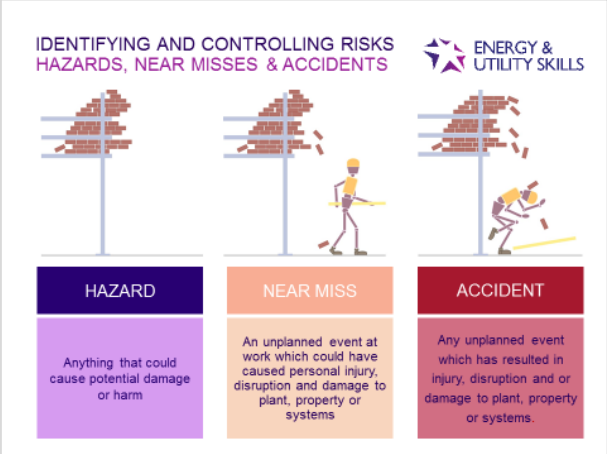
- Reveal the table headings and not proceed to the remaining transitions.
- Introduce **Activity 6** – Hazard Identification.
- Reveal the transitions following completion of Activity 5.
- Highlight and discuss common hazards that the group may have missed.
- Ask the group 'can weather be a hazard'? Follow this question with 'how?'
- Reveal the next slide.

ACTIVITY 6 – Hazard Identification (8 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Write one table heading on each flipchart.
- Arrange the individuals into 2/3 groups depending on the size of the group.
- Give each group 1 or 2 headed flipchart sheets.
- Write on the whiteboard or a flipchart the question: 'What are the hazards associated with the heading you have been given?'
- Instruct the groups that they have **3 minutes** to discuss the question with their group and write down the hazards identified.
- Stop the group after 3 minutes.
- Ask the groups to nominate a group member to feedback their results (ensure that this is a different person and not someone who has already taken on the role in another activity). **Allow 3 minutes** for the feedback sessions for the whole group.
- Display the flipcharts on the training room wall and reveal the transitions on the slide.
- Highlight any hazards that were not identified by the group during Activity 5.

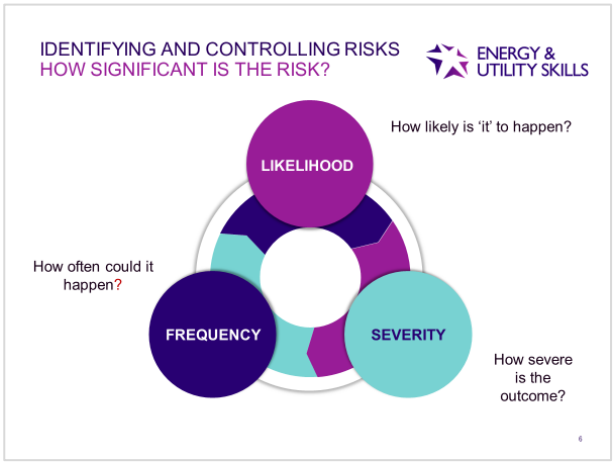


Slide 5 - IDENTIFYING AND CONTROLLING RISKS | HAZARDS, NEAR MISSES & ACCIDENTS

Trainer to:

- Ask the group 'what is the difference between a HAZARD, a NEAR MISS (also now called 'NEAR HIT') and an ACCIDENT?'
- Reveal the answers as they appear on the slide one by one.
- Reveal the next slide.

Slide 6 - IDENTIFYING AND CONTROLLING RISKS | HOW SIGNIFICANT IS THE RISK?



Trainer to:

- Click through the slide transitions.
- Explain how to calculate the risk that a hazard may pose.
- Use a number of contextualised examples to show individuals how the likelihood, severity of the outcome and frequency can impact the overall risk.

Likelihood: how likely is it to happen?

Severity: how serious may the outcome be if harm occurs? Consider cost, inconvenience, time and trouble.

Frequency: this takes the risk assessment to an extra level of depth. How often could it happen?

Trainer to explain that risk is calculated as a function of:

Likelihood x **Severity** x **Frequency = significance of risk**

Traffic lights, i.e. Red, Amber and Green are often used to identify levels of risk (this is often shortened to 'RAG' reporting of risks).

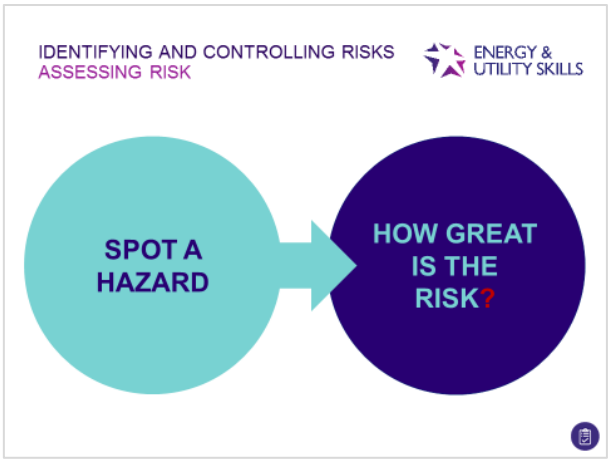
Example: obstruction of walkway

If there is a wire trailing across the floor or rubble on a path, there is a high likelihood that someone will trip over it.

The outcome, depending on the location, could be time off work, and a RIDDOR reportable injury.

The frequency will depend on its location. If it is an isolated site, the number of people affected will be lower than that of an obstruction on a public pathway, within a busy high street.

Trainer to reveal the next slide.



Slide 7 - IDENTIFYING AND CONTROLLING RISKS | ASSESSING RISK

Trainer to:

- Click through slide transitions.
- Complete **Mandatory Activity 7** – Assessing Risk.
- Provide individuals with feedback on the activity and clarify any difficulties the group may have experienced during the exercise.
- Reveal the next slide.

ACTIVITY 7 – Assessing Risk (6 minutes)

Resources: Sample risk assessment, pen & blank paper

Trainer to:

- Hand out the sample risk assessment form (note, you may wish to use the individual's own risk assessment template for this activity if available and appropriate).
- Instruct individuals that they have **1 minute** to look around the room and find something that may be considered a hazard.
- Instruct individuals that they have **1 minute** to write down how risky they think the hazard is – considering the likelihood, outcome and frequency of harm occurring.
- Ask each individual to feedback the hazard and the level of risk associated with the hazard. (**Allow 3 minutes** for the group to complete their feedback).

Risk assessment

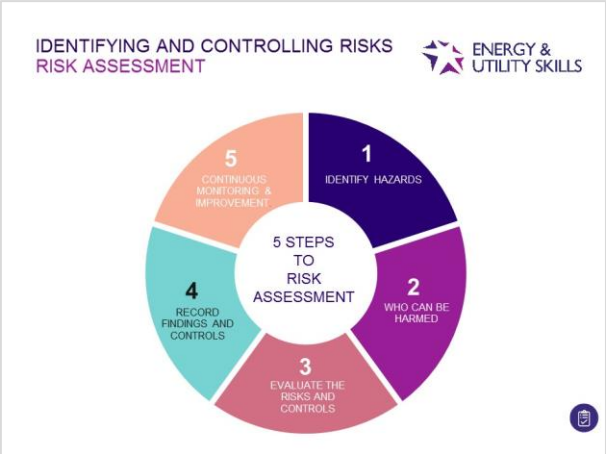
All employers must conduct a risk assessment. Employers with five or more employees have to record the significant findings of their risk assessment.

We have started off the risk assessment for you by including a sample entry for a common hazard to illustrate what is expected (the sample entry is taken from an office-based business).
Look at how this might apply to your business, continue by identifying the hazards that are the real priorities in your case and complete the table to suit.
You can print and save this template so you can easily review and update the information as and when required. You may find our example risk assessments a useful guide (www.hse.gov.uk/risk/casestudies). Simply choose the example closest to your business.

Organisation name:

What are the hazards?	Who might be harmed and how?	What are you already doing?	Do you need to do anything else to manage this risk?	Action by whom?	Action by when?	Done
Slips and trips	*Staff and visitors may be injured if they trip over objects or slip on spillages*	*We carry out general good housekeeping. All areas are well lit including stairs. There are no trailing leads or cables. Staff keep work areas clear, eg no boxes left in walkways, deliveries stored immediately, offices cleaned each evening*	*Better housekeeping is needed in staff kitchen, eg on spills*	*All staff, supervisor to monitor*	*01/10/2010*	*01/10/2010*

Employers with five or more employees must have a written health and safety policy and risk assessment.
It is important you discuss your assessment and proposed actions with staff or their representatives.
You should review your risk assessment if you think it might no longer be valid, eg following an accident in the workplace, or if there are any significant changes to the hazards in your workplace, such as new equipment or work activities.
For further information and to view our example risk assessments go to http://www.hse.gov.uk/risk/casestudies/
Combined risk assessment and policy template published by the Health and Safety Executive 11/11



Slide 8 - IDENTIFYING AND CONTROLLING RISKS | RISK ASSESSMENT

Trainer to:

- Reveal the slide transitions and explain each step of the 5 Steps of a Risk Assessment.
- Ask the group; 'what is a dynamic risk assessment?'
- Complete **Mandatory Activity 8** – 5 steps to risk assessment.
- Reveal the next slide.

Trainer's notes:

Dynamic assessment can be defined as the 'continuous assessment of risk in the rapidly changing circumstances of an operational incident, in order to implement the control measures necessary to ensure an acceptable level of safety'. In the 5 steps to risk assessment, this is represented by step 5. Note: it is a circular process. Risk assessment is not something that you do once and leave on a shelf. It is an active mechanism and should be regularly reviewed.

The five steps to risk assessment can be followed, to ensure that your risk assessment is carried out correctly. The five steps are:

- Identify hazards.
- Decide who might be harmed and how.
- Evaluate the risks and decide on control measures.
- Record your findings and controls, and implement them.
- Continuous monitoring and improvement.

Step 1: Identify hazards

In order to identify hazards, you need to understand the difference between a 'hazard' and 'risk'. A hazard is 'something with the potential to cause harm' and a risk is 'the likelihood of that potential harm being realised'.

Hazards can be identified by using a number of different techniques such as walking round the workplace, or asking your employees.

Step 2: Who might be harmed and how

Once you have identified a number of hazards you need to understand who might be harmed and how, such as 'people working in the warehouse', or members of the public.

Step 3: Evaluate the risks and controls

After 'identifying the hazards' and 'deciding who might be harmed and how', you are then required to protect the people from harm. The hazards can either be removed completely, or the risks controlled so that the injury is unlikely.

Look at what you're already doing, and the control measures you already have in place. Ask yourself:

- Can I get rid of the hazard altogether?

- If not, how can I control the risks so that harm is unlikely?

Some practical steps you could take include:

- Trying a less risky option.
- Preventing access to the hazards.
- Organising work to reduce exposure to the hazard.
- Issuing protective equipment.
- Providing welfare facilities such as first aid and washing facilities.
- Involving and consulting workers.

Step 4: Record your findings and controls

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. Any record produced should be simple and focused on controls.

If you have fewer than five employees you don't 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.

Any paperwork you produce should help you to communicate and manage the risks in your business. For most people, this does not need to be a big exercise - just note the main points down about the significant risks and what you concluded.

Step 5: Continuous monitoring and improvement

Few workplaces stay the same. Sooner or later, you will bring in new equipment, substances and procedures that could lead to new hazards. So, it makes sense to review what you are doing on an ongoing basis, look at your risk assessment again and ask yourself:

- Have there been any significant changes?
- Are there improvements you still need to make?
- Have your workers spotted a problem?
- Have you learnt anything from accidents or near misses?

Make sure your risk assessment stays up to date.

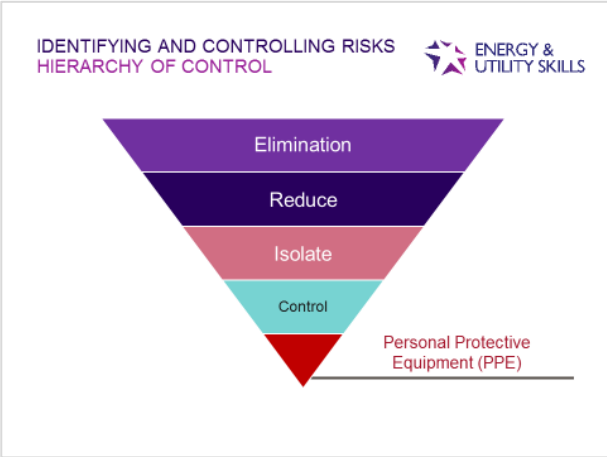
ACTIVITY 8 – 5 Steps to Risk Assessment

Resources: Sample risk assessment, pen & blank paper

Trainer to:

- Use the risk assessment sheets completed as part of the previous exercise.
- Ask individuals to consider the controls they would put in place to stop the hazard they have previously identified turning into a risk. (**Allow 2 minutes**)
- Stop the group after 2 minutes and ask individuals to feedback their answers. (**Allow 3 minutes**)
- Provide individuals with feedback.

Slide 9 - IDENTIFYING AND CONTROLLING RISKS | HIERARCHY OF CONTROL



The Hierarchy of hazard control is a system used to minimize or eliminate exposure to hazards.

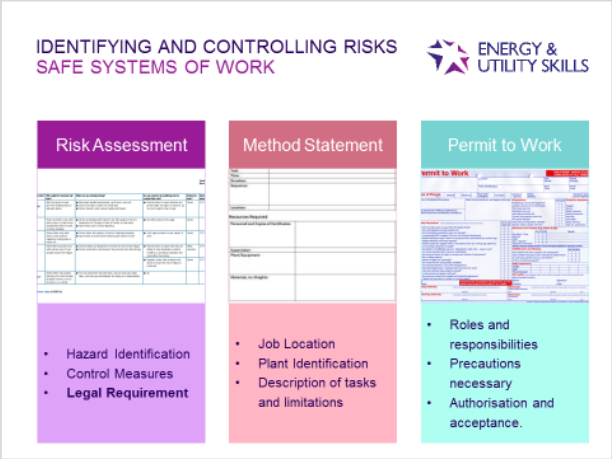
Trainer to reveal the individual hierarchy of control transitions and explain the following:

Elimination	Redesign the job or substitute a substance so that the hazard is removed or eliminated. For example, duty holders must avoid working at height where they can.
Reduce	Reduce the risk posed. For example, replace the material or process with a less hazardous one. For example, use a small Mobile Elevating Work Platform (MEWP) to access work at height instead of step ladders. Care should be taken to ensure the alternative is safer than the original.
Isolate	Isolate the risk to reduce the likelihood of a hazard causing harm. An example of this may be restricted work areas where only authorised people are allowed.
Control	These are all about identifying and implementing the procedures you need to work safely. For example: reducing the time workers are exposed to hazards (e.g. by job rotation); prohibiting use of mobile phones in hazardous areas; increasing safety signage, and performing risk assessments.
Personal protective clothes and equipment	Only after all the previous measures have been tried and found ineffective in controlling risks to a reasonably practicable level, equipment PPE should be used. For example, where you cannot eliminate the risk of a fall, use work equipment or other measures to minimise the distance and consequences of a fall (should one occur). If chosen, PPE should be selected and fitted by the person who uses it. Workers must be trained in the function and limitation of each item of PPE.

Trainer to ask the group to reflect on their answers given in Activity 7 and identify where they sit in the hierarchy of control.

Individuals may also be familiar with the HSE model of preventive measures, in order of priority, to reduce risk: Elimination; Substitution; Engineering Controls; Administrative Controls; and PPE.

Trainer to reveal the next slide.



Slide 10 - IDENTIFYING AND CONTROLLING RISKS |SAFE SYSTEMS OF WORK

Trainer to:

- Emphasise the importance of safe systems of work, including the need to comply with risk assessments, method statements and permits to work.
- Click through the slide transitions.
- Emphasise that a Risk Assessment is a legal requirement.
- Reveal the next slide.

Trainer's notes:

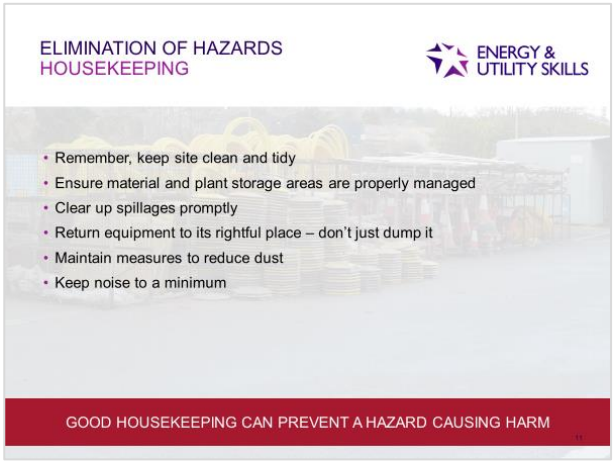
Risk Assessment: a systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking.

A **Generic Risk Assessment** is an approach that is commonly taken to assessing workplace risks where there are similar activities and hazards across different work activities, areas of the workplace, or at different sites owned by the same company. However, care should be taken with their use as for any particular work activity, area of workplace or site, it is necessary to consider whether all hazards are included in the risk assessment.

Method Statement: a work method statement, sometimes called a "safe system of work", is a document that details the way a work task or process is to be completed. The method statement should outline the hazards involved and include a step by step guide on how to do the job safely.

Permit to Work: a permit-to-work system is a formal written system used to control certain types of work that are potentially hazardous. A permit-to-work is a document which specifies the work to be done and the precautions to be taken. Permits-to-work form an essential part of safe systems of work for many maintenance activities.

Slide 11 - ELIMINATION OF HAZARDS | SITE HOUSEKEEPING



Trainer to use the opening slide to facilitate a discussion on the importance of housekeeping.

Trainer to explain that if good housekeeping is not in practice, the workplace can become one big hazard. It hides hazards that can cause injury. Housekeeping is not just about cleanliness, but it also includes workplace layout.

Trainer to run through the following list of examples:

- Adequacy of storage facilities.
- Proper maintenance.
- Clear access, routing and walkways.
- Equipment kept out of way.
- Correct barrier positioning.
- Clear egress.
- Keep site clean and tidy.
- Ensure material and plant storage areas are properly managed.
- Clear up spillages promptly.
- Return equipment after use, don't just leave it where you used it.
- Maintain measures to reduce dust.
- Keep noise to a minimum.

Trainer to reveal the next slide transition to confirm examples of good housekeeping.

Trainer to reveal the last slide transition and emphasise that good housekeeping can reduce the risk of a hazard causing an accident.

Trainer to reveal the next slide.

Slide 12 - IDENTIFYING AND CONTROLLING RISKS | WARNING SIGNS

Trainer to only display the header slide if the optional activity below is going to be used. Do not reveal the signs if the activity is going to be used.

Trainer to explain that the Health and Safety (Safety Signs and Signals) Regulations (1996) require employers to ensure that safety signs are provided (or are in place) and maintained in circumstances where there is a significant risk to health and safety that has not been removed, or controlled, by other methods.

Trainer to explain that this is only appropriate where use of a sign can further reduce the risk. The other methods may include engineering controls or safe systems of work, which may be required under other relevant legislation. Safety signs are not a substitute for other methods of control.

Trainer to reveal the next slide.

OPTIONAL ACTIVITY – Administrative Warning Signs (4 minutes)

Resources: Safety sign photos (**Trainer will need to provide their own photos**), sheet of paper and pen for individuals to write their answers.

Trainer to:

- Instruct the group that they need to identify the different categories of signs that they are about to see and write down their answer on the paper provided.
- Show various signs.
- Ask individuals to swap their answer sheet with the person to their right for marking.
- Reveal the transition on the slide to reveal the correct answers.

Trainer's notes:

Trainer explains that a sign is either:

- **Safety and/or health sign** – a sign providing information or instruction about safety or health at work by means of a signboard, a colour, an illuminated sign or acoustic signal, a verbal communication or hand signal.
- **Signboard** – a sign which provides information or instructions by a combination of shape, colour and a symbol or pictogram which is rendered visible by lighting of sufficient intensity. In practice, many signboards may be accompanied by supplementary text, e.g. 'Fire exit', alongside the symbol of a moving person.

Trainer to summarise the different types of signs as follows:

- **Mandatory Sign** – a sign prescribing specific behavior e.g. 'eye protection must be worn'.

- **Warning sign** – a sign giving warning of a hazard or danger e.g. 'danger: electricity'.
- **Prohibition sign** – a sign prohibiting behavior likely to increase or cause danger e.g. 'no access for unauthorised persons'.
- **Information sign –** a sign giving information on emergency exits, first aid, or rescue facilities e.g. 'emergency exit/escape route'.

Slide 13 - LAST LINE OF DEFENCE | TYPES OF PPE?

Trainer to ask individuals at random to name an item of PPE that they think may help protect each of the body parts shown.

Expected answers:

1. Protective goggles/glasses

2. Hearing protection

3. Steel-capped boots

4. Safety Gloves, Barrier Cream

5. Breathing Apparatus (BA) equipment, dust mask

6. Helmet.

Trainer to ask the group if they can think of any other types of PPE that they use?

Trainer to complete the Optional Activity – Types of PPE, if appropriate for the group.

Trainer to reveal the next slide.

OPTIONAL ACTIVITY - Types of PPE (5 minutes)

Resources: PPE such as safety boots; safety gloves; ear defenders; high visibility clothing; safety goggles; hard hat; protective trousers OR photographs of the above (**Trainer will need to provide their own PPE or photos**).

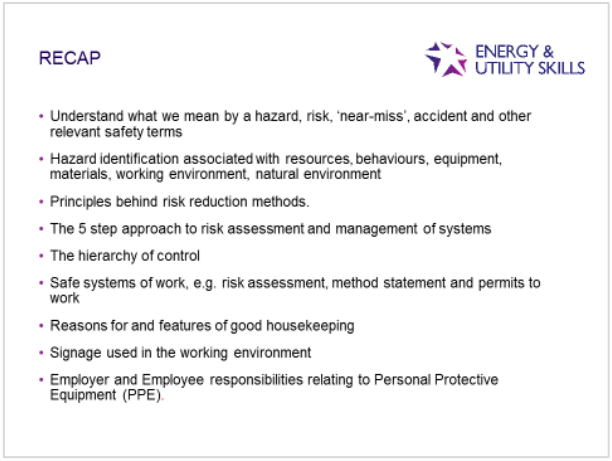
Trainer to:

- Arrange individuals into two groups and give each group a different workplace situation.
- Ask each group to assign the correct PPE to the situation they have been allocated, noting their answers on the paper provided.
- Warn the group that they will need to be able to justify their decisions and share their reasoning with the rest of the group.
- Ask the groups to present their choices to the rest of the group with an explanation of why they have chosen the type of PPE identified.

Slide 14 - LAST LINE OF DEFENCE | PERSONAL PROTECTIVE EQUIPMENT

Trainer to:

- Display title slide only.
- Explain that now we all understand the different types of PPE available, it is time to consider the individual employee's responsibilities, as well as those of their employer, in relation to the use of PPE.
- Ask individuals what they think their responsibilities are.
- Click to the next slide transition to reveal their responsibilities – facilitate a discussion as appropriate including any items not listed that the group identify.
- Ask individuals what they think their employer's responsibilities are.
- Click to the next slide transition to reveal the answers – facilitate a discussion as appropriate.
- Reveal the final slide transition.
- Emphasise that 'if in doubt, speak to their supervisor'.
- Reveal the next slide.



Slide 15 - RECAP

Trainer to summarise the topic areas covered in Module 4.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to remind the group to place any notes out of sight.

Trainer to administer the assessment for Module 4.

Slide 16 - MODULE COMPLETE

Trainer to exit module presentation, navigate towards the 'training material' menu and initiate module assessment.

Common hazards in the workplace

MODULE 5

This module develops the individual's ability to both identify a range of common physical hazards and minimise their impact in the workplace, in line with CSCS requirements.

There are 6 learning outcomes for this module:

LO1: Understanding transport risks

LO2: Understanding the Provision and Use of Work Equipment Regulations 1998 (PUWER)

LO3: Avoiding other services

LO4: Undertaking excavations

LO5: Working at Height

LO6: Understanding the Lifting Operations Lifting Equipment Regulations 1998 (LOLER)

Within this module we will be looking at:

- Using a vehicle and knowing your company policy
- The importance of regular vehicle checks
- Risks from transport both to and from work and whilst at work
- The meaning and importance of safe, courteous driving and parking
- Responsibilities of employers and employees under PUWER
- Hazards and controls associated with the use of work equipment
- Basic checks required prior to operating portable electrical tools
- Types of underground services and how to locate underground services safely
- Working with gas, water or electricity services and possible hazards
- Hazards of markers being used as an indicator of the position of underground services
- Safely moving mobile plant around in the vicinity of overhead lines
- Areas of special risk
- Hazards associated with excavations and control measures
- Confined spaces definition, who can enter and potential hazards
- Definition of working at height
- Basic principles of work at height regulations
- Hazards associated with working at height
- Controlling hazards associated with working at height

- LOLER, control measures and responsibilities
- Hazards associated with lifting/moving equipment
- Operating mobile plant safely and the need for specific training and inspections

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

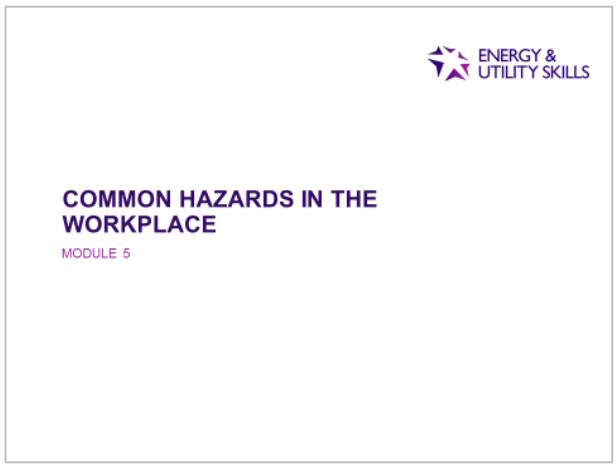
- Daily vehicle checks
- Group discussion – driving considerations
- Work equipment
- Group discussion – working near the railway
- Hazards associated with lifting/moving equipment

Optional activities

- Safest route
- Group discussion – work equipment hazards and control

COMMON HAZARDS IN THE WORKPLACE

Approximate delivery time: 90 minutes

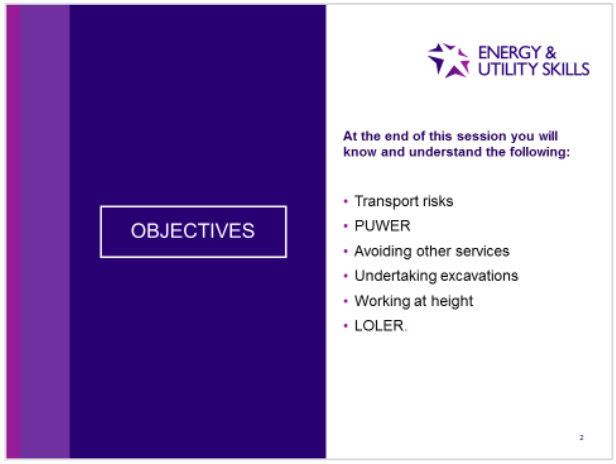


Slide 1 - COMMON HAZARDS IN THE WORKPLACE

Trainer to reveal the title slide and explain that the aim of Module 5 is to familiarise individuals with hazards and safety measures relating to a range of physical hazards and their control.

Trainer to reveal the next slide.

Slide 2 - OBJECTIVES



Trainer to briefly explain what will be covered in this module and that this module will familiarise individuals with a basic awareness and understanding of common hazards associated with the workplace and safety measures that can be put in place. Individuals will understand risks associated with transport, how to avoid other services, excavations/working in confined spaces, working at height, near railways and the basics of the LOLER and PUWER regulations.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.

Slide 3 – HEALTH AND SAFETY GONE MAD? YOU DECIDE

Trainer to introduce the module by explaining that we are going to watch a video that impacts on the next two modules.

Trainer to introduce the video as follows:

This video sets the scene for how actions and behaviours can affect not only our health and safety but that of others at work. Many people think that the HSE is "elf n safety" mad and spend their time banning barbeques or bonfires, or stopping children from playing games such as conkers. The reality is far different.

What the Health and Safety Executive is concerned about are those work issues that cause people's health to be significantly affected, and unsafe working practices that result in employees being seriously injured, maimed for life, or even killed.

A little extra thought as to how they should be working would have protected the people you will see in this video. Simple changes to how they did their jobs would have made a big difference to their lives and the lives of their families.

Trainer to reveal the next slide.

Slide 4 – USING A VEHICLE

Trainer to ask the question as it appears on the slide and encourage individuals to start thinking about the principles of using a company vehicle.

Trainer to ask the group 'who in the room has a company van or car?' followed by, 'what do you know about your company policy?'

Trainer to ask the group if they have themselves, or if they know anyone, who has had an accident at work and facilitate a discussion.

Trainer to reveal the slide transition and ask the group 'how many can you list?'

Trainer to reveal the next slide.

Slide 5 – USING A VEHICLE | SAFETY PROVISIONS

Trainer to display the heading only - do not click through to the answers.

Trainer to explain that based on your own company policy you may have these in your company vehicles. Vehicles will often have safety provisions that help protect users.

Trainer to run through the slide transitions and ask the group if they can think of any others, or if they use other provisions in their vehicles?

Trainer to reveal the next slide.

Slide 6 – TRANSPORT RISKS | THE IMPORTANCE OF REGULAR VEHICLE CHECKS

Trainer to reveal the first two bullets which will appear automatically.

Trainer to complete **Mandatory Activity 9** – Daily Vehicle Checks.

Trainer to reveal the remaining slide transitions and read through the trainer notes below to support each bullet point (following completion of the activity).

Trainer to ask the group 'what are the potential risks if you do not carry out vehicle checks?'

Trainer to reveal the next slide.

ACTIVITY 9 – Daily Vehicle Checks (10 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Arrange the group into groups of 3 /4 depending on the size of the group.-provide each group with a sheet of flipchart paper and a pen.
- Explain that the groups need to consider the daily checks they must carry out on their vehicles and the purpose of the checks.
- Instruct the groups to write two headings on the flipchart paper, as below.

Check	Purpose

Trainer to:

- Instruct the groups that they have **5 minutes** to compile a list of 10 checks and write what they will be looking for during each check (purpose).
- Stop the group after 5 minutes.
- Ask each group to feedback their check lists to the rest of the group.
- Provide group feedback.

Trainer's notes:

Trainer then discusses the following with the group:

Daily checks:

- Fluid levels and leaks (fuel, oil, washer and radiator)
- Hydraulic systems – levels and leaks
- Tyres – condition and pressure, wheel security
- Lights, indicators, beacons and reflectors
- Speedometer
- Clear vision – windscreen, mirrors, good all round visibility
- CCTV, Reversing - audible and aids
- Emergency stop devices
- Hand cleaning provision
- Instruments – horn, washers, wipers, communications equipment where fitted
- Extinguisher and first aid box
- Steering and brakes
- Exterior signage (number plates etc.)
- Exhaust for smoke
- Safe operation of fitted equipment
- Condition of the vehicle body
- Adequate records of the vehicle must be kept to include tachograph, daily and periodic check records, maintenance and repair records, staff training records.

Trainer clicks to next bullet point and discusses with the group what periodic checks they have to undertake.

Other periodic checks:

- Cleaning vehicle to remove contaminants.
- Clean cab.
- Clear debris from interior of body, hopper and rams.

- Clean lifting equipment.
- Lubricate lifting equipment.
- Entry and exit to a vehicle.
- Load - vehicles should not be overloaded. This is particularly important when loading recyclables of different weights. Consider fitting weight sensors (preferably with automatic compactor cut-off to prevent overloading). Check weighbridge tickets to establish trends.

Drivers should know:

- The gross vehicle weight (GVW);
- The vehicle's payload; and
- How to operate weighing equipment (if fitted).

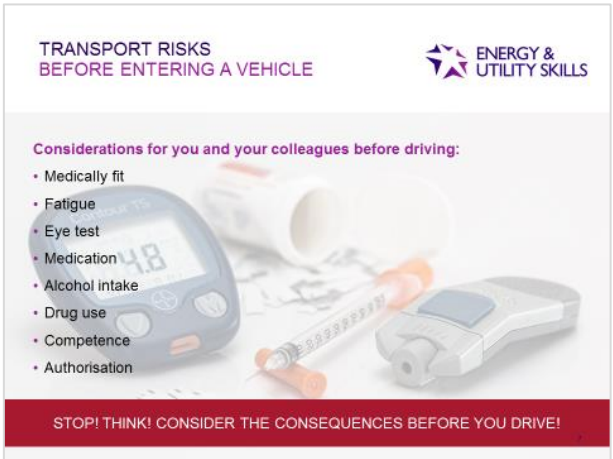
Trainer clicks through next few bullet points and asks the group what they think is important about preventative maintenance?

Trainer then explains that **Preventative maintenance** assures optimal working conditions and conserves the life span of the equipment as well as saving time in the long run. Planned **preventative maintenance** may cause a small hindrance for production, but that is nothing compared to actual downtime caused by a breakdown.

'Some employers provide drivers with a list of daily checks for their vehicles, for them to sign off.' Trainer asks the group *Who has a daily check list? Is it helpful?*

And of course, you should follow HSE guidelines for Safety in Motor Vehicle Repair, which are available separately.

Trainer clicks again to red band at bottom of page and asks the group to call out the potential risks if they don't carry out daily checks.



Slide 7 - TRANSPORT RISKS | BEFORE ENTERING A VEHICLE

Trainer to display the title and image only.

Trainer to discuss employee checks that should be made to ensure suitability before driving.

Trainer to reveal the slide transitions and facilitate a discussion.

Trainer to reveal the next slide.

Slide 8 - USING A VEHICLE | CONSIDERATIONS WHEN DRIVING

Trainer to:

- Display the slide with the title header and image only.
- Complete **Mandatory Activity 10** – Group discussion - driving considerations.
- Complete the Optional Activity – Safest Route, if appropriate for the group.
- Reveal slide transitions.
- Reveal the final slide transition – red banner and discuss reversing and how to mitigate the risks.
- Reveal the next slide.

ACTIVITY 10 – Group discussion - driving considerations (5 minutes)

Resources: None Required

Trainer to:

- Ask the group "*What are important things to bear in mind when you are driving? Think about when you are moving around site and also when you are travelling to and from your worksite".*
- Encourage the group to call out their ideas and facilitate a short discussion.
- Display the individual slide transition bullet points, reading each one and relating it back to the group's answers to facilitate further discussion.
- Introduce the more general rules/etiquette regarding safe and courteous driving and parking.

Safe and courteous driving and parking

What do we mean?

Try tweaking your driving habits:

- Consider other road users (and pedestrians).
- Stick to the speed limits.
- Be aware of road conditions and weather.
- Consider those with children and those with disabilities when parking, do not park on pathways.
- Only park in legal places.
- Be courteous and let out other drivers from side streets and leave space for those to merge or turn into side streets.

- Indicate your intentions and thank people when you are let through, even if it's your right of way.
- Always give way to more vulnerable road users no matter who has right of way.

OPTIONAL ACTIVITY – Safest Route (15 minutes)

Resources: Map of an area (trainer to provide own) with A and B marked on it, felt tip pens, paper.

Trainer to:

- Arrange the group into groups of 3/4 individuals.
- Provide each group with a map.
- Inform the group that they have 10 minutes to plan the safest route from A to B on the map.
- Provide the groups with a background brief prior to the start of the activity explaining that: You are travelling at 8:30am in the morning on a Friday. You will need to consider things such as built up areas, areas where children and other vulnerable people are likely to be, bus stops, etc. You also need to consider the vehicles themselves (any low bridges?).
- Stop the activity after 10 minutes and ask the group to provide feedback by explaining the route they planned and why. (Allow the group 5 minutes for feedback).

Trainer's notes:

REVERSING!

Trainer explains to the group that reversing is a very dangerous activity and that, according to HSE, nearly a quarter of all deaths involving vehicles at work occur during reversing. Many other reversing accidents do not result in injury, but cause costly damage to vehicles, equipment and premises.

Most of these accidents can be avoided by taking simple precautions, such as those below:

Further information is provided by the HSE:
http://www.hse.gov.uk/workplacetransport/information/reversing.htm

MITIGATE THE RISKS IN REVERSING BY:

Remove the need for reversing altogether, by setting up one-way systems, for example, drive-through loading and unloading positions. Where reversing is unavoidable, routes should be organised to minimise the need for reversing.

Ensure visiting drivers are familiar with the layout of the workplace, and with any site rules. Do drivers have to report to reception on arrival?

In locations where reversing cannot be avoided:

- 'Reversing areas' should be planned out and clearly marked.
- People who do not need to be in reversing areas should be kept well clear.
- Consider employing a trained signaller (a banksman/person), both to keep the reversing area free of pedestrians and to guide drivers. Be aware: the use of signallers is not allowed in some industries due to the size of vehicles involved, and the difficulty that drivers have in seeing them.

A signaller:

- Will need to use a clear, agreed system of signalling.

- Will need to be visible to drivers at all times.
- Will need to stand in a safe position, from which to guide the reversing vehicle without being in its way.
- Should wear very visible clothing, such as reflective vests, and ensure that any signals are clearly seen.
- If drivers lose sight of the signallers they should know to stop immediately.
- Consider whether portable radios or similar communication systems would be helpful.
- CCTV monitors can help.
- High visibility warning lights and/or reversing alarms and reversing detectors can provide additional warning of objects or people entering the reversing zone.

DID YOU KNOW?

As detailed in the Resource magazine reported on 14th April 2014, a city council was fined £20,000 following the death of a pensioner who was struck by one of its refuse vehicles in a city centre.

On Friday (11 April), a Court heard how Malcolm McCulloch, 71, was walking across a street, when he was struck by the reversing lorry on 10 August 2012. According to the defence, the driver checked his mirrors, turned on the vehicle's flashing beacon and reversing siren, and reversed down the street while his colleague sat in the passenger seat. However, neither the driver nor the labourer (whose job it was to empty glass bins) saw McCulloch as he walked out between some parked cars to cross the road.

He was struck by the lorry, fell underneath the vehicle and was dragged some way along the road as the driver continued to reverse, unaware of what had happened. It was revealed that the driver only saw McCulloch lying in the road when he stopped the vehicle and got out of his cab. The retired dock worker had suffered severe chest and pelvic injuries and later died in hospital.

Vehicle blind spot

The incident was investigated by the Health and Safety Executive (HSE), which found that although there were no defects with the glass-collecting vehicle, which was equipped with a CCTV camera, there was a blind spot 2.2 metres wide not covered by the camera or wing mirrors.

Accordingly, a reversing assistant should have been used to guide the driver while reversing and to prevent pedestrians from being able to cross the road as the lorry reversed. The court also heard that the council had in place a programme of reversing assistant training (which involves showing assistants how to stand outside the vehicle and guide the driver 'in situations where reversing manoeuvres cannot be avoided'), but neither the driver nor the labourer travelling with the driver had undergone the relevant training.

The driver had been employed through an agency, rather than as a direct employee of the council, and had worked on the refuse vehicle since March 2012. The council employed the labourer. As such, HSE prosecuted the council for safety failings, as it had 'failed to identify' that its own employee had not received training, and had 'failed to ensure' that agency workers had undergone the relevant programme.

The Council was fined £20,000 after pleading guilty to breaching Section 3(1) of the Health and Safety at Work Act 1974, which states that employers have a duty to conduct their undertakings in such a way as to 'ensure, as far as is reasonably practicable, that persons not in their employment who may be effected thereby are not exposed to risks to their health and safety'.

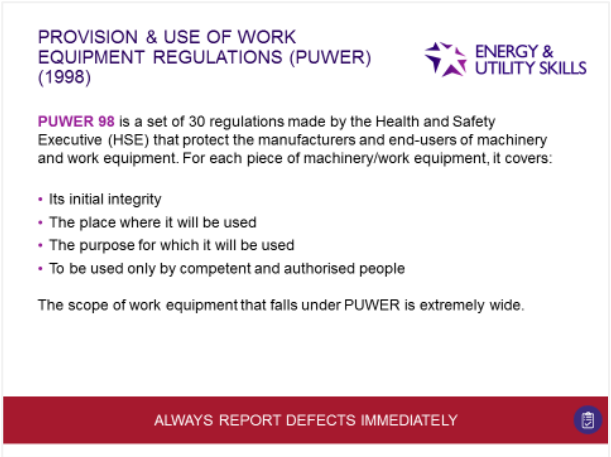
Source: http://resource.co/government/article/glasgow-city-council-fined-%C2%A320000-after-refuse-vehicle-death

Slide 9 - USING A VEHICLE | DO'S AND DON'TS OF SAFETY

Trainer to reveal the slide transitions and talk through the Dos and Don'ts to summarise the areas covered on vehicle safety in this section.

Trainer to reveal the next slide.

Slide 10 - PROVISION & USE OF WORK EQUIPMENT REGULATIONS (PUWER) (1998)



Trainer to introduce the Provision & Use of Work Equipment Regulations 1998 (PUWER).

Trainer to explain that PUWER is a set of 30 regulations made by the Health and Safety Executive (HSE) that protects the manufacturers and end-users of machinery and work equipment. PUWER focuses on the suitability of work equipment in these three key areas.

Trainer goes through the slide transitions to reveal the bullets, reading each as it appears.

- Its initial integrity – means what it was like prior to use/when it was purchased before use.
- The place where it will be used - take account of the working conditions and health and safety risks in the workplace when selecting work equipment.

- The purpose for which it will be used - ensure the equipment is constructed or adapted to be suitable for the purpose it is used or provided.
- To be used only by competent and authorised people. Employers must ensure that all persons who use work equipment have received adequate training for the purposes of health and safety, including training in the methods which may be adopted when using work equipment and risks which such use may entail and the precautions to be taken.

Trainer to explain that the term 'work equipment' is extremely wide. Not only does it cover single mobile machines such as a HIAB, back mechanical excavator or dumper truck, but also tools such as an angle grinder, saw or jack hammer.

Trainer to complete **Mandatory Activity 11** – Work Equipment.

Trainer to reveal the final slide transition after completing Activity 11 - red band across the bottom of the slide.

ACTIVITY 11 – Work Equipment

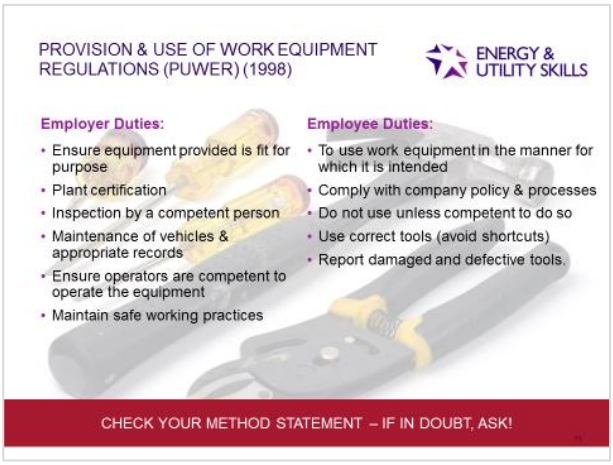
Resources: Flip-chart and Pen

Trainer to:

- Write the heading "Work equipment" on the flipchart.
- Explain to the group that the scope of "work equipment" that falls under PUWER is very wide.
- Arrange the individuals into groups of 3/4 individuals depending on the size of the group.
- Provide each group with a sheet of flipchart paper and a pen.
- Instruct the groups that they have **5 minutes** to brainstorm as many examples of "work equipment" that they use that would be covered under PUWER, and write them down on the piece of flipchart paper.
- Stop the group after 5 minutes and ask them to provide feedback on the equipment they have identified.

Expect to see equipment such as:

HIAB	Excavators	Dump truck	Ladder	Angle grinder
Saw	Drill	Drill bits	Compressor	Jack Hammer
Hammer	Trench Sheets	Computer	Resuscitator	Socket set
Trench Box	Lifting Sling	Hand saw	Fork Lift	Transformer
Crane	Mini Excavator	External pipe clamp	Road breaker	Whacker
Butt fusion machine	Welding Equipment	Boiler	Loading shovel	



Slide 11 – PROVISION & USE OF WORK EQUIPMENT REGULATIONS (PUWER) (1998)

Trainer to reveal the Employer Duties.

Trainer to click to reveal the Employee Duties and stress that you must be trained to work on certain work equipment.

Trainer to reveal the last slide transition – red banner and reinforce the point that If in doubt ASK!

Trainer to reveal the next slide.

DID YOU KNOW?

Employers can get massive fines for breaching the PUWER Regulations.

Health and Safety at Work reported in July 2017 that a large bakery business was fined £1.9m after a worker's arm was trapped against a running conveyor belt. It is the second time that the company had been handed a multi-million pound fine in the last six months. A Court heard how, on 4 August 2015, the agency worker was injured as he cleaned parts of the bread production line. His arm became trapped, leaving him with friction burns that required skin grafts. An investigation by the HSE found CCTV footage of the incident. It showed the worker cleaning parts of the line, then reaching into it and becoming trapped between two conveyors. Part of the machine had to be dismantled to release him. HSE inspectors found the machine could have been fitted with localised guarding to prevent access between the conveyors. The bakery business pleaded guilty to breaching Regulation 11 of the Provision and Use of Work Equipment Regulations. As well as the fine of £1.9m, the company was ordered to pay costs of £21,459.

Source: www.healthandsafetyatwork.com/work-equipment/warburtons-puwer-fine-worker-friction-burns

Slide 12 - WORK EQUIPMENT AND HAZARDS

Trainer can choose to use the **Optional Activity** – group discussion - work equipment hazards and control, if appropriate for the group or, ask the group to name some hazards associated with powered work equipment.

Trainer to click to reveal the transitions and discuss.

Trainer to contextualise the hazards to the group and identify corrective action relating to the individual's use of equipment.

Trainer to reveal the next slide.

OPTIONAL ACTIVITY - Group discussion – Work Equipment Hazards and control

Resources: None required.

Trainer to ask the group: '*What are some hazards associated with work equipment?'*

Trainer to click through the slide transitions and ask the group if they have experienced any of these.

Trainer to ask the group: '*What are some other hazards associated with your work and the equipment you use?'*

Possible answers might include:

- Too many people using one piece of equipment.
- Carrying passengers or too many passengers when the machine is not supposed to.
- Lifting items that are too heavy.
- Uneven ground.
- Not using banksmen.
- Not being in control of the equipment.
- Not being trained and competent.

Trainer to close the discussion by asking the group '*So let's look some of the controls we could implement. What simple behaviours, best practice and procedures could reduce the level of hazard you are exposed to?*'

Some possible suggestions might include:

- Mobile plant and equipment must only be operated by authorised and qualified persons.
- No passengers to be carried unless equipment is suitable.
- Mobile phones must not be used.
- Seat belts must be used where fitted.
- Brakes, lights and windscreen washers/wipers must be checked prior to use.
- Equipment should be checked before use and be subject to periodic inspections.
- All faults must be reported.
- Transmission shafts must be safeguarded.
- All mobile plant should be used in line with operator's instructions.
- Follow procedures.
- Challenge people who are not following procedure.

DID YOU KNOW?

In the TOP 5 Health and Safety fines in 2014 …

A company was fined £200,000 for breaches of Health and Safety at Work Act 1974 (HSWA) section 2; Provision and Use of Work Equipment Regulations 1998 (PUWER) regulation 8 and 9; Management of Health and Safety at Work Regulations 1999, Regulation 3.

Donny Williams, 62, was killed in 2011 whilst fitting a spreader to a tractor for a trial to apply granular de-icer on a runway. Whilst working with a colleague, he became trapped between the tractor's rear tyre and the spreader and died of a fractured skull. The investigation identified a lack

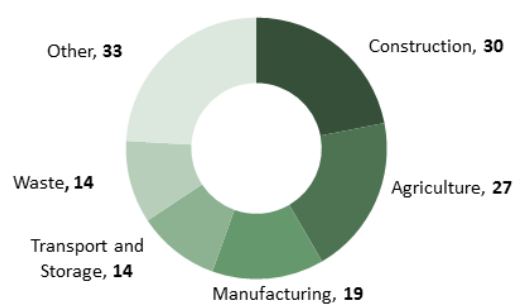
of a safe system of work, no risk assessment, and no information, instruction and training for Mr Williams and his co-workers on working on the tractor and spreader.

Source: http://www.hse.gov.uk/statistics/pdf/fatalinjuries.pdf

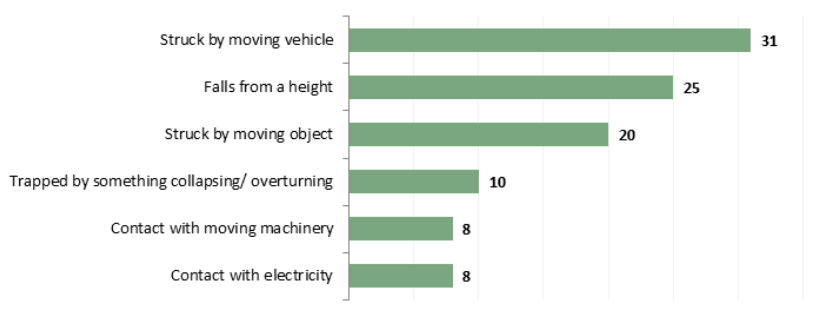
DID YOU KNOW

Fatal Injuries arising from accidents at work 2017, reported by HSE.

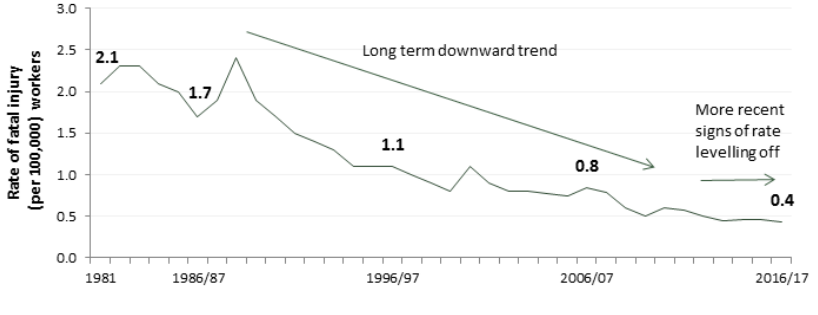
Fatal injuries to workers by main industry:



Main kinds of fatal accidents for workers:



Rate of fatal injury per 100,000 workers:



Source: www.hse.gov.uk/statistics/pdf/fatalinjuries.pdf

Slide 13 - PORTABLE ELECTRICAL EQUIPMENT INSPECTION

Trainer to explain that electrical equipment, such as power tools and other portable equipment, often face harsh conditions and may be damaged. All electrical equipment must be visually inspected for damage prior to use. Certain wired electrical equipment must be Portable Appliance Testing (PAT) tested before use.

Trainer to work through transitions. Trainer to ask the group: '*What are some examples of things to look out for?* '

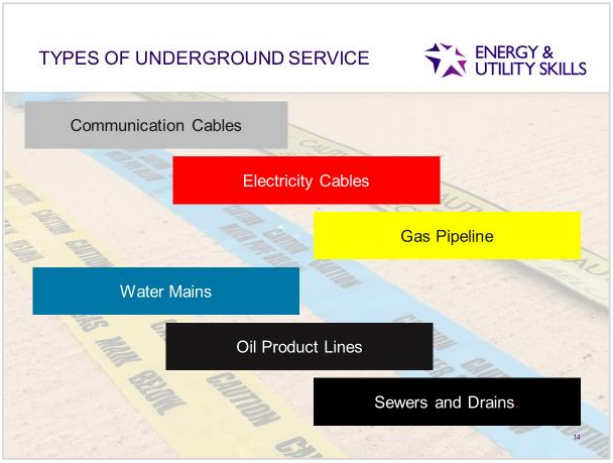
- Bare wires.
- Cuts or abrasions on cables.
- Plugs and machine are in good condition, with no cracks in casings, bent pins or loose screws, taped or other non-standard joints.
- Cables sheaths not gripped securely.
- Coloured wires visible.
- Overheating marks.
- Regularly check trip devices (RCDs) by pressing the test button.

Trainer to advise the group to check your company's policy on inspections and frequency. Equipment should be tested regularly on a timescale in line with company policy.

Cordless tools or tools which operate from a 110V (Yellow) supply are used to minimise risk.

Trainer to emphasise that you must never carry out makeshift repairs. You must stop using the equipment as soon as you notice any damage and never ever do a patch-up job.

Trainer to reveal the next slide.



Slide 14 - TYPES OF UNDERGROUND SERVICE

Trainer to:

- Run through the bullet points listing the types of underground services that can be encountered.
- Explain that we are going to watch a video that shows the potential impact of hitting a power cable.
- Where appropriate, play the optional video: 'Dead Man Digging': https://www.youtube.com/watch?v=pE5tM4e4Puc
- Reveal the next slide.

DID YOU KNOW?

Two construction companies were fined £90,000 in 2015 after two workers were seriously burned, and one scarred for life after they cut into a live 11,000v electrical cable.

Southwark Crown Court heard the labourer and a bricklayer were working in a House of Lords site at Millbank, London, on 1 July 2013, to lay bricks around a manhole.

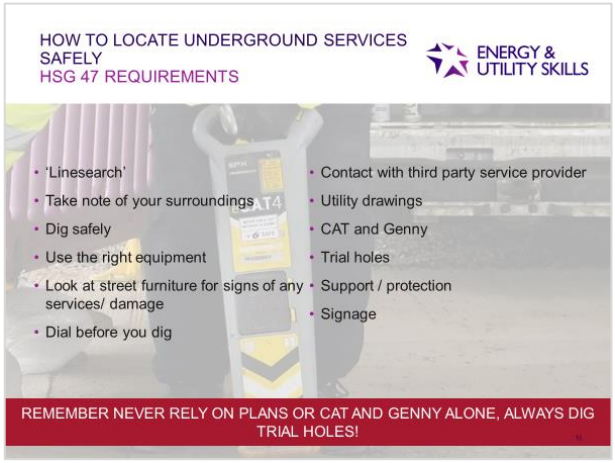
One of the men, who was 22 at the time of the incident, hit the cable with a jackhammer when removing old brickwork and suffered serious burns to his arms, legs, hands and face. He was in hospital for nearly a month receiving treatment to his injuries. The HSE Inspector commented after the hearing: "This serious incident should be a warning to the industry about the need to identify the risks to workers' safety before work begins, so they can be protected.

"Employers have a duty to check workers have sufficient skills, knowledge, experience and training before they allow them to use equipment such as jackhammers on construction sites.

"A key point is to not assume a worker can use the equipment safely, just because they may have operated it previously.

Source: http://www.constructionenquirer.com/2015/12/18/shock-video-of-11000v-cable-strike

Slide 15 - HOW TO LOCATE UNDERGROUND SERVICES SAFELY | HSG 47 REQUIREMENTS



Trainer to:

- Ask the group if they have heard of HSG47 (i.e. HSE Health and Safety Guidance Document 47 – Locating Underground Services Safely) and if so what does it mean to them?
- Write responses on a flipchart.
- Click through slide transitions to reveal the bullet points one by one and ask the group if they are familiar with all of the different ways to locate underground services.
- Ensure that the following message is heard and understood - **KEY MESSAGE: NEVER EVER RELY SOLELY ON PLANS, MARKERS OR CAT AND GENNY.**
- Ask the group 'why?'
- Explain that plans can be out of date, CAT and Genny can't locate all services; whilst useful, it has its limitations. Hazard markers are frequently disturbed or moved so you must never rely on them as a failsafe way of locating services in the ground.
- Reveal the next slide.

Trainer's notes:

In summary, identify clearly the extent of the work area and find out what underground services are within the area before considering whether they are likely to be disturbed:

- Obtain service drawings from utilities companies and other organisations with relevant information about the site.
- Survey the site to identify the services and other underground structures. Record the location of any services.
- Review/assess the planned work to avoid disturbing services where possible.
- Allow sufficient time and provide sufficient resource to do the work safely.
- Emergency work still requires planning and assessment of the risks arising from the work.

- A precautionary approach must be taken when breaking ground.

DID YOU KNOW?

Utility service provision (electricity, gas, telecommunications, fresh water and sewerage), and the impact of utility street works is widely felt and far reaching.

National Grid has ownership of the UK's infrastructure for transmission and distribution of electricity since 1990 as a result of the decommissioning of the nationalised Central Electricity Generating Board (Beck et al., 2007). According to McMahon et al. (2005) the total length of the distribution and transmission network is approximately 482000 km which consists of buried low voltage (lower than 1kV) and high voltage cables (higher than 1kV).

National Grid is also the sole proprietor and operator of gas transmission in the UK, which comprises five distribution networks (National Grid, 2013); the total length of this gas network is estimated to be 275000 km (McMahon et al., 2005).

Fibre and copper optic cables make up the underground telecoms infrastructure. British

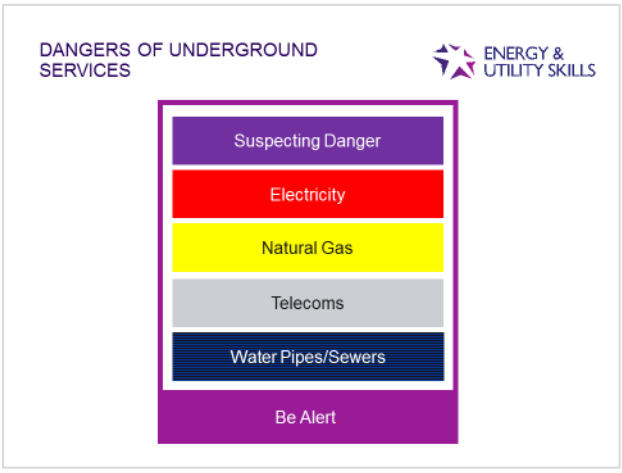
Telecommunications had monopolised the telecoms industry up to 1981, which was subsequently privatised in 1984 (Beck et al., 2007). The current privatised telecoms industry has a large number of service providers and this state of affairs makes it problematic to appraise the overall size of the network (McMahon et al., 2005). This is only compounded by the lack of information made available by telecommunication companies on the basis of not wanting to disclose commercially sensitive information.

It is estimated at present that there are 396,000 km of water supply mains in the UK, in addition to 353,000 km of sewers in England and Wales alone (McMahon et al., 2005). In England and Wales, the industry was privatised in 1989 which subsequently led to the formation of ten companies for water and wastewater supply (Beck et al., 2007). A further twelve companies are tasked with the provision of clean water only (Water-UK, 2015). Only in Scotland is clean water provided for by Scottish Water, a statutory corporation.

These 'statutory utilities' are mostly delivered via conduits and cables that are placed below the ground surface (i.e. 0 - 5m below ground). The inevitable repair, maintenance as well as improvement of these services (utility networks), necessitates approximately 1.5 million street works each year in the UK (McMahon et al., 2005), a figure that does not account for the numerous excavations carried out on construction projects that are currently in progress. A wide range of equipment and operational procedures are utilised in street works to repair, replace and maintain buried pipes and cables, and the preferred approach is often chosen to satisfy project time constraints, besides being cost-effective.

In many circumstances, this requires excavation from the surface down using open trenches.

The principle risk faced as part of these numerous excavations is the occurrence of a 'utility strike' (also termed as service strikes or hits). A utility strike is caused when any utility network infrastructure (electricity, gas, telecommunications, fresh water and foul water) is hit and damaged during excavation. This risk of causing a utility strike is a constant feature of any excavation, which interacts with buried services, notwithstanding the type of excavation tool employed (hand tools, mini-digger, breaker, large excavator, or other tool) and the excavation technique of the site operative.



Slide 16 - DANGERS OF UNDERGROUND SERVICES

Trainer to:

- Reveal the slide transitions highlighting the dangers from the underground services.
- Ask the group if they know what to do if they strike a cable or other services?
- Read what to do if you hit a cable/service from the notes below headed**:** Suspecting Danger – what do you do?
- Reveal the next slide.

Trainer's notes:

Suspecting Danger – what do you do? Stop work, make safe, report. The service owner needs to be informed immediately.

More specifically:

Electricity: the greatest risk of immediate injury lies in direct contact with high and low voltage electricity cables.

People may be:

- Electrocuted.
- Severely burned.
- Further injured from secondary effects (such as falling).

Your responsibility:

- Raise the alarm/Contact Emergency Services.
- Make the area safe/Assist the casualty without placing yourself in danger/Disconnect the electrical source if possible.
- Inform your Supervisor of the situation.

Team Leader/Supervisor responsibilities:

- Inform the owners of the cable to organise isolation of power supply to the affected cable.
- Assist the Emergency Services.
- Follow Company Reporting Procedure.

Gas:

Your responsibility

- Tell your Supervisor.

Team Leader/Supervisor responsibilities:

- Clear area, tell colleagues, make safe for you and public.
- Cease operations immediately.
- Do not operate switches.
- Prohibit smoking.
- Inform your supervisor.
- Execute an evacuation and post sentries to prohibit entry into the danger zone.
- Contact Local Gas Network Owner through the national emergency number 0800 111 999.

Telecoms:

Your responsibility:

- Tell your Supervisor.

Team Leader/Supervisor responsibilities:

- Contact service owner.
- Keep all operatives out of the excavation.
- Post a sentry to prevent others entering the danger area.
- Damage to telecommunication and cable TV cables may require expensive repairs and can cause considerable disruption to those relying on the system. However, the risk of personal injury is normally very low. Telecommunication cables may be covered in black plastic. If any black plastic service is found, it should be assumed to be a live electricity cable. Owners of the cables should be consulted on precautions, to avoid costly damage.

Water - Your responsibility:

- Tell your Supervisor.

Team Leader/Supervisor responsibilities:

- Contact service owner.
- Keep all operatives out of the excavation.
- Post a sentry to prevent others entering the danger area.

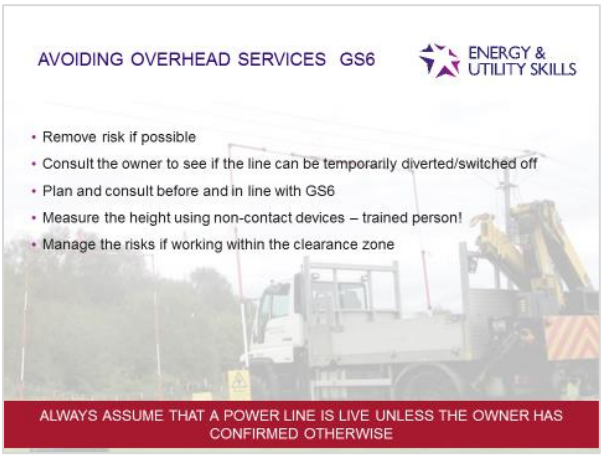
Be Alert! Danger can come from:

- Leaks
- Fire
- Explosion
- Damage from poor re-instatement.

DID YOU KNOW?

A construction company paid £210 000 in fines and costs after an employee died in an explosion, following damage to an 11,000 volt live cable within an excavation. The worker suffered burns to over 60% of his body while he and other workers were using breakers and a shovel within the excavation. He died of his injuries 13 days later. The company had not informed workers that there were live cables in the excavation and failed to put adequate measures in place to prevent them being damaged.

Source: http://www.hse.gov.uk/pUbns/priced/hsg47.pdf



Slide 17 - AVOIDING OVERHEAD SERVICES GS6

Trainer to:

- Ask the group if they have heard of GS6 (HSE Guidance Note GS6 on Avoiding Overhead Services) and if they know what the requirements are?
- Click through the slide transitions to reveal the bullet points and read through each one.
- Reveal the red banner and emphasise the importance of assuming that a power line is live unless confirmed otherwise.
- Introduce the next slide.

DID YOU KNOW?

Every year people at work are killed or seriously injured when they come into contact with overhead electricity power lines. These incidents often involve machinery such as cranes, lorry-loader cranes and tipping trailers; equipment such as scaffolding tubes or ladders; work activities such as loading and unloading, lifting and stacking.

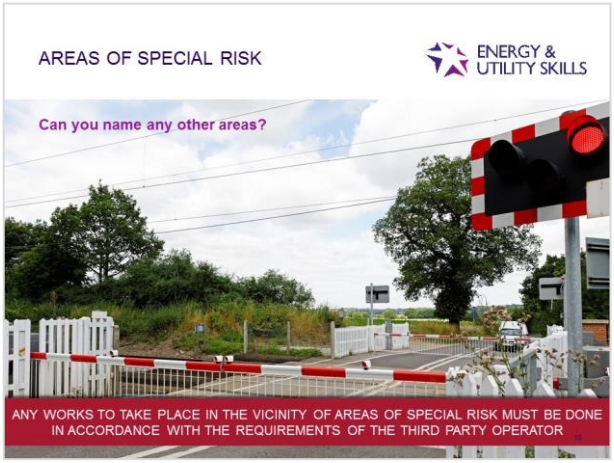
If a machine, scaffold tube, ladder, or even a jet of water touches or gets too close to an overhead wire, then electricity will be conducted to earth. This can cause a fire or explosion and electric shock and burn injuries to anyone touching the machine or equipment. An overhead wire does not need to be touched to cause serious injury or death as electricity can jump, or arc, across small gaps.

One of the biggest problems is that people simply do not notice overhead lines when they are tired, rushing or cutting corners. They can be difficult to spot, e.g. in foggy or dull conditions, when they blend into the surroundings at the edge of woodland, or when they are running parallel to, or under, other lines.

Always assume that a power line is live until the owner of the line has confirmed that it is dead.

Source: http://www.hse.gov.uk/pubns/gs6.pdf, http://www.hse.gov.uk/electricity/information/overhead.htm

Slide 18 - AREAS OF SPECIAL RISK



Trainer to:

- Explain that it is possible that work could be carried out on, or near, railway lines.
- Ask the group: 'can anyone give any examples of the activities that require work around railway lines?'

  Possible answers to include:

  - A utility company laying a pipeline under a railway line.
  - Construction work on adjacent land or roads.
  - Cables and bridges under or over the railway tracks.
  - A jib of a crane reaching across our property.
  - Hoardings around our land.
- Complete **Mandatory Activity 12**– Group discussion – working near the railway.
- Ask individuals if they know of any other areas of risk where they could be working on or near.

  Expect to see:

  - Farmer's fields – risk of injury from animals.
  - Low bridges – risk of hitting bridge.
  - Rivers, canals – risk of falling in/drowning.
  - Special engineering difficulties.
- Reveal the final slide transition – red banner.
- Reveal the next slide.

ACTIVITY 12 - Group discussion – working near the railway (5 minutes)

Resources: None required**.**

Trainer to ask the group: '*what are the risks of working near the railway?'*

Trainer to facilitate a discussion about the risks and encourage individual experiences.

Possible answers or points to encourage further discussion:

Risk of injury from being struck by a moving rail vehicle or passing train

- Only authorised persons are allowed on or near the line.

Passing train

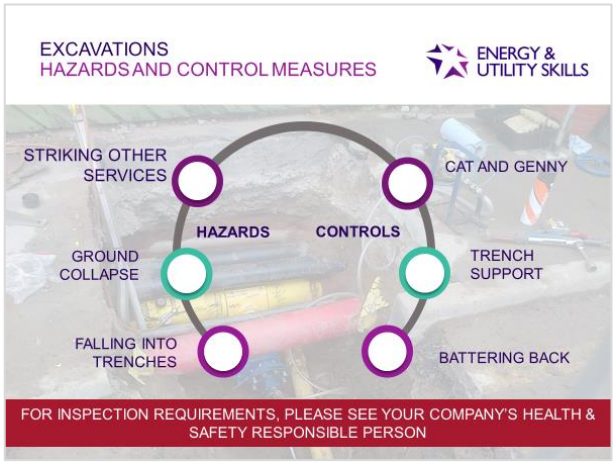
- A hazard of injury by being swept into the side of a passing train as a result of air turbulence.

Slip and Trip hazards

- When working or walking on or near the line, care must be taken of trackside equipment (including sleepers, point rodding, cable ducting, rails and sleepers) to ensure that trips do not occur. Slipping hazards may be occasioned by the presence of ice or water, making the surface slippery. Particular care must be taken when a surface is covered by snow and during the hours of darkness when visibility is restricted.
- Underfoot conditions can become slippery in adverse weather, leading to possible slips, trips and falls.

Trainer to close the discussion and conclude that the railway environment is always dangerous for you to work alongside and can have an impact upon your work.

Slide 19 – EXCAVATIONS | HAZARDS AND CONTROL MEASURES



Trainer to:

- Reveal the two headings 'hazards' and 'controls' and inform individuals that we are looking at the hazards and controls associated with excavations.
- Click the slide transitions to reveal the three hazards.

- Ask the group if they can think of any others.

Expect to see:

  - *Tripping over equipment, debris or spoil.*
  - *Excavated material or other objects falling on workers.*
  - *Exposure to overhead electric cables.*
  - *Unstable adjacent structures.*
  - *Mishandled or poorly placed materials.*

- Ask individuals if they have experienced any of these hazards themselves before moving on to control measures.

Trainer asks if individuals know of any control measures that can be put in place to control the hazards in excavations. Trainer shows first three examples and then asks if they know of any more. This slide shows examples of possible hazards on the left and controls on the right. These do not correspond directly with one another.

Expect to see:

  - *Fencing to protect the public.*
  - *Control plant movements around the excavation. Keep plant a safe distance from the excavation.*
  - *Ensure safe access and egress.*
  - *Never work underneath an excavator.*

Explain that the law says you must prevent danger to workers in or near excavations. To maintain the required precautions, a competent person must inspect excavation supports or 'battering' at the start of the working shift and at other specified times. No work should take place until the excavation is safe.

Click the next slide transitions to reveal the controls. Trainer asks: Can you think of any others? Have you had to organize control measures?

Explain that commercial clients must provide certain information to contractors before work begins. This should include relevant information on:

- Ground conditions.
- Underground structures or water courses; and
- The location of existing services.

This information should be used during the planning and preparation for excavation work.

Key issues are:

- Collapse of excavations.
- Falling or dislodging material.
- Falling into excavations.
- Inspection.

Trainer states that, for inspection requirements, employees should see their company's Health & Safety responsible person. There is more information on this in Module 1.

Trainer to reveal the next slide.

Trainer's notes:

Excavations – making them safe: **Excavation support** is generally required for excavations in excess of 6ft or excavations that are not sloped. **Excavation support** for deep **excavations** refers to the additional bracing that is required to stabilize a retaining wall, such as a sheet pile, when excavation gets typically deeper than 10 to 14 ft.

Shoring is the process of temporarily **supporting** a vessel, structure, or trench with shores (props) when in danger of collapse or during repairs or alterations. Shoring comes from a timber or metal prop. **Shoring** may be vertical, angled, or horizontal.

The excavation should be constructed to prevent people and materials falling in, i.e. with **barriers** strong enough not to collapse if someone falls against them.

Plant and materials should be kept away from the edge.

A ladder should be provided to get in and out.

Adjacent structures should not be undermined – digging should be conducted well away from them. Be aware, due to the way the load from a wall or structure is distributed, excavating close to a wall or structure can lead to its collapse into the excavation.

The excavation should be checked each day before work starts and after any event that may affect its stability – e.g. a fall of material or poor weather.

Keep records so people can be sure it is safe for work to continue.

DID YOU KNOW?

Case study: worker buried in 2.7m trench collapse

IOSH Magazine reported on 11 May 2017 that a Fife, Scotland-based construction company had been handed a £14,000 fine, after a worker was buried under dislodged earth at a house renovation in Falkland in September 2011, when an excavator caused a trench excavation to cave in.

A Health and Safety Executive (HSE) investigation found that none of the workers had formal health and safety training to manage a construction site and that the excavation work had not been risk assessed. As a result, workers were given instructions through verbal briefings rather than detailed, mapped out plans.

The Court heard how a 43-year-old employee of the construction company was part of a team that had been using an excavator to dig a trench to help connect the drainage system of the property with a new extension. When the workers came across a boulder that prevented further digging, they used the excavator to try and shift it.

The injured man was laying the new pipe in the trench and helping to guide the machinery when one of the trench walls, 2.7 m deep, subsided, burying him. His colleagues immediately started digging the soil away from his head to enable him to breathe. The worker remained partially buried in the trench until emergency services arrived and dug him free.

The worker sustained a broken shoulder and collarbone, punctures to both lungs and fractures to all but two of his ribs. He remained in hospital for almost three weeks.

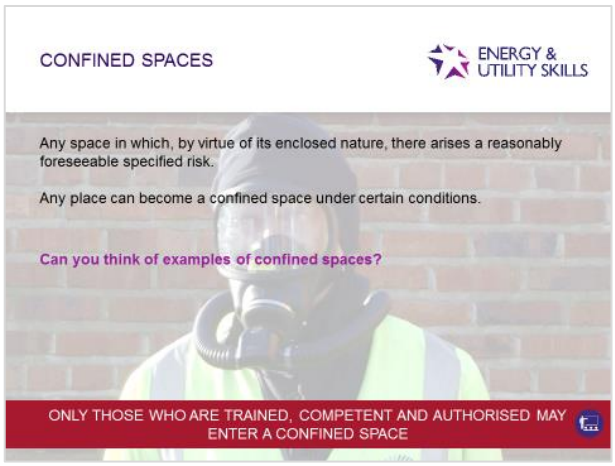
The HSE found that the trench had not been supported or "stepped back" to control the risk of it collapsing. The construction company, pleaded guilty to breaching ss 2(1) and 33(1)(a) of the Health and Safety at Work Act.

HSE inspector Ritchie McCrae said: "The risks associated with collapsing excavation walls are well known, as are the necessary control measures … the company failed to identify the risk and

there was a total absence of any control measure which would have prevented this incident from occurring. The worker sustained serious, permanent injury and is extremely lucky to still be alive."

Source: https://www.ioshmagazine.com/article/worker-buried-27-m-trench-collapse

Slide 20 - CONFINED SPACES



Trainer opens the slide and reads the definition of a confined space.

"Any space in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk."

Trainer to ask the group: '*can anyone give us some examples of a confined space?'*

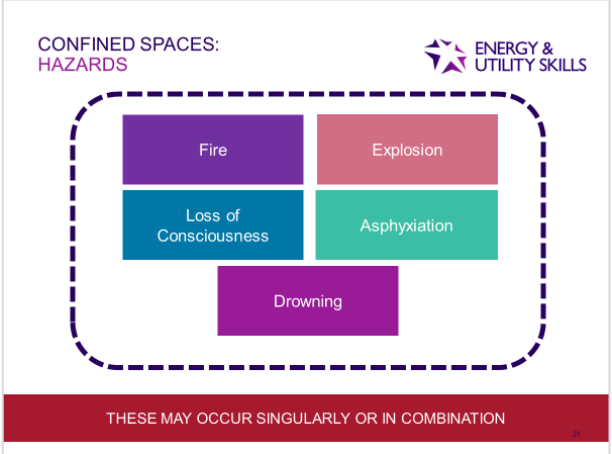
Expect to hear: *silos, vats, hoppers, utility tanks, water supply towers, sewers, pipes, access shafts, rail tank cars, truck tanks, aircraft wings, boilers, manholes, pump stations, digesters, manure pits, storage bins, and diesel generators being used in poorly ventilated areas.*

Trainer to explain that some confined spaces may require you to use breathing apparatus and have a specialist safety team on standby.

Breathing apparatus for confined spaces may require a specialist team above ground with different breathing apparatus for dealing with different gases. You need to be sure that you know your emergency rescue plan – your site specific one will be contained in your method statement.

Trainer to reveal the next slide.

Slide 21 - CONFINED SPACES | HAZARDS

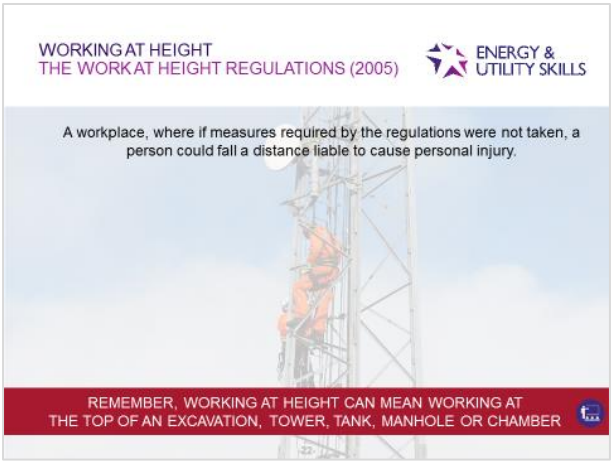


Trainer to:

- Explain that we are now going to look at the hazards associated with confined spaces.
- Ask the group '*what are some of the hazards of confined spaces?*'
- Encourage the group to call out answers.
- Click through the slide transitions, reading each hazard as it appears.
- Ask the group 'what are the risks associated with these hazards?'

When the red banner appears, trainer to remind the group that of course, these hazards will not necessarily appear in isolation. They should be prepared to see more than one at a time.

Trainer to reveal the next slide.

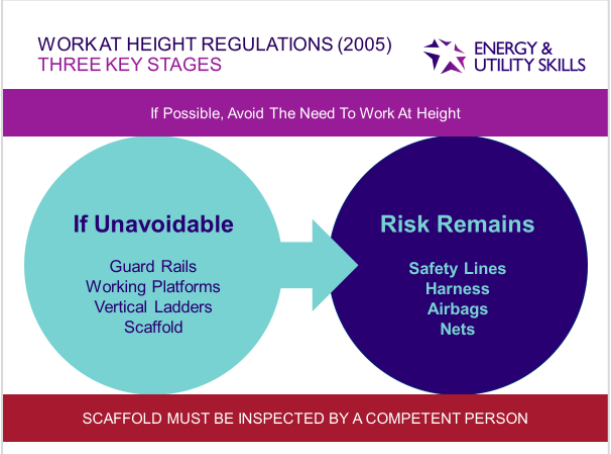


Slide 22 - WORKING AT HEIGHT | THE WORK AT HEIGHT REGULATIONS (2005)

Trainer to:

- Ask the group '*Who here works at height?*' followed by '*What do we mean by 'Working at height*?'
- Click to reveal the slide transition and read the definition of working at height.
- Click to reveal the slide transition and read the text on the red banner.
- Comment, 'did you know that working on the back of a lorry (e.g. flat-bed truck) constitutes working at height?'

- Reveal the next slide.



Slide 23 - WORK AT HEIGHT REGULATIONS (2005) | THREE KEY STAGES

Trainer to explain that the Work at Height Regulations of 2005 takes a three-pronged approach to working at heights. The preference is always to find a different way. Do not work at heights if you can avoid it.

Trainer to explain that in the real world, we know that is not always realistic, so anyone working at height should take action to avoid falls.

Trainer's notes:

Trainer to:

- Ask the group for ideas 'how to avoid falls?'
- Click to reveal the next slide transition and read the text in the first circle (e.g. Guard rails, vertical ladders and platforms).
- Ask the group 'if we cannot completely eliminate the risk, what action can we take to mitigate against it?'
- Click to reveal the next slide transition and read the text in the second circle (Harness, Airbags, Nets).
- Click to reveal the red banner and read it out to remind the group that scaffold must only be inspected by a competent person.
- Provide a brief summary:
  - Do not work at height unless absolutely necessary.
  - If we must work at height, we do everything possible to avoid falls.
  - If there is still a risk, use safety equipment to mitigate the risk of falling.
- Reveal the next slide.

Slide 24 - WORK AT HEIGHT REGULATIONS (2005) | HAZARDS, FACTORS AND CONTROL MEASURES

Trainer to ask the group *'what are the hazards and factors associated with working at heights?'* followed by *'What are the control measures?*'

Trainer acknowledges the group's responses and runs through the rest of the slide, reading each transition as it is revealed.

Trainer to reveal the next slide.

Supporting information includes:

Hazards

- Crushing (e.g. from falling structures).
- Falling from vehicles and platforms.
- Collision/impacts of mobile lifting equipment.
- Overturning and overloading.
- Power failure of lifting equipment during the move.

Factors

- Age
- Experience/training
- Health.

Control Measures

Only use a ladder or stepladder:

- For non-repetitive works for a maximum of 30 minutes.
- Where you can maintain three points of contact with the ladder at all times.
- On firm ground.
- On clean solid surfaces.
- Where it has been secured.

Maintaining specified distances from overhead powerlines:

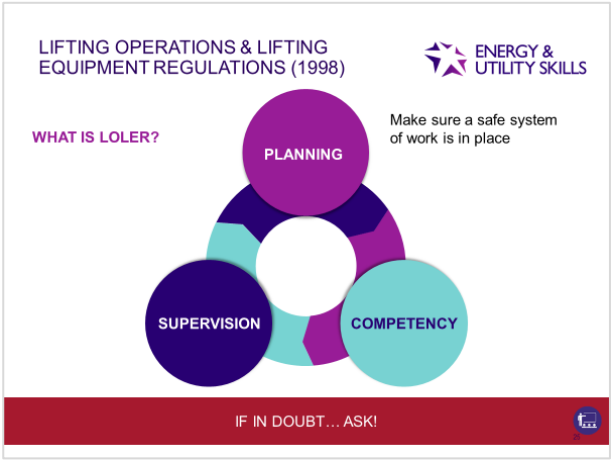
- Good management, planning and consultation with interested parties before and during any work close to overhead lines will reduce the risk of accidents. This applies whatever type of work is being planned or undertaken, even if the work is temporary or of short duration. You should manage the risks if you intend to work within a distance of 10m, measured at ground level horizontally from below the nearest wire.
- Where it is necessary to work closer than the guideline distances, the work shall be carried out following close liaison with the utility owner and under a permit to work.
- No-one must work close to overhead lines unless this is in place and work is controlled by a banksman.

Effective housekeeping can eliminate some workplace hazards and help get a job done safely and properly. Poor housekeeping can be a cause of accidents, such as:

- Tripping over loose objects on floors, stairs and platforms.
- Being hit by falling objects.
- Slipping on greasy, wet or dirty surfaces.
- Striking against projecting, poorly stacked items or misplaced material.
- Cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping.

Fragile roofs:

- Ensure that a competent person assesses the roof using a safe system of work.
- Ensure the work is properly planned in advance by a contractor with sufficient expertise in working on fragile roofs.
- Specify non-fragile assemblies for new and replacement roofs.
- Satisfy yourself that the contractors have allowed sufficient time to carry out the work safely.
- After work starts, ensure the planned safe system of work is implemented.



Slide 25 - LIFTING OPERATIONS & LIFTING EQUIPMENT REGULATIONS (1998)

Trainer to explain that LOLER is the regulation that applies to lifting operations and lifting equipment and, as such, is a mandatory requirement.

Trainer to ask the group 'how do we ensure that lifting equipment is used appropriately when undertaking lifts? *And* 'what kind of safeguards must we have in place?'

Trainer to acknowledge individual responses.

Trainer to click through the slide transition and read the text as it appears linking it back

to the group responses highlighting anything that was not mentioned.

Trainer to reveal the next slide.

Trainer's notes:

Planning – make sure a safe system of work is in place and carry out a thorough examination of the equipment. It is therefore important to properly resource, plan and organise lifting operations so they are carried out in a safe manner.

Competency – make sure a competent person is involved in each step described above.

Supervision – Supervision should be proportionate to the risk, taking account of the competencies and experience of those undertaking the lift. Many everyday lifting operations do not require direct supervision (e.g. experienced fork-lift operators undertaking routine lifts), although there may be circumstances where supervisory assistance may be required to manage risk (e.g. lifting an unusual load, crossing a public road etc.).

You need to make sure that when using any lifting equipment, the requirements of LOLER are met.

For example, you should make sure that all lifting equipment is:

- Sufficiently strong, stable and suitable for the proposed use. Similarly, the load and anything attached (e.g. timber pallets, lifting points) must be suitable.
- Positioned or installed to prevent the risk of injury, e.g. from the equipment or the load falling or striking people.
- Visibly marked with any appropriate information to be taken into account for its safe use, e.g. safe working loads. Accessories, e.g. slings, clamps etc., should be similarly marked.

AND

- Where appropriate, before lifting equipment (including accessories) is used for the first time, it is thoroughly examined.
- Lifting equipment may need to be thoroughly examined in use at periods specified in the Regulations (i.e. at least six-monthly for accessories and equipment used for lifting people and, at a minimum, annually for all other equipment) or at intervals laid down in an examination scheme drawn up by a competent person.
- All examination work should be performed by a competent person (someone with the necessary skills, knowledge and experience).
- Following a thorough examination or inspection of any lifting equipment, a report is submitted by the competent person to the employer to take the appropriate action.

Additionally, you must make sure that:

- Lifting operations are planned, supervised and carried out in a safe manner by people who are competent; (there's that word competent again) where equipment is used for lifting people it is marked accordingly, and it should be safe for such a purpose, e.g. all necessary precautions have been taken to eliminate or reduce any risk.
- Authorisation should be obtained to carry out the lift and only use equipment if trained and competent.

- Only use lifting equipment in the manner specified by manufacturers and company procedures.
- Keep unauthorised persons away from the lifting area.

DID YOU KNOW?

The Lifting Operations Lifting Equipment Regulations 1998 (LOLER) are a set of regulations created under the Health and Safety at Work etc. Act 1974 which came into force in Great Britain on 5 December 1998 and replaced a number of other pieces of legislation which covered the use of lifting equipment.

Lifting equipment includes any equipment used at work for lifting or lowering loads, including attachments used for anchoring, fixing or supporting it. The Regulations cover a wide range of equipment including, cranes, forklift trucks, lifts, hoists, mobile elevating work platforms, and vehicle inspection platform hoists. The definition also includes lifting accessories such as chains, slings, eyebolts etc.

LOLER does not apply to escalators, which are covered more specifically by the Workplace (Health, Safety and Welfare) Regulations 1992.

Slide 26 - HAZARDS ASSOCIATED WITH LIFTING/MOVING EQUIPMENT

Trainer to:

- Display the **title slide only**.
- Explain that there are many types of lifting equipment used on major hazard sites.
- Explain that major lifts to install or remove large plant items will involve the use of large cranes, such as tower cranes, and mobile cranes.
- Explain that many plant operations will involve the lifting of drums of chemicals, mobile equipment and spares for maintenance using lifting chains, travelling cranes, hoists and lifting trucks.
- These smaller routine lifts are normally carried out by trained plant operators, whereas larger lifts are undertaken by specialists.
- Complete **Activity 13** – Hazards associated with lifting/moving equipment.

- Click to reveal the hazards associated with lifting/moving equipment.
- Reveal the next slide.

ACTIVITY 13 - Hazards associated with lifting/moving equipment

(10 minutes)

Resources: Flipchart & pen, blank paper

Trainer to ask the group 'what are the possible hazards from the various scenarios already mentioned?'

Trainer to ask if individuals have an experience that they would like to share with the group, either a hazard they have experienced, or an accident.

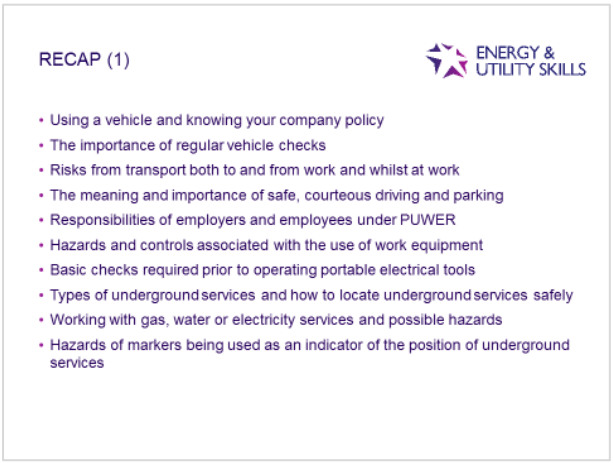
Trainer to reveal the slide transitions listing various hazards associated with lifting/moving equipment.

Slide 27 - OPERATING MOBILE PLANT SAFELY | TRAINING AND INSPECTIONS

Trainer to:

- Reveal the slide transitions and read each point.
- Explain that all operators of mobile plant must receive adequate training specific to their work to ensure that they work safely and without risk to their self and others.
- Explain that they must also receive job specific training. Employers require their plant operators to be trained to any scheme which they think is appropriate to their workplace, as long as completion of the training the company chooses, means that employees are competent to operate the mobile plant they will be using. Training also keeps you up to date with current Health & Safety requirements to ensure you follow proper recognised procedures on site.
- Explain that the operator requires job familiarisation training to also cover those areas without direct supervision, but through observation. If the company is satisfied by the standard of the operator to use the equipment then authorisation to drive their machines should be given.

- State that mobile plant is operated safely by applying the controls we have talked about: for example, only trained, competent and authorised people using any equipment, and only then in the manner specified by the manufacturer.
- Reveal the next slide.



Slide 28 - RECAP (1)

Trainer to summarise the topic areas covered in Module 5.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Slide 29 - RECAP (2)

Trainer to summarise the topic areas covered in Module 5.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Slide 30 - MODULE COMPLETE

Trainer to exit module presentation, navigate towards the 'training materials' menu and initiate module assessment.

Occupational health hazards

MODULE 6

This module aims to explain the meaning of the term 'occupational health' and develop the individuals' understanding of a range of occupational health hazards and their requirements. It helps individuals identify, mitigate and minimise occupational health hazards in the workplace.

There are 5 learning outcomes for this module:

LO1: Understanding the meaning of occupational health in the workplace

LO2: Understanding physical health hazards

LO3: Understanding chemical health hazards

LO4: Understanding biological health hazards

LO5: Understanding psychosocial health hazards

Within this module, we will be looking at:

- The meaning of occupational health in the workplace
- Examples of different kinds of occupational health hazards
- Roles and responsibilities of occupational health officer/team
- Responsibilities of employer and employee
- Manual handling as a hazard
- Noise as a hazard
- Signs and effects of hand arm and whole-body vibration
- Working in direct sunlight
- Effective use of display screen equipment
- Risk assessments through COSHH
- Identification of and effects on health of hazardous substances
- Types of biohazard
- The importance of personal hygiene
- Routes of entry for illness and infection
- Psychosocial health hazards

ACTIVITIES

The following outlines the activities within this module, including whether they are mandatory or optional.

Mandatory activities

- Occupational health roles and responsibilities
- HAVs prevention
- COSHH sign identification

Optional activities

- Heat exhaustion/sun stroke symptoms and controls

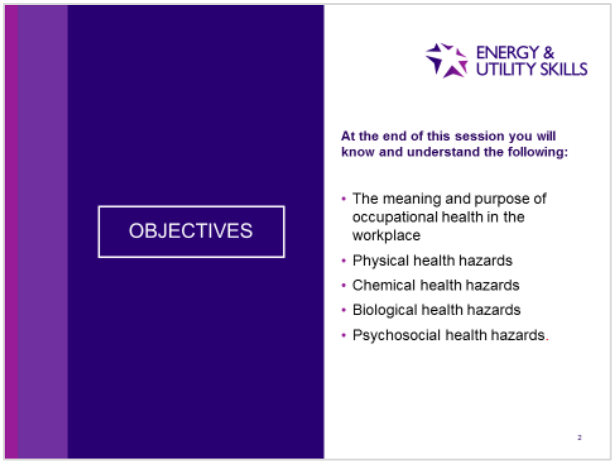
Approximate delivery time: 60 minutes

Slide 1 - OCCUPATIONAL HEALTH HAZARDS

Trainer to reveal the title slide and explain that the aim of Module 6 is to familiarise individuals with occupational health in the workplace.

Trainer to ask the group if they understand the term occupational health in the workplace?

Trainer to reveal the next slide.

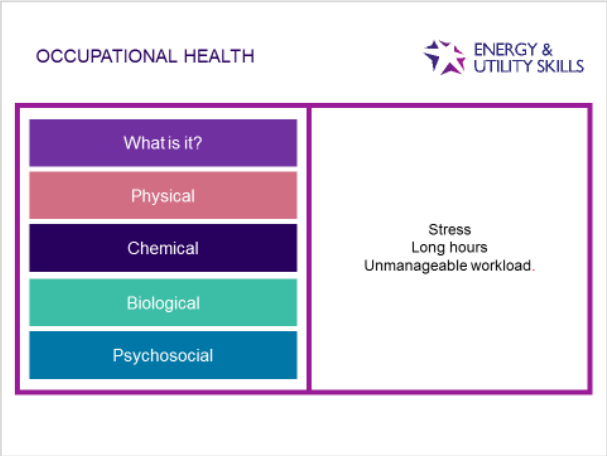


Slide 2 - OBJECTIVES

Trainer to briefly explain that this module will introduce individuals to the meaning and purpose of occupational health in the workplace including:

- Physical health hazards
- Chemical health hazards
- Biological health hazards
- Psychosocial health hazards.

Trainer to remind the group that following completion of this module there will be an assessment.



Slide 3 - OCCUPATIONAL HEALTH

Trainer to explain that we can define Occupational Health by saying 'it is all about protecting you at work', and 'promoting your health in the workplace'.

Trainer to explain that occupational health hazards can be split into four main categories.

Trainer to click to reveal the slide transitions listing 'what is it?' followed by the four categories (Physical, Chemical, Biological and Psychosocial) plus an example of each.

Trainer to stop at each slide transition and read the examples.

Trainer to reveal the next slide.

Slide 4 - CHRISTOPHER MORGAN'S STORY | ASBESTOS

Trainer to introduce the video of Christopher Morgan's story.

Trainer to remind individuals that this is only an awareness programme and they may need to undergo additional training.

Trainer to reveal the next slide.

DID YOU KNOW?

Work related ill-health and occupational disease in Great Britain

The HSE Reports that 13,000 deaths each year are estimated to be linked to past exposure at work, primarily to chemicals or dust. In addition, 1.3 million workers were suffering from work-related ill health in 2016/17.

Source: HSE Work related ill health and occupational disease in Great Britain

Slide 5 - ROLES AND RESPONSIBILITIES

Trainer to reveal the headings at the top of the slide.

Trainer to complete **Activity 14** – Occupational Health Roles and Responsibilities.

Trainer to reveal the next slide.

ACTIVITY 14 - Occupational Health Roles and Responsibilities (10 minutes)

Resources: Flipchart and Pens

Trainer to:

- Arrange the individuals into groups of 3/4 depending on the size of the group.
- Provide each group with a sheet of flipchart paper and pen.
- Ask the groups to divide the flipchart paper into 3 sections with the following headings: Employer, Person Responsible for Occupational Health (OH) (if applicable), Employee

Employer	Employee	Person responsible for Occupational Health (if applicable)

- Instruct the group that they have **5 minutes** to write down the responsibilities of each job role.
- Stop the group after 5 minutes and a nominated person from each group is to feedback their results (aim for an individual who has not already taken on the role in an earlier activity).
- Provide group feedback.
- Display the flipcharts on the training room wall.

Expect to see:

Employer responsibilities:

- *Risk assessments.*
- *Prevent or control exposure.*
- *Decide what precautions are required.*

- *Ensure use of control measures.*
- *Monitor the work environment.*
- *Provide health surveillance if required.*
- *Provide information, instruction and training.*

Occupational Health Officer responsibilities (if applicable):

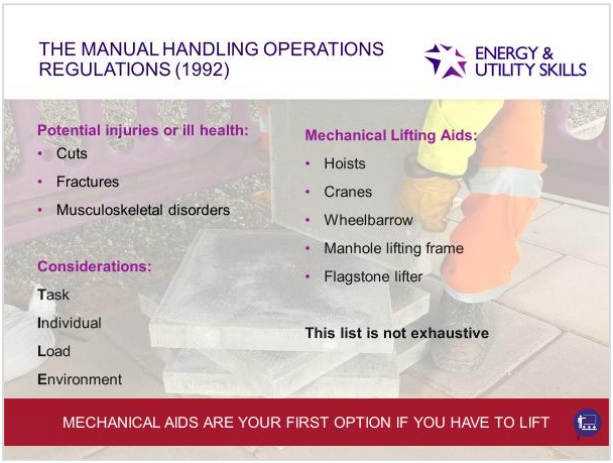
- *Health assessments for all new staff, with follow-up advice as appropriate.*
- *Ergonomic advice/workstation assessment where there are health problems.*
- *Health assessment/medical for any staff driving for work.*
- *Advice regarding counselling.*
- *Health surveillance for designated workers.*
- *Health promotion.*
- *Support for first aiders.*
- *Advice for those travelling abroad on work business.*
- *Arrangement of early eyesight test if required for health reasons.*
- *Advice on rehabilitation following sickness absence, if required.*
- *Identify hazards in the working environment, advise on aspects relating to Health and Safety legislation and follow up all work-related accidents.*

Employee Responsibilities:

- *Follow your training.*
- *Take reasonable care.*
- *Co-operate with your employer.*
- *Tell someone if you are concerned.*

Trainer summarises these findings.

Slide 6 - MANUAL HANDLING



Trainer to reveal the slide transition and section headings.

Trainer to read each bullet point.

Trainer to use the supporting notes below to explain the detail of the regulations:

The Manual Handling Operations Regulations (MHOR) 1992 define manual handling as:

"… any transporting or supporting of a load (including the lifting, putting down, pushing, pulling, carrying or moving thereof) by hand or bodily force." These regulations were developed to help organisations reduce the number of Musculoskeletal Disorders (MSDs), associated with Manual Handling, which is the most commonly reported type of work-related ill health.

These regulations demonstrate a hierarchy of measures that will help you manage your manual handling risks. The ranking system for this hierarchy is listed below:

- First – you must avoid the harmful manual handling operations, so far as it is reasonably practicable.
- Second – assess the manual handling operations that cannot be avoided. How will it be done? Can it be done alone or is it a two-man job?
- Third – reduce the risk of injury so far as it is reasonably practicable by carrying out the lift safely.
- Plan your task.

Consider:

T – Task – what is the plan?

I – Individual – who is responsible?

L - Load – what are you required to move? – size, weight

E – Environment – consider the area and any obstacles, walk the route.

Trainer can demonstrate with a volunteer - how to lift correctly.

Plant your feet so that you get a good grounding, make sure you have a firm grip with your hands, keep the load as close to the body as possible in order to centre the load, DON'T hold your arms outstretched. Bend your knees, keep your back neutral and head upright, lift with your legs and move your feet to turn and change direction. Lastly move slowly when carrying a load.

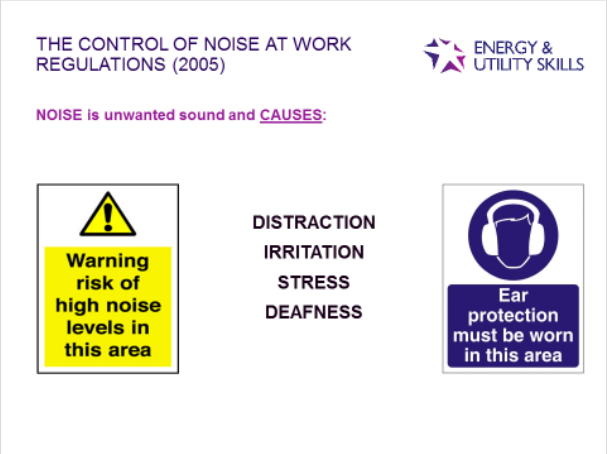
Manual handling is a hazard and has the potential to cause injuries/ill health from manually handling incorrectly. Injuries can include cuts, fractures, musculoskeletal disorders, lower back pain. Current legislation/guidelines exist such as LOLER. This, coupled with the proper site safety equipment, including aids available to assist manual handling (e.g. hoists, cranes, power shovels), along with effective manual handling techniques, can reduce the risk of injury substantially.

Where appropriate, play optional video: "Child's Play" https://youtu.be/B4dK_BoPEKg

Trainer to reveal the final slide transition – the red banner and read it to the group.

Trainer to reveal the next slide.

Slide 7 - THE CONTROL OF NOISE AT WORK REGULATIONS (2005)



Trainer to display the two signs on the slide including the definition of noise.

Trainer to explain that:

Damage to the ear and hearing is done through loud or consistent exposure to noise – even as low as 75 decibels – and it is irreversible:

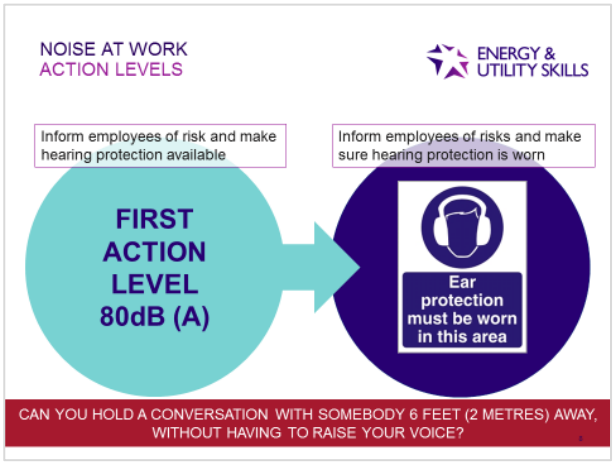
- Noise can be defined as unwanted sound. It can be distracting or irritating, can cause stress and even deafness.
- Work areas must display a prominent warning notice banning any unauthorised entry. Notices stating entry without the use of hearing protectors should be posted near every entrance to an ear protection zone. You will see examples of warning signs on the slide.
- Ear protection zones are defined as areas where persons may be exposed to sound levels exceeding 85db(A).

Trainer to click to reveal the remaining transitions indicating the effects of excessive noise.

Where appropriate, trainer to play Optional HSE video showing how noise affects our hearing: http://www.hse.gov.uk/noise/video/hearingvideo.htm

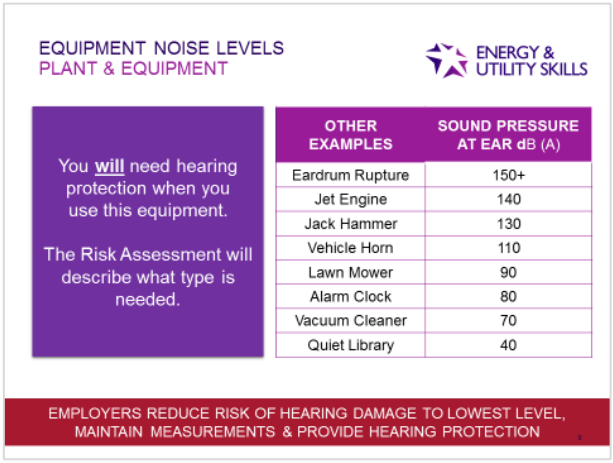
Trainer to reveal the next slide.

Slide 8 - NOISE AT WORK | ACTION LEVELS



Trainer to:

- Click through the slide transitions to reveal both circles.
- Explain that at 80dB, noise is about the level of an alarm clock or a door bell. Employers are obliged to inform employees of the risk and make ear protection available.
- Explain that at the level of 85dB or above, your employer must not only make ear protection available but also make sure it is worn.
- Click to reveal the two text boxes linked to the information above (and the relevant sign).
- Explain that at 97-102 dB, your hearing sounds as loud as a circular saw.
- Ask the group ‘CAN YOU hold a conversation with someone 2 metres away without having to raise your voice?’
- Click to reveal the red banner.
- Clarify that if you cannot hold a conversation, then you need to either turn the noise down, or wear protection.
- Reveal the next slide.



Slide 9 - EQUIPMENT NOISE LEVELS | PLANT & EQUIPMENT

Trainer to ask individuals if they use any of the equipment in the list.

Trainer to explain that:

All plant and equipment is likely to subject the operator or others to sound levels in excess of 85db(A). Plant and equipment should be clearly labelled, with warning notices indicating the necessity for hearing protection to be worn while the machine is in operation.

In construction, this is achieved by whisper plant and maintaining tools/equipment that reduce the risk of hearing damage to the lowest level.

Trainer's notes:

Trainer to click to reveal the next slide transition listing more examples to contextualise the level of noise:

- The distant rustling of leaves is 10dB.
- Whispering close up is 20dB.
- Quiet rural areas 30dB.
- Quiet library 40dB.
- Conversation at home 50dB.
- Conversation in a bar 60dB.
- Vacuum cleaner at 1m 70dB.
- Close alarm clock 80dB.
- Operating a lawn mower 90dB.
- Speaker in a club 1m away 100dB.
- Vehicle horn 1m away 110dB.
- Chain saw close up 120 dB (discomfort).
- Jack hammer 130dB (pain threshold).
- Jet engine 140dB (pain threshold).
- Eardrum rupture 150+dB.

Trainer to click to reveal the final slide transition - the red banner.

Trainer to state that a risk assessment will tell you what type of hearing protection you will need.

You should:

- Assess noise levels.
- Maintain records of noise measurements.
- When noise cannot be completely eliminated, avoided, or reduced below the second action level (as mentioned before) 85dB (A) employees must be provided with and wear ear protection.

Trainer to reveal the next slide.

DID YOU KNOW?

Hearing damage

Noise at work can cause hearing damage that is permanent and disabling. This can be hearing loss that is gradual because of exposure to noise over time, but also damage caused by sudden, extremely loud noises. The damage is disabling as it can stop people being able to understand speech, keep up with conversations or use the telephone.

Hearing loss is not the only problem. People may develop tinnitus (ringing, whistling, buzzing or humming in the ears), a distressing condition which can lead to disturbed sleep.

Safety issues

Noise at work can interfere with communications and make warnings harder to hear. It can also reduce people's awareness of their surroundings. These issues can lead to safety risks – putting people at risk of injury or death.

The law

The Control of Noise at Work Regulations 2005 (the 'Noise Regulations') require your employer to eliminate or reduce risks to health and safety from noise at work. Depending on the level of risk, your employer should:

- Take action to reduce the noise exposure.
- Provide you with personal hearing protection.

Other duties under the Regulations include the need to:

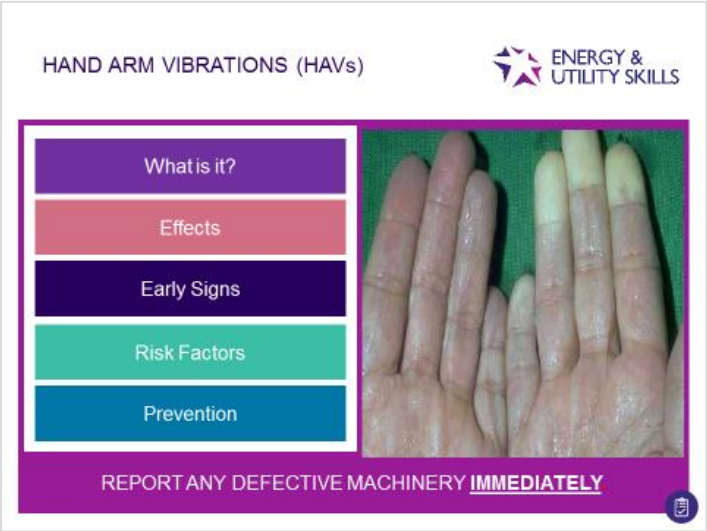
- Make sure the legal limits on noise exposure are not exceeded.
- Maintain and ensure the use of equipment provided to control noise risks.
- Provide you with information, instruction and training; and
- Carry out health surveillance (monitor workers' hearing ability).

The Regulations apply where work activities expose people at work (your employees or other workers affected by your work activities) to risks to their health and safety from noise.

The Regulations do not apply where people who are not at work are exposed to risks to their health and safety from noise related to work activities; however, the general duties of section 3 of the Health and Safety at Work etc. Act 1974 may apply in such cases.

Source: http://www.legislation.gov.uk/uksi/2005/1643/contents/made

Slide 10 - HAND ARM VIBRATIONS (HAVs)



Trainer to ask the group if anyone knows what HAV is.

Trainer to acknowledge individual suggestions and then click to reveal the slide transition box 'what is it?'

Trainer to explain that:

Hand Arm Vibration is a collective term that includes a range of conditions such as Vibration White Finger and Carpal Tunnel Syndrome.

Hand Arm Vibration can damage blood vessels, nerves in the fingers, and muscles and bones.

Trainer to click to reveal the slide transitions to display the list of 'Effects' and 'Early Signs'. Trainer to explain:

- The tips of your fingers turn white.
- You may get numbness and 'Pins & Needles'.
- You may find you are unable to grip things properly.
- You could well lose the strength in your hands.
- The whiteness may change to deep red flush.

Trainer to click to reveal that slide transition displaying Risk Factors and explain that the things that can cause HVA are:

- The amount of vibration you are exposed to.
- The length of time you are exposed to vibration.
- How you use the tool.
- How cold it is.

Trainer to ask the group 'what can you do to avoid suffering from HAV?'

Trainer to acknowledge individuals' suggestions.

Trainer to click to reveal the Prevention list and explain that there are things you can do to guard against HVA and reduce your chances of suffering from it:

- Keep warm.
- Wear warm gloves and extra clothing.
- Do not smoke.
- Exercise your hands and fingers to improve blood flow.
- Monitor use of equipment.

Trainer to complete **Mandatory Activity 15** – HAVs prevention.

Trainer to click to reveal the final slide transition reinforcing the overarching message: report defective machinery immediately!

ACTIVITY 15 – HAVs Prevention (5 minutes)

Resources: Flip-chart and Pen

Trainer to instruct individuals that they take **5 minutes** to brainstorm 'what else can they do to reduce the risk of HAVs when using hand held tools?'

Trainer to ask the group to feedback their suggestions.

Trainer to write suggestions on the flipchart.

Expect to hear:

- Report any defective tools.
- Use the right tool for the job.
- Rotate the task.
- Only use the right amount of force required when using tools and/or machinery.
- Keep tools and machines in good working order.
- Get trained!

Trainer to display the flipchart on the training room wall.

DID YOU KNOW?

HSE reported that on 3rd October 2017 a council had been fined after a 57-year old man was diagnosed with Hand Arm Vibration Syndrome (HAVS). The Court heard how the employee of the council's Street Scene department had been diagnosed with HAVS in September 2015.

An investigation by the Health and Safety Executive (HSE) found the council failed to address the issue of HAVS following an audit in February 2011, which identified a failure to assess the risk to employees from vibration. The council had developed a number of policies dating back to 2004 to tackle the risk of HAVS, however it was found these policies were not implemented.

Following the introduction of HAVS occupational health surveillance for users of vibrating tools, a further eleven diagnoses of HAVS or Carpal tunnel syndrome have been reported.

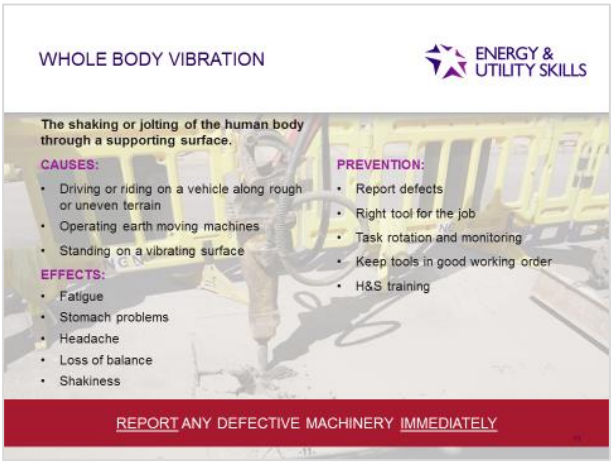
The Council pleaded guilty to breaching Section 2 (1) of the Health and Safety at Work Act 1974.

The council has been fined £150,000 and ordered to pay costs of £10,901.35. Speaking after the hearing HSE inspector Mhairi Duffy said: "This employee now suffers from a long term, life changing illness. The council should have implemented the policy they devised following the

audit in 2011. Workers' health should not be made worse by the work they do; all employees have the right to go home healthy at the end of the working day."

The HSE have produced a calculator to assist in calculating exposures for hand-arm vibration: http://www.hse.gov.uk/vibration/hav/vibrationcalc.htm

Slide 11 - WHOLE BODY VIBRATION



Trainer to click to definition and explain that whole body vibration (WBV) is transmitted through the seat, or feet of employees who drive mobile machines, or other work vehicles over rough and uneven surfaces as a main part of their job. Large shocks and jolts may cause health risks including back-pain.

Trainer to:

- Click to reveal the slide transition heading 'causes'
- Ask the group 'has anyone experienced WBV?''
- Acknowledge individual experiences.
- Click on 'causes' and explain that Whole Body Vibration can be caused by:
    - Driving or riding on a vehicle along rough or uneven terrain.
    - Operating earth moving machines.
    - Standing on a structure which is attached to a machine which produces vibration.
    - Vibrating Rollers.
    - Vibrating Floors.
    - Using a pecker (biggest cause of Whole Body Vibration.
    - Production sites.

Trainer to click to display the slide transition heading 'Effects'. Trainer to click on the 'effects' and add that the effects include symptoms like those many people experience after a long car or boat trip:

- Fatigue
- Stomach problems
- Headache

- Loss of balance
- Shakiness.

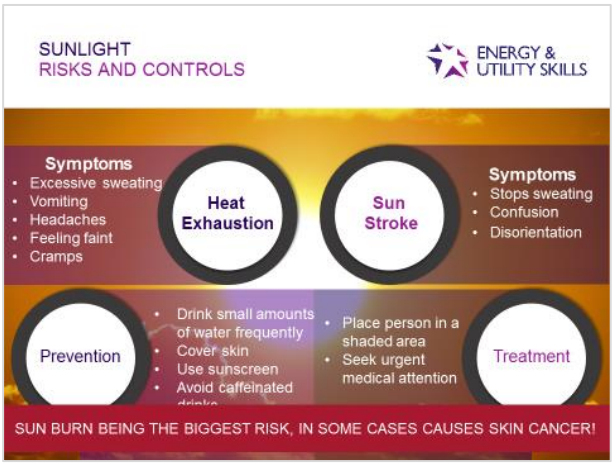
Trainer to click to reveal the slide transition 'Prevention' and asks the group 'what can you do to prevent Whole Body Vibration?' Trainer to click on answers.

- REPORT any defective tools.
- USE the right tool for the job.
- ROTATE the task.
- DO NOT use any more force than necessary when using tools or machinery.
- KEEP your tools and machines in good working order.
- TAKE an active part in your employer's health and safety training.

Trainer clicks to reveal the slide transition red banner.

Trainer to reveal the next slide.

Slide 12 – SUNLIGHT | RISKS AND CONTROLS



Trainer to:

- Ask individuals if anyone works outside during their work activity.
- Advise that we will now explore the dangers of working outside on hot, sunny days.
- Explain that the biggest risk to workers outside in the sun is sunburn leading to skin cancer!
- Complete **Optional Activity** if appropriate for the group.
- Click through the slide transitions to reveal 'heat exhaustion' and 'sun stroke' and talk through the symptoms of both.
- Click through the slide transitions to reveal 'treatment' and 'prevention' and the steps to take to prevent further harm.
- Add that sun stroke can very quickly lead to death if it is not identified quickly. Heat exhaustion itself can cause stress and can make it more difficult to pay attention to the hazards around you.
- Click to reveal the final slide transition – red banner.

- Reveal the next slide.

OPTIONAL ACTIVITY - Heat exhaustion/sun stroke symptoms and controls (5 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Arrange the individuals into two groups and explain that they have 5 minutes to complete this activity.
- Instruct the groups that they will each be given a risk associated with working in the sun.
- Explain that the groups will need to work together to discuss the risk they have been given and decide what the answers are the following questions:
    1. What do they think the symptoms are?
    2. How can you prevent the risk from turning into a serious injury?
- Provide each group one of the following topics:
    1. Heat exhaustion
    2. Sun Stroke.
- Stop the group after 5 minutes.
- Ask the groups to nominate one of their group to feedback their results to the rest of the group.
- Provide feedback.

Trainer to:

- Click through the slide transitions to reveal ‘heat exhaustion’ and ‘sun stroke’ and talk through the symptoms of both.
- Click through the slide transitions to reveal ‘treatment’ and ‘prevention’ and the steps to take to prevent further harm.
- Add that sun stroke can very quickly lead to death if it is not identified quickly. Heat exhaustion itself can cause stress and can make it more difficult to pay attention to the hazards around you.
- Click to reveal the final slide transition – red banner.
- Reveal the next slide.

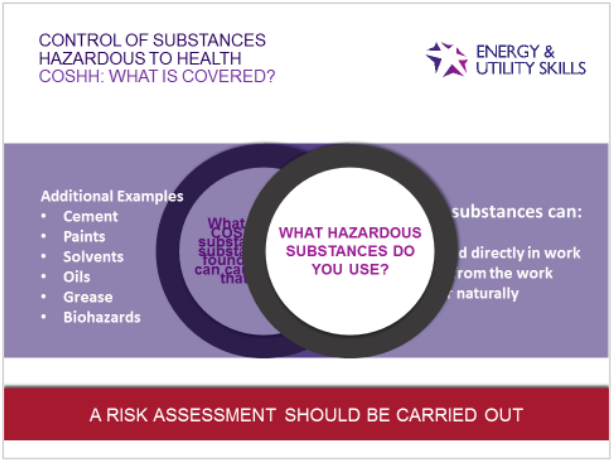
Slide 13 - DISPLAY SCREEN EQUIPMENT (DSE) | CONSIDERATIONS

Trainer to explain that there are various considerations for the safe use of Display Screen Equipment (DSE), sometimes known as Visual Display Units (VDUs).

Trainer to click through the slide transition to reveal the list of considerations.

Trainer to reveal the next slide.

Slide 14 - CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH | COSHH: WHAT IS COVERED?



Trainer clicks through initial slide transitions to explain that the Control of Substances Hazardous to Health legislation regulates the potential of substances you might work with that may cause harm to your health, for example, by irritating your skin or burning you.

These substances can:

- **Be used directly in work** – e.g. solvent based paints or cleaning materials.
- **Arise from the work** – e.g. dusts, fumes.
- **Occur naturally** – e.g. fungal spores found in agriculture.

Trainer clicks again and asks the group: What hazardous substances do you use at work? (Group calls out answers).

Trainer to click through the slide transition to reveal the 'Additional Examples' list and discuss.

Trainer to click to reveal the next slide transition to display the red banner and state that 'a risk assessment should be carried out when working with hazardous materials'.

Trainer to reveal the next slide.

Trainer's notes:

Under COSHH, exposure to hazardous materials should be monitored and controlled, and if at all possible, prevented.

Monitor exposure:

- For works with hazardous substances and carrying out health surveillance.
- To ensure employees are properly informed, trained and supervised.

Control exposure if prevention is not reasonably practicable. Control measures might include:

- If possible, total enclosure of the process.
- Partial enclosure of the local extraction equipment.
- General room or area extraction.
- Use systems of work and handling procedures which reduces leaks and spillages to a minimum.
- Reduce the number of personnel exposed.

If you don't have to be exposed to hazardous materials, you should not be. Prevent exposure by:

- Changing the process or activity so that the hazardous substance is not required.
- Replace with a safer alternative.
- Using it in a safer form, e.g. pellets instead of powder.

As a very last resort, we have to issue PERSONAL PROTECTIVE EQUIPMENT which is suitable for use.

Slide 15 - CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH | IDENTIFICATION

Trainer to explain that 'we are now going to see how many of these symbols you can identify.'

Trainer to complete **Mandatory Activity 16** – COSHH sign identification.

Trainer to reveal the next slide.

ACTIVITY 16 – COSHH Sign Identification (5 minutes)

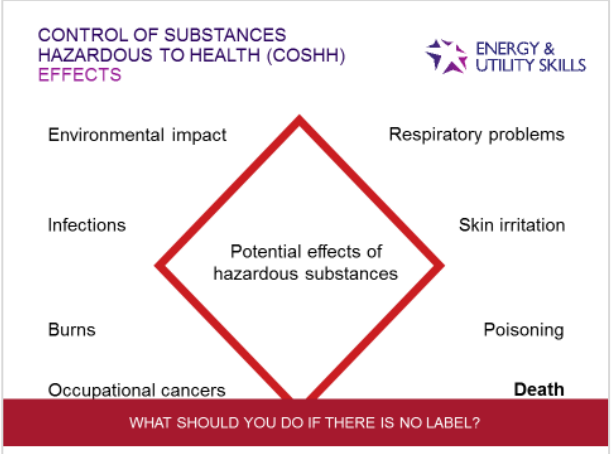
Resources: Flip-chart and Pen

Trainer to:

- Instruct the group that they have 5 minutes to identify as many symbols found on hazardous substances as they can in the time permitted.
- Provide each individual with a blank piece of paper for them to record their answers.
- Start the activity and click slowly through each symbol.
- Instruct the individuals to swap their answers with the person on their left for marking.
- Click through the slides to reveal the answer next to the symbols.
- Ask, 'who got 9/9?', 'Anyone get 8? 'etc., until all of the scores are revealed.
- Close the activity and explain that:

It is important to remember that thousands of people are exposed to hazardous substances at work every day. If exposure is not prevented or properly controlled, it can cause serious illness. Some of the effects are long term and sometimes there is a risk of death.

Slide 16 - CONTROL OF SUBSTANCES TO HEALTH (COSHH) | EFFECTS



Trainer to:

- Click through the transitions to display the list of potential effects of chemical hazards at work.
- Explain that they range greatly in severity, from skin irritations to much more long term or severe effects, such as cancers like asbestosis, and even death.
- Ask the group to ‘think what some of the hazards could be that cause these effects?’
- Acknowledge individual suggestions.
- Points could include: *Solvents, dust, process fumes and more.*
- Reveal red band and ask the group ‘what would you do if you find that the label is missing on a container?’
- Confirm that the correct response would be to assume it could be dangerous and report it to your supervisor.
- Reveal the next slide.

Slide 17 - BIOHAZARDS

Trainer to:

- Display the warning symbols and explain that Biological hazards, also known as Biohazards, are substances that pose a threat to the health of living organisms, i.e. us! It could be a bacterial infection, a virus or a toxin and could come in the following form:
    - Through contact with waste (e.g. waste, human waste, discarded sharps)
    - Disease (e.g. Leptospirosis/ Weil's Disease, Hepatitis, Typhoid, Tetanus)
- Explain that they are not always obvious, and they certainly are not always labelled.
- Reveal the next slide transitions and the list of hazards.
- Reveal the slide transition red banner and reinforces the importance of good personal hygiene practices.
- Reveal the next slide.

DID YOU KNOW?

Illnesses you could get from biohazards:

Leptospirosis: Leptospirosis is a type of bacterial infection spread by animals – e.g. rats. It's caused by a strain of bacteria called leptospira. In 90% of cases, leptospirosis only causes mild flu-like symptoms, such as a headache, chills and muscle pain. However, in some cases the infection is more severe and can cause life-threatening problems, including organ failure and internal bleeding. In its most severe form, leptospirosis is also known as Weil's disease**.** The common mild symptoms mean most leptospirosis infections are hard to diagnose. Diagnosis is easier if the infection causes more serious problems.

Weil's Disease - Weil's disease is a severe form of leptospirosis. This is a type of bacterial infection. It's caused by Leptospira bacteria. You can contract it if you come into contact with the urine, blood, or tissue of animals or rodents that are infected with the bacteria.

Typhoid fever: Also known simply as **typhoid**, is a bacterial infection due to Salmonella typhi. Symptoms may vary from mild to severe and usually begin six to thirty days after exposure. Often there is a gradual onset of a high fever over several days. Weakness, abdominal pain, constipation, and headaches also commonly occur. Diarrhoea is uncommon and vomiting is not usually severe. The cause is the bacterium *Salmonella* typhi, also known as *Salmonella*

enterica serotype Typhi, growing in the intestines and blood. Typhoid is spread by eating or drinking food or water contaminated with the faeces of an infected person. Risk factors include poor sanitation and hygiene.

Hepatitis C: Hepatitis C is caused by the hepatitis C virus and is the most common type of viral hepatitis in the UK. It's usually spread through blood-to-blood contact with an infected person. In the UK, it is most commonly spread through sharing needles used to inject drugs. Poor healthcare practices and unsafe medical injections are the main way it's spread outside the UK. Hepatitis C often causes no noticeable symptoms, or only flu-like symptoms, so many people are unaware they're infected. Around one in four people will fight off the infection and be free of the virus. In the remaining cases, it will stay in the body for many years. This is known as chronic hepatitis C and can cause cirrhosis and liver failure. You can get Hepatitis C through picking up discarded sharps.

Tetanus: - The bacteria that cause **tetanus** can be found in soil, manure, or dust. They infect humans by entering the body through cuts or puncture wounds, particularly when the wound area is dirty. Animal bites, burns, and non-sterile injection of drugs can also lead to infection with Clostridium tetani.

Slide 18 - HYGIENE PRACTICES | CLOTHES, VEHICLES & EQUIPMENT

Trainer to:

- Ask the group 'what hygiene practices do you think apply to your clothes, vehicles and equipment?'
- Walk around the room and ask individual individuals what they suggest is the answer.
- Reveal the slide transition and discuss the list.
- Ask individuals 'why do you think it is important to follow these practices?'
- Acknowledge responses.
- Reveal the next slide.

Slide 19 – HYGIENE PRACTICES | CLEAN HANDS

Trainer to emphasise the importance of washing your hands thoroughly and regularly, to minimise the risk of illness through ingestion and absorption; using hot water and soap or approved antiseptic wipes.

Trainer to reveal the next slide.

Slide 20 – ILLNESS & INFECTION | ROUTES OF ENTRY

Trainer to reveal the slide transitions and ask individuals at random to identify ways in which people can contract illnesses, or infections during their day to day work activity. Note there are some hints on screen.

Expected answers:

1. Through cuts.
2. Through the mouth.
3. Breathing it in.
4. Through the skin.

Trainer clicks and reveals the headings to the pictures.

Trainer to reveal the next slide.

Slide 21 – ILLNESS & INFECTION | CONTROLLING AND PPE

Trainer to click the slide transition to reveal the first bullet point and reads the statement to the group.

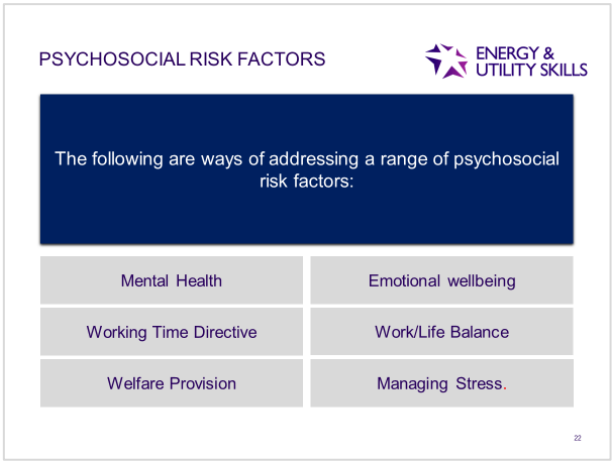
Trainer to ask individuals, 'what PPE they have to protect them against illness and infection?'

Expect to see:

1. *Gloves*
2. *Latex gloves*
3. *Suits*
4. *Face masks*
5. *Eye wear*
6. *Barrier cream*
7. *Waterproof dressings.*

Trainer to click through the slide transitions revealing the images.

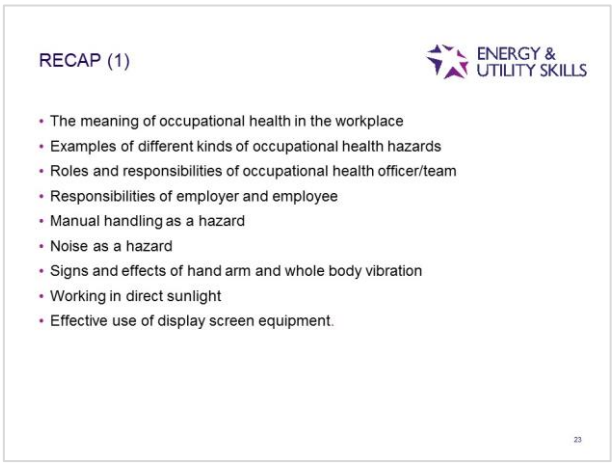
Trainer to reveal the next slide.



Slide 22 - PSYCHOSOCIAL RISK FACTORS

Trainer to:

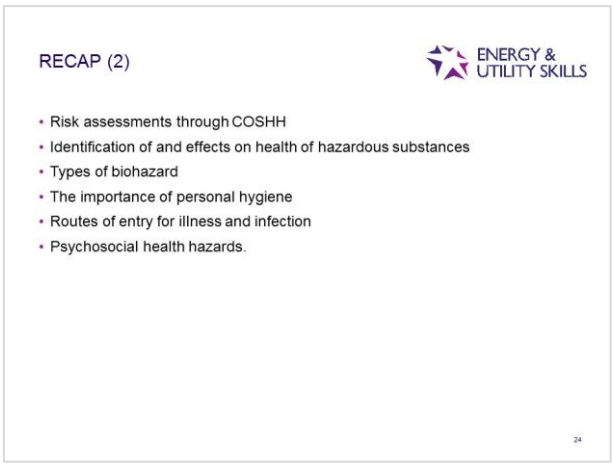
- Ask the group, '*what do you think psychosocial means?'*
- Reveal the definition in the blue box.
- Ask the group, '*what are the key Psychosocial risk factors to health in the workplace?'*
- Acknowledge suggestions and write them on the whiteboard or flipchart.
- Click the slide transition to display the answers, linking them back to the group's answers.
- Click to reveal the overlay transitions that each identify ways in which these psychosocial can be addressed.
- Reveal the next slide.



Slide 23 - RECAP (1)

Trainer to summarise the topic areas covered in Module 6.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.



Slide 24 - RECAP (2)

Trainer to summarise the topic areas covered in Module 6.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to remind the group to place any notes out of sight.

Trainer to administer the assessment for Module 6.

Slide 25 - MODULE COMPLETE

Trainer to exit module presentation, navigate towards the 'training material' menu and initiate module assessment.

Cross-country pipeline hazards

MODULE 7

The module introduces the individual to some specific hazards associated with a range of technical processes involved in the laying of cross-country pipelines. The module outlines the basic technical processes, addresses related hazards and protective measures needed.

There are 2 learning outcomes for this module:

LO1: Understanding pipeline welding, grinding and coating techniques

LO2: Understanding pipeline testing methods

Within this module we will be looking at:

- Welding types, techniques, hazards and controls
- The purpose of grinding and the associated hazards/controls
- Grit blasting, coating methods and associated hazards/controls
- Types of pipeline and joint testing
- Radiographic testing of joints and potential hazards/controls
- Ultrasonic testing and the advantages of this method
- Hydrostatic testing and potential hazards caused by pipeline integrity failure and controls

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

- Hazards with welding operations

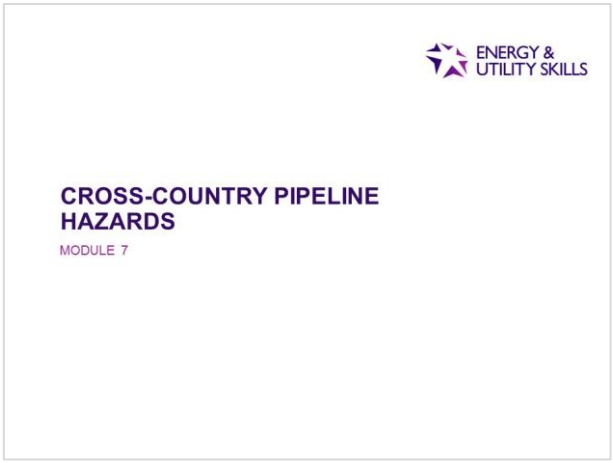
RESOURCES

The following outlines the general resources underpinning delivery of this section. All other resources are embedded in the modules.

http://www.hse.gov.uk/pubns/indg297.pdf
http://www.hse.gov.uk/welding/electrocution.htm
https://www.youtube.com/watch?v=dMxel7uCu64
https://www.youtube.com/watch?v=BmBc2U74qqY
https://www.youtube.com/watch?v=xEK-c1pkTUI
http://www.hse.gov.uk/pipelines/hseandpipelines.htm

CROSS-COUNTRY PIPELINE HAZARDS

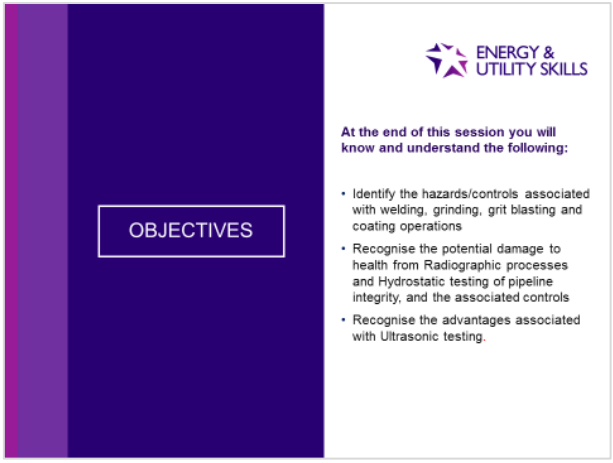
Approximate delivery time: 45 minutes



Slide 1 – CROSS-COUNTRY PIPELINE HAZARDS

Trainer to reveal the module title slide and explain that the aim of module 7 is to develop an individual's understanding of the hazards and controls related to a variety of pipeline processes associated with the building, preserving and testing of the pipeline construction.

Trainer to reveal the next slide.



SLIDE 2 – OBJECTIVES

Trainer to briefly explain what will be covered in this module.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal the next slide.

SLIDE 3 - WELDING OPERATIONS | TYPE OF WELDING

Trainer to:

- Describe the various types of welding as listed on the slide.
- Ask the group 'What is a fabrication weld?' Clarify that fabrications are the short lengths used to join the main runs of pipes at road crossings, bends and other obstructions.
- Ask the group 'What is a Tie-in weld?' Clarify that a "Tie-in" is where sections of the Pipeline are welded together in situ. This work is often undertaken in a confined space and requires considerable welding skill and expertise to produce seams that meet the highest standards required. As every joint will be subject to testing, there is no margin for error.
- Ask the group 'What is manual welding?' Clarify that manual welding is an arc welding process that uses a consumable electrode covered with a flux to lay the weld.
- Explain that for small diameter pipes a lot of welding is still done using stick electrodes. However, current industry development tendencies show that automatic welding is beginning to replace manual welding.
- Explain that automatic welding systems enable various degrees of automation of the girth welding process. The method combines well with other methods, such as manual welding.
- Complete **Activity 17** – Hazards with welding operations.
- Emphasise that additional training is required for a person to be deemed competent.
- Reveal the next slide.

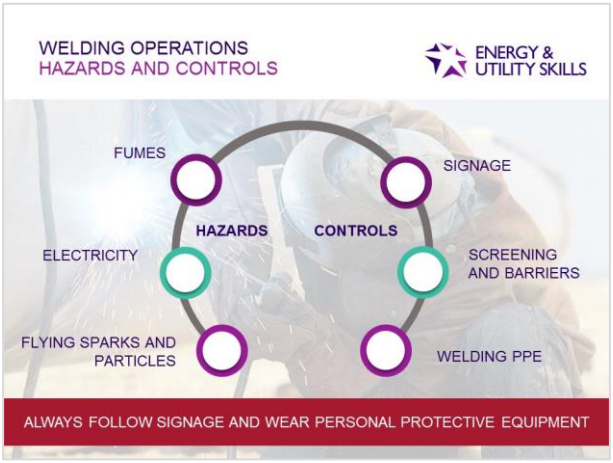
ACTIVITY 17 - Hazards with welding operations (10 minutes)

Resources: Blank Paper and pens

Trainer to:

- Arrange individuals in pairs or groups of 3.
- Instruct the group that they have **5 minutes** to list as many hazards they can think of, related to the different types of welding displayed on the slide in front of them.
- Stop the group after **5 minutes.**
- Ask the individual groups to feedback the hazards they have listed for each welding type.
- Allow **5 minutes** for feedback and discussion.
- Expect to see the following answers:
    - *Fumes*
    - *Potential electric shock*
    - *Radiated light causing "arc eye" damage*
    - *Fire or explosion*
    - *Flying Sparks and Particles*
- Reinforce points and protective measures using the following slides.

SLIDE 4 - WELDING OPERATIONS | HAZARDS AND CONTROLS



Trainer to:

- Click through the slide transitions to reveal the hazards listed on the left hand side of the diagram and relate back to previous activity.
- Explain that the hazards associated with welding operations may be summarised as (i) physical (flying sparks and particles), (ii) electrical (shocks, radiation burns or arc-eye) and (iii) chemical (toxic fumes and gases).
- Ask the group: 'What type of controls might we put in place to control these hazards?'
- Click through the slide transitions to reveal the controls and the label headings 'hazards' and 'controls'.

  Note that slide shows examples of possible hazards on the left and controls on the right. These do not correspond directly with one another.
- Explain the preventative measures and controls needed to eliminate the risks that these hazards impose. Include:
  - Sufficient clear signage that informs all those on site about the welding operation and warns them to keep clear.
  - Screens and barriers to exclude other workers from the welding area
  - Wearing the correct welding PPE including full helmet with filter lens
- Emphasise the red banner at the bottom of the slide and stress its importance.
- Reveal the next slide.

Trainer's notes:

The inert gas metal arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal arc welding. Employees should not be permitted to engage in, or be exposed to, the process until the following special precautions have been taken.

The use of chlorinated solvents should be kept at least 200 feet, unless shielded, from the exposed arc, and surfaces prepared with chlorinated solvents should be thoroughly dry before welding is permitted on such surfaces.

Employees in the area not protected from the arc by screening should be protected by filter lenses. When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type shall be worn under welding helmets. Hand shields to protect the welder against flashes and radiant energy shall be used when either the helmet is lifted or the shield is removed. Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

Slide 5 - GRINDING – HAZARDS AND CONTROLS

Trainer to:

- Explain that grinding is a process that uses an abrasive wheel (usually on a portable hand held tool) to reduce any surplus metal from the weld.
- Explain that grinding is needed to smooth off the weld and eliminate any material that could allow gaps in the coating applied later, thereby facilitating the possibility of corrosion.
- Ask the group to call out as many hazards they can think of relating to grinding.
- Write the hazards onto a flipchart as they are called out, correcting any incorrect suggestions.
- Working through each hazard noted on the flipchart, ask the group ‘how would you control it?’
- Refer to Trainer Notes for expected answers.
- Emphasise that additional training is required for a person to be deemed competent.
- Reveal the next slide.

Trainer’s notes:

People who use abrasive wheels on any type of machine are exposed to a number of **hazards** including**:**

- Injury to the eyes from flying abrasive and metallic particles
- Inhalation of dust from dry grinding operations
- Physical injury due to flying wheel fragments or ejected workpieces

- Noise and vibration
- Loose clothing such as ties or coat sleeves are easily drawn in between the wheel and the workpiece and should not be worn. Rags and waste should not be used near a revolving wheel as they may also become entangled.

Control Measures include:

- Correct PPE including goggles or other approved eyewear, dust masks and ear defenders
- Clear signage and barriers to restrict access to other site personnel
- On construction sites, there will be a need for head protection as well as for feet and hands.

Slide 6 – GRIT BLASTING – HAZARDS AND CONTROLS

Trainer to:

- Click to reveal the title slide only 'Grit Blasting – Hazards and Controls' and ask the group: 'Who can describe the process of 'grit blasting'?'
- Explain that abrasive grit blasting uses compressed air or water to direct a high velocity stream of an abrasive material to clean an object or surface, remove burrs, apply a texture, or prepare a surface for the application of paint or other type of coating. Employers must protect workers from hazardous dust levels and toxic metals that may be generated from both the blasting material and the underlying substrate and coatings being blasted.
- Click to reveal the slide transition listing the type of hazards associated with grit blasting.
- Explain that the manufacturer's data sheet for grit should be reviewed and understood prior to using the product. A copy should be available on site and will provide details of the type of grit being used and any specific health related hazards that material creates. Some abrasive grits contain silica which can cause cancers if ingested.
- Click to reveal the slide transition listing control measures associated with each hazard.

- Explain that approved supplied air systems are to be used while performing grit blast operations. Air system filters should be checked daily and replaced if necessary.
- Explain that Personal Protective Equipment such as ear defenders, hoods, gloves, long sleeve shirts and trousers should be worn.
- Explain that persons not involved with grit blast operations should not enter the work area.
- Emphasise that additional training is required for a person to be deemed competent.

Trainer to reveal the next slide.

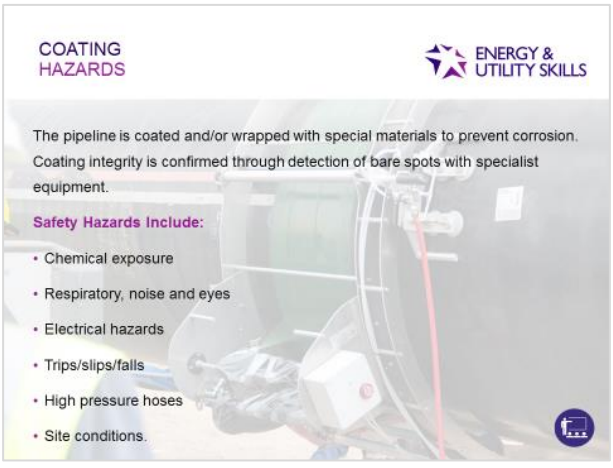
Trainer's notes:

Controls may also include:

- Substitution - use a less toxic abrasive blasting material, use abrasives that can be delivered with water (slurry) to reduce dust.
- Isolation and Containment - use barriers and curtain walls to isolate the blasting operation from other workers, use blast rooms or blast cabinets for smaller operations, use restricted areas for non-enclosed blasting operations, and keep other workers away from the blaster.
- Ventilation - Use exhaust ventilation systems in containment structures to capture dust.

For more information see: https://www.osha.gov/Publications/OSHA3697.pdf

Slide 7 – COATING HAZARDS



Trainer to:

- Explain why coating is needed and that during coating, the pipeline is coated and/or wrapped with special materials to prevent corrosion. Coating integrity is confirmed through detection of bare spots with specialist equipment.
- Explain that the hazards include:
  - Chemical exposure.
  - Respiratory
  - Noise/eyes.
  - Electrical hazards, trips/ slips or falls.

- High pressure hoses – wherever used is considered hazardous should it be dropped or misdirected
- Site conditions - where they could become wet, muddy or have loose ground.

- Highlight the control measures that should be used to safeguard the workforce on site during coating operations. Control measures include:
  - Manufacturer's data sheet for epoxy coating shall be reviewed and understood prior to using product. Copy to be on site.
  - Personnel protective equipment (eye, hand, respiratory) to be used when handling product.
  - Product inventory to be kept.
  - Required disposal standards and methods to be used for containers brushes, rollers, rags etc.
- Emphasise that additional training is required for a person to be deemed competent.
- Reveal the next slide.

Trainer's notes:

A pipeline coating is a cost effective and viable solution to maintain pipeline integrity. This coating provides a constant protective lining that helps save pipelines from the damaging effects of corrosion. Pipeline coating is one of the most reliable corrosion prevention methods used by industries today.

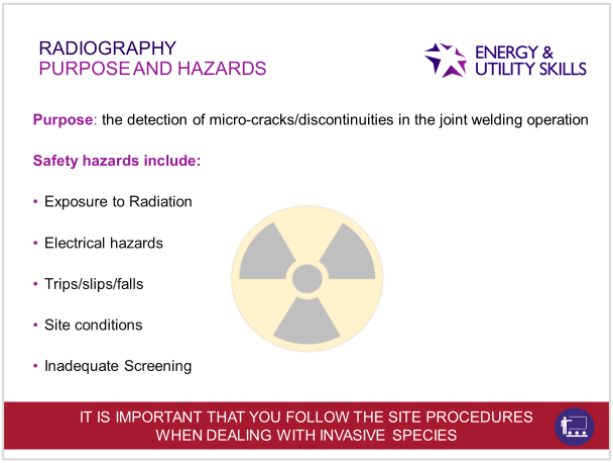
DID YOU KNOW?

Fusion bonded epoxy (FBE) coatings are the most popular coating systems because they:

- Are excellent insulators
- Are hydrocarbon, acid, and alkali resistant
- Are unaffected by temperature
- Do not require a primer
- Can be applied over finished welds (field joint)

Tape-coating systems and coal-tar enamel systems are becoming less popular. Tape coating is difficult to apply and is especially difficult to use on large-diameter pipe. A number of tape-coated systems have experienced failures over relatively short spans of time because of improper application. Coal-tar epoxy is becoming less desirable because of some health and environmental concerns caused during application.

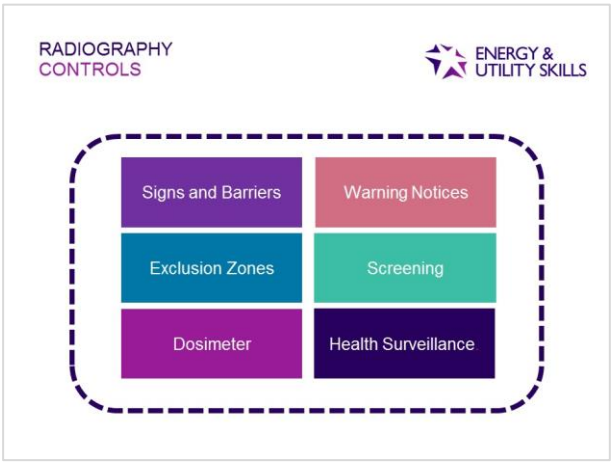
SLIDE 8 – RADIOGRAPHY | PURPOSE AND HAZARDS



Trainer to:

- Display the title slide only 'Radiography – purpose and hazards'.
- Ask the group: 'What is the purpose of radiography in the joint welding operation?'
- Click to reveal the slide transition summarising the purpose.
- Ask the group: 'What safety hazards might the use of radiography present?'. Refer to the Trainer Notes for more information.
- Click to reveal the safety hazards and discuss.
- Click to reveal the final slide transition (red banner) and emphasise its importance.
- Reveal the next slide.

Slide 9 – RADIOGRAPHY | CONTROLS



Trainer to:

- Ask the group: 'What controls can we put in place to eliminate the hazards associated with radiography?'
- Write the controls as they are called out onto a flipchart, correcting any wrong suggestions.
- Click through the slide transitions to reveal the 6 types of control, referring to the answers on the flipchart where they match.
- Explain that on-site controls must include Signs, Barriers and Warning Notices to inform everyone on site and establish restricted access areas and/or Exclusion Zones. The activity must also be screened to prevent any radiation affecting anyone close to the area.
- Explain that regular health monitoring of workers undertaking this activity should include the use of personal dosimeters that check the levels or radiation that the worker is being exposed to. Records of levels should be retained for longer term health surveillance of these workers.
- Reveal the next slide.

Trainer's notes:

Radiographic and ultrasonic weld inspection are the two most common methods of non-destructive testing (NDT) used to detect discontinuities within the internal structure of welds. The obvious advantage of both these methods of testing is their ability to help establish the weld's internal integrity without destroying the welded component.

Radiographic Testing (RT) – This method of weld testing makes use of X-rays, produced by an X-ray tube, or gamma rays, produced by a radioactive isotope. The basic principle of radiographic inspection of welds is the same as that for medical radiography. Penetrating radiation is passed through a solid object, in this case a weld rather that part of the human body, onto a photographic film, resulting in an image of the object's internal structure being deposited on the film. The amount of energy absorbed by the object depends on its thickness and density. Energy not absorbed by the object will cause exposure of the radiographic film. These areas will be dark when the film is developed. Areas of the film exposed to less energy remain lighter. Therefore, areas of the object where the thickness has been changed by discontinuities, such as porosity or cracks, will appear as dark outlines on the film. Inclusions of low density, such as slag, will appear as dark areas on the film while inclusions of high density, such as tungsten, will appear as light areas. All discontinuities are detected by viewing shape and variation in density of the processed film.

Radiographic testing can provide a permanent film record of weld quality that is relatively easy to interpret by trained personnel. This testing method is usually suited to having access to both sides of the welded joint (with the exception of double wall signal image techniques used on some pipe work). Although this is a slow and expensive method of non-destructive testing, it is a positive method for detecting porosity, inclusions, cracks, and voids in the interior of welds. It is essential that qualified personnel conduct radiographic interpretation since false interpretation of radiographs can be expensive and interfere seriously with productivity. There are obvious safety considerations when conducting radiographic testing. X-ray and gamma radiation is invisible to the naked eye and can have serious health and safety implications. Only suitably trained and qualified personnel should practice this type of testing.

DID YOU KNOW?

Ionising radiation can break molecules into smaller fragments. These charged particles are called ions. Ions can then take part in other chemical reactions in the living cells. As a result, ionising radiation damages substances and materials, including those in the cells of living things. The ions themselves can take part in chemical reactions, spreading the damage. This may result in the living cells dying or becoming cancerous. Industrial radiography usually involves using intense radiation sources which can expose people at work to significant amounts of radiation. Gamma radiation sources, most commonly iridium-192 and cobalt-60, are used to inspect a variety of materials. Most use of radiography concerns the testing and grading of welds on pressurised piping, pressure vessels, high-capacity storage containers, pipelines, and some structural welds. Site radiography is only acceptable when it is not reasonably practicable to provide a shielded enclosure for radiographing articles. However, there are clearly situations in which site radiography is the only option, for example on in situ pipe work which is an integral part of process plant.

Contractors (including temporary workers and the self-employed) need to be given sufficient information on the work to be done as far in advance as possible. For example, the contractor will often need to inspect the plant in advance to plan for any difficulties which might arise. If access is difficult, radiographers will need a pre-determined safe location to control the exposure from. Localised shielding, barriers, warning notices and signals, site lighting and access routes may also need to be agreed or arranged well in advance of work starting.

Careful planning is particularly critical for complex site radiography work. This could be in a structure which can be accessed by several people on site to areas irradiated by the radiation source at different levels; where more than one radiography team is working simultaneously; or where the person changing films is not clearly visible from the control position. An effective communication system between the radiographer and assistants will be necessary to prevent misunderstandings.

Site radiography requires people to be excluded from the work area. Exposures must be kept as low as reasonably practicable by using temporary enclosures or localised shielding e.g. appropriate collimation, moveable panels, pre-formed shields, lead mats, bags of lead shot. Even earth mounds or a careful array of large drums filled with water can provide effective shielding. The size of the controlled area can be a major decision for both the client and contractor. It should not be so large that it is difficult to control. The boundary of the area must be supervised, to ensure that only authorised people may enter. In all cases, employers must have management control of any area in which their radiography work causes radiation controlled area conditions.

Slide 10 – ULTRASONIC NON-DESTRUCTIVE TESTING

Trainer to:

- Ask the group: 'Who can explain what ultrasonic non-destructive testing is?'
- Explain briefly the method of testing using ultrasonic testing. Refer to Trainer Notes for more information.
- Ask the group: 'What do you think are the advantages of using ultrasonic non-destructive testing compared to radiography?'
- Click to reveal the slide transition headed 'Advantages' and discuss.
- Explain the differences between radiographic and ultrasonic testing, with emphasis on the reduced health risks.
- Explain that while Radiographic Testing involves the use of potentially dangerous X-rays, Ultrasonic Testing uses sound waves, which are not harmful to health (the same method is used to monitor the development of the unborn baby during pregnancy).
- Explain that there are some hazards associated with Ultrasonic Testing.
- Click to reveal the slide transition headed 'Hazards' and discuss.
- Click to reveal the next slide.

Trainer's Notes:

Ultrasonic Testing (UT) – This method of testing makes use of mechanical vibrations similar to sound waves but of higher frequency. A beam of ultrasonic energy is directed into the object to be tested. This beam travels through the object with insignificant loss, except when it is intercepted and reflected by a discontinuity. The ultrasonic contact pulse reflection technique is used. This system uses a transducer that changes electrical energy into mechanical energy. The transducer is excited by a high-frequency voltage, which causes a crystal to vibrate mechanically. The crystal probe becomes the source of ultrasonic mechanical vibration. These vibrations are transmitted into the test piece through a coupling fluid, usually a film of oil, called a 'couplant'. When the pulse of ultrasonic waves strikes a discontinuity in the test piece, it is reflected back to its point of origin. Thus, the energy returns to the transducer. The transducer now serves as a receiver for the reflected energy. The initial signal or main bang, the returned echoes from the discontinuities, and the echo of the rear surface of the test piece are all displayed by a trace on the screen of a cathode-ray oscilloscope. The detection, location, and evaluation of discontinuities become possible because the velocity of sound through a given

material is nearly constant, making distance measurement possible, and the relative amplitude of a reflected pulse is proportional to the size of the reflector.

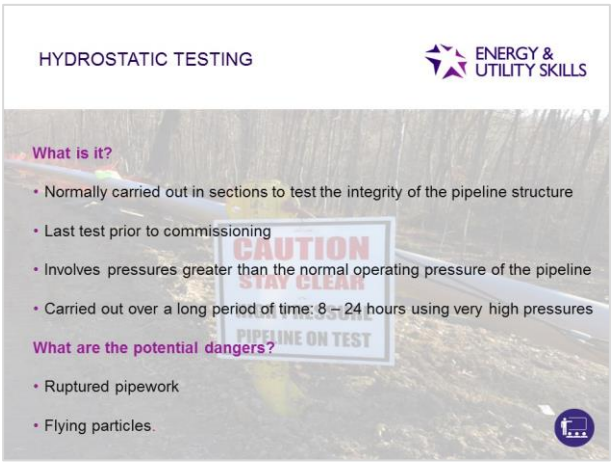
One of the most useful characteristics of ultrasonic testing is its ability to determine the exact position of a discontinuity in a weld. This testing method requires a high level of operator training and competence and is dependent on the establishment and application of suitable testing procedures. This testing method can be used on ferrous and non-ferrous materials, is often suited for testing thicker sections accessible from one side only and can often detect finer lines or plainer defects which may not be as readily detected by radiographic testing.

DID YOU KNOW?

X-rays are highly energetic waves, so they can interact with DNA and cells. This ability of X-rays always carry the risk of cancer.

Ultrasound waves are mechanical acoustic waves. Therefore, they do not carry any risks.

Slide 11 – HYDROSTATIC TESTING



Trainer to:

- Ask the group: 'What is Hydrostatic testing?' and establish if anyone in the group has any experience of Hydrostatic testing.
- Explain that a hydrostatic test is a way in which pressure vessels such as pipelines can be tested for strength and leaks.
- Read the bullet points on the slide.
- Emphasise the potential dangers in the second question on the slide: 'What are the potential dangers?' and facilitate a discussion of testing using pressurised water.
- Include why water is used, why lengthy time periods are involved, and which locations people should avoid (i.e. in front of any caps or potential blow out points).
- Further details are provided in the Trainer Notes below.
- Reveal next slide.

Trainer's Notes:

A hydrostatic test is a way in which pressure vessels such as pipelines can be tested for strength and leaks. The test involves filling the pipe system with a liquid, usually water, which may be dyed to aid in visual leak detection, and pressurisation of the vessel to the specified test pressure. Pressure tightness can be tested by shutting off the supply valve and observing whether there is a pressure loss. Strength is usually tested by measuring permanent deformation of the container.

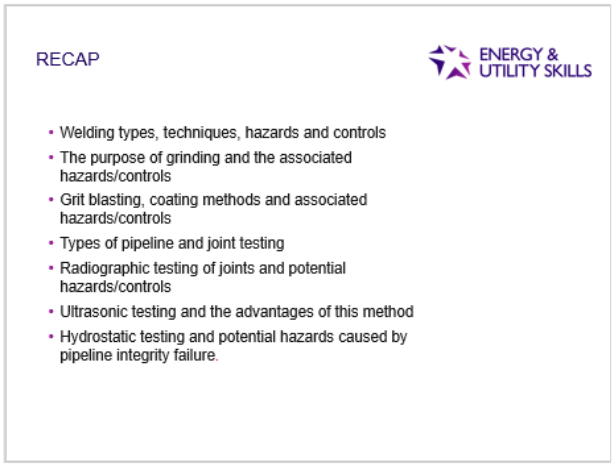
Hydrostatic testing is the most common method employed for testing pipes and pressure vessels. Using this test helps maintain safety standards and durability of a vessel over time. Newly manufactured pieces are initially qualified using the hydrostatic test. They are then re-qualified at regular intervals using the proof pressure test which is also called the modified hydrostatic test. Testing of pipelines is very important because weak points can explode if they fail under pressure

The length of time for the test is determined by the volume of the pipeline section being tested, but may be several hours, or even days.

Testing equipment will be connected and operated by specialists who are competent to perform that role. All other operatives will need an awareness of the high pressures involved, along with the potential for component failures and the need to keep clear and out of any barriered areas.

DID YOU KNOW?

Buried high pressure oil and gas pipelines are tested for strength by pressurising them to at least 125% of their maximum allowable working pressure (MAWP) at any point along their length. Since many long distance transmission pipelines are designed to have a steel hoop stress of 80% of specified minimum yield strength (SMYS) at maximum allowable operating pressure MAOP, this means that the steel is stressed to SMYS and above during the testing, and test sections must be selected to ensure that excessive plastic deformation does not occur.



Slide 12 - RECAP

Trainer to summarise the topics covered in Module 7.

Ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to reveal the next slide.

Slide 13 - MODULE COMPLETE

Trainer to remind the group to place any notes out of sight.

Exit the module presentation, navigate towards the training course menu and initiate the Module 7 assessment.

Traffic management

MODULE 8

This module identifies the need for, and the purpose of, a clear and comprehensive Traffic Management Plan for a pipeline construction site. It addresses typical pipeline site traffic management issues and looks at good practice in relation to site traffic safety.

There are 2 learning outcomes for this module:

LO1: Understanding the Traffic Management Plan

LO2: Understanding of travelling safely on a pipeline construction site

Within this module we will be looking at:

- The importance and purpose of a Traffic Management Plan
- Potential hazards created by moving people, vehicles and plant on-site
- Key features of a good Traffic Management Plan
- Driving on-site and authorisation
- Common pipeline site travel hazards
- Reporting hazards and risks

ACTIVITIES

The following outlines the activities within this module, indicating whether they are mandatory or optional.

Mandatory activities

- Traffic Management Plan

Optional activities

- Traffic Management Plan review

RESOURCES

The following outlines the general resources underpinning delivery of this section. All other resources are embedded in the module.

http://www.hse.gov.uk/pubns/indg199.pdf
http://www.hse.gov.uk/pubns/priced/hsg144.pdf
http://www.hse.gov.uk/construction/safetytopics/vehiclestrafficmanagement.htm
http://www.hse.gov.uk/construction/safetytopics/mobileplant.htm

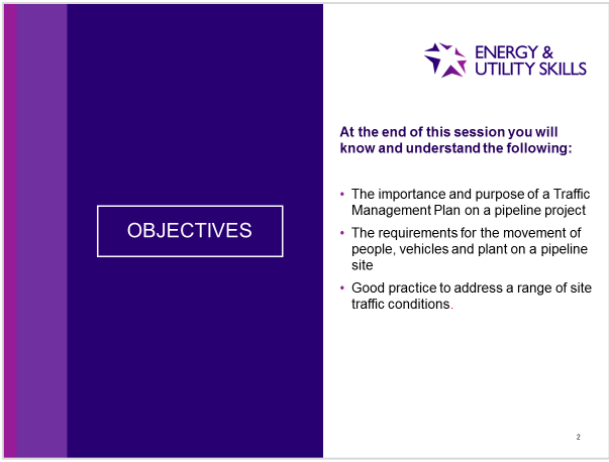
TRAFFIC MANAGEMENT

Approximate delivery time: 30 minutes

Slide 1 – TRAFFIC MANAGEMENT

Trainer to reveal the module title slide and explain that the module aims to develop an individual's understanding of the purpose of the Traffic Management Plan and working safely on a pipeline construction site.

Trainer to reveal the next slide.

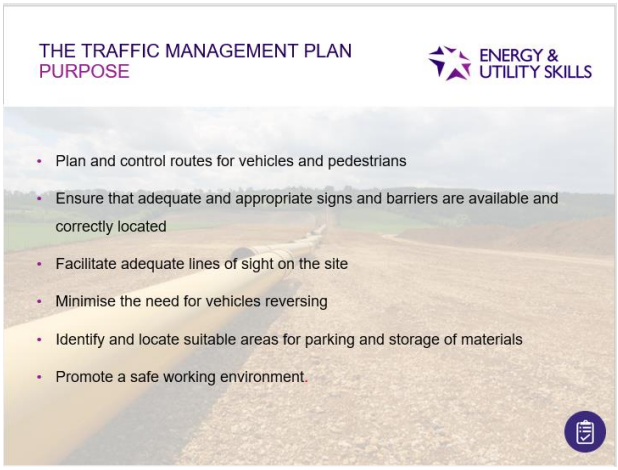


Slide 2 - OBJECTIVES

Trainer to briefly explain what will be covered in this module.

Trainer to remind the group that following completion of this module there will be an assessment.

Trainer to reveal next slide.



Slide 3 – THE TRAFFIC MANAGEMENT PLAN | PURPOSE

Trainer to:

- Display the title slide 'The Traffic Management Plan – purpose' and ask the group: 'What is the purpose of a Traffic Management Plan?'
- Facilitate a discussion.
- Click to reveal the slide transition and link the bullet points to the suggestions made by the group.
- Complete **Activity 18** – Traffic Management Plan.
- Reveal the next slide.

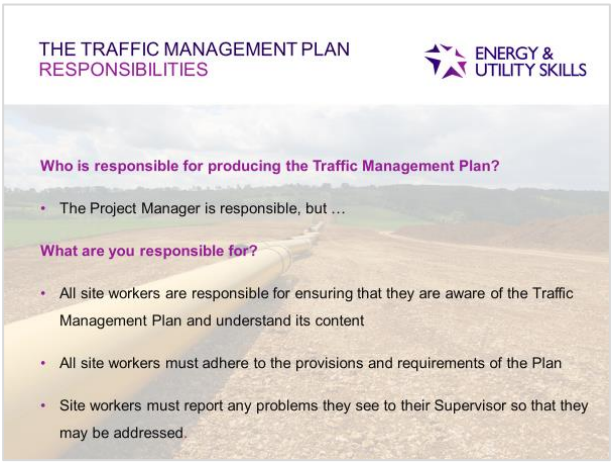
ACTIVITY 18 – Traffic Management Plan (8 minutes)

Resources: Flip chart and pen

Trainer to:

- Arrange the group into pairs or groups of 3 depending on the number of individuals in the group.
- Provide each group with a sheet of paper and a pen.
- Instruct the groups that they have **5 minutes** to write down one potential problem or issue relating to each of the bullets points displayed on the slide in front of them.
- Stop the groups after **5 minutes.**
- Ask each group to feedback their answers to the rest of the group and encourage discussion, ensuring that the potential problems suggested below are covered:
- Potential problems could include: *insufficient signage, traffic not following one-way system, loads dropped in wrong place, unsafe ground due to weather conditions, vehicles and pedestrians not properly separated, vehicles having to reverse unnecessarily, access routes blocked or obstructed, lines of sight restricted by obstacles, deliveries arriving outside of set times, inadequate protection of overhead lines.*

Slide 4 – TRAFFIC MANAGEMENT PLAN | RESPONSIBILITIES



Trainer to:

- Display the title slide only headed ‘Traffic Management Plan – Responsibilities’.
- Ask the group: ‘Who is responsible for producing the Traffic Management Plan?’
- Click to reveal the slide transition to display the question and the answer and explain that the Project Manager is responsible for producing the Traffic Management Plan and for making it available to all on-site.
- Ask the group: What are you responsible for?’ and facilitate a discussion.
- Click to reveal the slide transition listing individual responsibilities.
- Explain that everyone either working on the site, or those visiting to deliver materials or to carry out inspections etc. must be made aware of the Plan, and all are responsible for

reading it (asking for clarification if necessary) and moving around the site in accordance with the requirements of the Plan.

- If any problems or potential hazards are identified, all personnel are responsible for reporting them to their supervisor.
- Ask the group: 'What issues/problems might arise from this?' and facilitate a discussion.
- Click to reveal next slide.

Slide 5 – SITE TRAFFIC MANAGEMENT

Trainer to:

- Click to reveal only slide title, image and question 'What do you see?'
- Ask the group: 'What features in the photograph help identify what needs to be included in the Traffic Management Plan?'
- Facilitate a group discussion about the features in the photograph.
- Responses could include:

Separate compound, hard standing car park, storage facilities, pipes stored well away from compound and distributed in readiness.

- If time allows, discuss other aspects such as:

  Toilet location (maybe too near to vehicles?) and what to do about road crossing when the pipeline crossing is being prepared.
- Complete **Optional Activity** if appropriate for the group.
- Click to reveal slide transitions and explain that a good Traffic Management Plan will identify all site access routes for pedestrians, vehicles and plant.
- That it will establish the "rules" for movement on site; speed restrictions, delivery times, restricted areas and specific hazards such as overhead lines and/or unsafe ground etc.
- Explain that it is the responsibility of everyone on site to adhere strictly to the requirements of the Plan.
- Click to reveal the next slide.

OPTIONAL ACTIVITY – Traffic Management Plan review (5 minutes)

Resources: Traffic Management Plan (Trainer to provide own)

Trainer to hand a copy of the Traffic Management Plan to each individual.

Use a Traffic Management Map to explain the range of elements that would be included on a typical Map. Include: main access entry point to site, one-way system for vehicles, location of storage areas, pedestrian routes etc.

Slide 6 – DRIVING ON SITE | VEHICLES AND PLANT

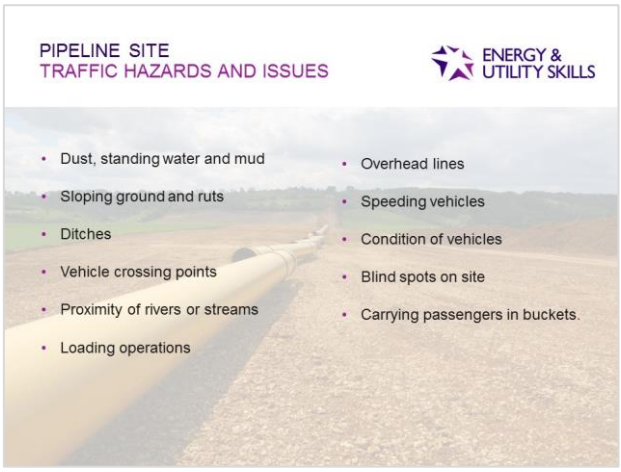
Trainer to:

- Ask the group: 'Who can drive vehicles on site?' and establish a consensus.
- Click the slide transition to reveal the answer and acknowledge those who answered correctly.
- Click the slide transition and ask the question: 'Does authorisation to drive on site cover all vehicles?' and establish a consensus.
- Click the slide transition to reveal the answer and acknowledge those who answered correctly.
- Click the slide transition and ask the question: 'What are typical requirements for authorisation?' and establish a consensus.
- Click the slide transition to reveal the answer and acknowledge those who answered correctly. Trainer to obtain a group consensus view before revealing the answers.

More information on traffic management on site may be found on:
http://www.hse.gov.uk/pubns/indg199.pdf

Trainer to reveal the next slide.

Slide 7 – PIPELINE SITE | TRAFFIC HAZARDS AND ISSUES



Trainer to:

- Encourage discussion relating to each bullet point listed on the slide when considering the hazards associated with the movement of people, vehicles and plant on a pipeline site.
- Ask the group 'What controls should be put in place to address each of the hazards listed?'
- Refer to Trainer Notes for more information.
- Reinforce the range of potential traffic hazards and issues associated with a pipeline construction project.
- Reveal the next slide.

Trainer's notes:

The range of hazards associated with the movement of people, vehicles and plant across an often wet and muddy spread are numerous. Minimising the risks and hazards posed by this movement requires careful planning, effective implementation, competent operation and a high level of concentration by all involved.

Site Traffic Hazards may be divided into three types:

Ground and Site Considerations

To include the state of the ground itself; dry and dusty ground may need dampening down with water to reduce dust that can reduce visibility, adversely affect machinery and pollute water courses.

Conversely, wet and muddy ground may need to be bolstered or reinforced with sawdust, woodchip or other material to avoid slipping and potential damage to equipment

Both these, weather related conditions may be exacerbated if the site has sloping ground, is near to water courses or contains natural ditches etc.

Features that merit special attention and require signage and barrier protection include overhead lines and crossing points, particularly where people, vehicles and/or plant are in proximity to each other.

Vehicle and Plant Operation

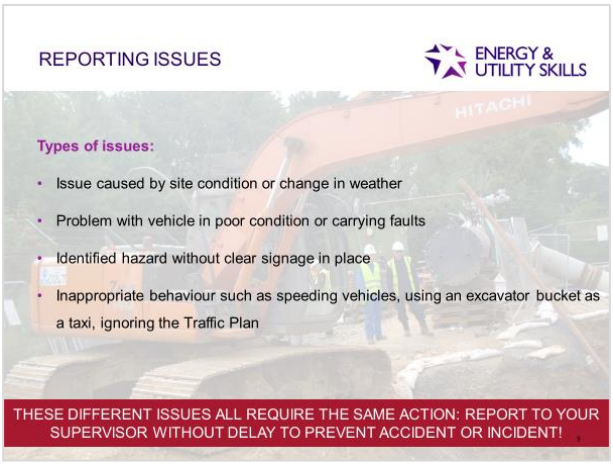
It is important that all vehicles and items of plant are maintained in good condition, with essentials such as tyres, lights and moving parts kept in good working order. Windscreens and mirrors need to be kept clean to enable good visibility and avoid accidents. Speed is always an important aspect and strict limits must be observed, with those ignoring site limits and other traffic controls (such as one-way systems) being reported to your supervisor.

Behaviour and Attitude

Underpinning the whole Traffic Management Plan is how people act on the content. Anyone behaving inappropriately on a Cross Country Pipeline spread is a risk both to themselves and to

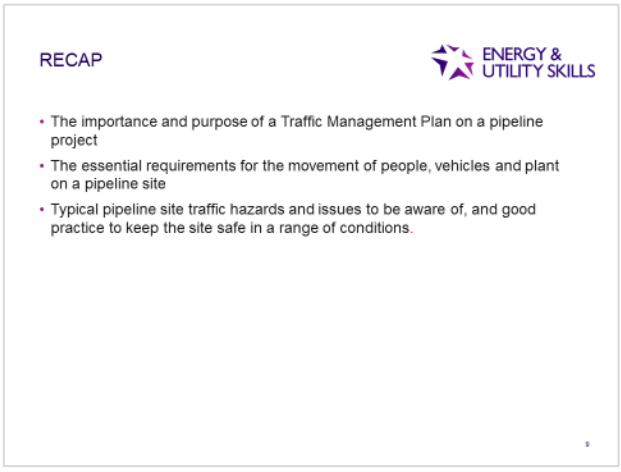
everyone else on site. Some examples of unacceptable behaviour include: speeding, ignoring signs and restrictions, using plant inappropriately (carrying people in an excavator bucket) and believing that the “rules” don’t apply to them. Any demonstration of this type of attitude must be reported before a hazard becomes an incident that could have been avoided.

Slide 8 – REPORTING ISSUES



Trainer to:

- Click to reveal the slide transition heading ‘Types of issues’.
- Ask the group to call out as many types of safety issues they can think of relating to a pipeline site (including people).
- Click to reveal the types of issues that can be found on a pipeline site and acknowledge those whose answers match the slide.
- Ask the group: ‘What should you do if you spot any of these issues?’
- Click to reveal the final slide transition (red banner) and emphasise the importance of reporting any of the issues described to their supervisor, as soon as possible, to prevent the issue turning into an accident or incident.
- Reveal the next slide.



Slide 9 – RECAP

Trainer to summarise the areas covered in Module 8.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group’s understanding of the topic areas.

Trainer to reveal the next slide.

Slide 10 - MODULE COMPLETE

Trainer to remind the group to place any notes out of sight.

Exit the module presentation, navigate towards the training course menu and initiate the Module 8 assessment.

Responding to emergencies

MODULE 9

This module develops individuals' understanding of emergency response behaviours, the role of reporting, inspection and enforcement of health and safety in the workplace, and the impact on employee and employer of both poor/improving health and safety in the workplace.

There are 3 learning outcomes for this module:

LO1: Practising emergency response procedures and reporting

LO2: Understanding roles and responsibilities with investigation and enforcement

LO3: Exploring impact on employee and employer

Within this module we will be looking at:

- Terms and definitions, e.g. recapping near-miss, accident
- Reporting processes including RIDDOR
- General emergency procedures
- Procedures for responding to emergency situations
- Role and powers of enforcement authorities
- The need to assist in all investigations
- Costs of poor health and safety/environmental management
- The effects of accident investigation
- The outcomes that flow from improved health and safety

ACTIVITIES

The following outlines the activities within this module, including whether they are mandatory or optional.

Mandatory activities

- RIDDOR categories
- Exiting the building
- Emergency spill kit
- What have you learned about Health and Safety?

Optional activities

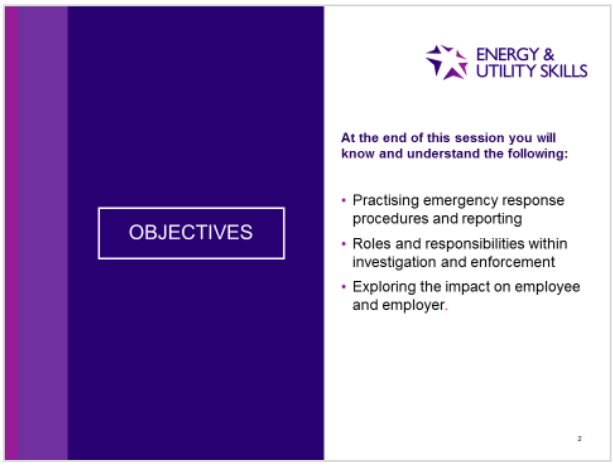
- Using fire extinguishers

Approximate delivery time: 40 minutes

Slide 1 - RESPONDING TO EMERGENCIES

Trainer to reveal the title slide and explain that the aim of Module 9 is to develop the individual's understanding of responding to emergencies.

Trainer to reveal the next slide.



Slide 2 - OBJECTIVES

Trainer to briefly explain that the Management of Health and Safety at Work Regulations 1999 covers emergencies (and that this is another regulation to fall from the HASAW umbrella).

Trainer to outline the objectives of Module 9.

Trainer to remind the group that following completion of this module there will be an assessment.

Slide 3 - NEAR-MISSES, ACCIDENTS AND REPORTING

Trainer to:

- Display the title slide only.
- Remind the group that we discussed the definition of a ‘near-miss’ and an ‘accident’ in Module 4.
- Ask the group ‘who can remember the definitions?
- Click to reveal the slide transition definitions and relate back to the groups definition.
- Click to reveal the slide transition to display the reporting process and facilitate a discussion.
- Complete **Mandatory Activity 19** – RIDDOR Categories.
- Explain that RIDDOR is the law that requires employers, and other people in charge of work premises, to report and keep records of:
    - work-related accidents which cause deaths
    - work-related accidents which cause certain serious injuries (reportable injuries)
    - diagnosed cases of certain industrial diseases; and
    - certain ‘dangerous occurrences’ (incidents with the potential to cause harm)
- Click to reveal the slide transition red banner and emphasise the importance of reporting ALL accidents.
- Reveal the next slide.

Trainer’s notes:

Near miss/’near hit’: incidents that could have resulted in injury, illness, or property damage, if given a different set of circumstances, but didn't. Near misses are also known as 'close calls.' Perhaps the better term to consider is 'near hit.'

Accident: an accident is the opposite of the fundamental intentions of a safety program, which is to find hazards, fix hazards, and prevent incidents. When we accept that accidents have no cause, we assume that they will happen again.

Employers should have a way to report and record accidents that allows a full investigation to take place. Only ‘responsible persons’ including employers, the self-employed and people in control of work premises should submit an accident report. The accident report must be available to all employees. The requirement to keep an accident book is a feature of the Social Security (Claims and Payments) Regulations 1979.

RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations) accidents should be clearly identified. Responsible persons should complete the appropriate online report form listed on the HSE website. The form will then be submitted directly to the RIDDOR database. You will receive a copy for your records.

ACTIVITY 19 – RIDDOR Categories (5 mins)

Resources: Trainer to print associate Activity Sheet, separating titles from information for the group to work through.

Trainer to:

- Arrange the individuals into groups of 3.
- Provide each group with a pre-populated sheet with 3 main areas of RIDDOR.

- Inform the group that the sheet contains information covered under 3 of the 4 main areas of RIDDOR, although the information won't be labelled:
    a) Serious injuries (specified injuries) – work related accidents which cause certain serious injuries (reportable injuries)
    b) Occupational diseases – diagnosed cases of certain work-related diseases
    c) Dangerous occurrences – incidents with the potential to cause harm.
- Instruct the groups that they need to match the information with the respective area of RIDDOR.

Expected answers:

- Serious injuries: *Fracture (except fingers, thumbs & toes); Amputation; permanent loss of sight; serious burns.*
- Occupational diseases: *Occupational Asthma; Occupational Dermatitis; Occupational Deafness; Hand Arm Vibration Syndrome.*
- Dangerous occurrences: *Plant or equipment coming into contact with overhead power lines; explosions or fire causing work to be stopped for more than 24 hours.*

Activity 19 Activity Sheet

a) Serious Injuries
b) Occupational Diseases
c) Dangerous Occurrences
Occupational Deafness
Permanent loss of sight
Serious burns
Occupational Asthma
Occupational Dermatitis
Plant or equipment coming into contact with overhead power lines
Fracture (except fingers, thumbs & toes)
Hand Arm Vibration Syndrome
Amputation
Explosions or fires causing work to be stopped for more than 24 hours

DID YOU KNOW?

The death of any person

All deaths to workers and non-workers, with the exception of suicides, must be reported if they arise from a work-related accident, including an act of physical violence to a worker.

Specified Injuries to workers

The classification of 'major injuries' has been replaced with a shorter list of 'specified injuries', work-related accidents which cause certain serious injuries. This includes, for e.g., fracture (other than to fingers, thumbs and toes), permanent loss of sight and crush injuries.

Over-seven-day incapacitation of a worker (except Northern Ireland)

Accidents must be reported where they result in an employee or self-employed person being away from work, or unable to perform their normal work duties, for more than seven consecutive days as the result of their injury (not counting the day of the incident). The report must be made within 15 days of the accident.

Over-three-day incapacitation (Northern Ireland)

Accidents must be recorded, but not reported, where they result in a worker being incapacitated for more than three consecutive days. If you are an employer, you must keep an accident book under the Social Security (Claims and Payments) Regulations 1979, which will be sufficient in recording the accident.

Non-fatal accidents to non-workers (e.g. members of the public)

Accidents to members of the public, or others who are not at work, must be reported if they result in an injury and the person is taken directly from the scene of the accident to hospital for treatment to that injury. Examinations and diagnostic tests do not constitute 'treatment' in such circumstances.

There is no need to report incidents where people are taken to hospital purely as a precaution when no injury is apparent.

Reportable occupational diseases

Employers and self-employed people must report diagnoses of certain occupational diseases, where these are likely to have been caused or made worse by their work: These diseases include (regulations 8 and 9):

- carpal tunnel syndrome
- severe cramp of the hand or forearm
- occupational dermatitis
- hand-arm vibration syndrome
- occupational asthma
- tendonitis or tenosynovitis of the hand or forearm
- any occupational cancer

- any disease attributed to an occupational exposure to a biological agent.

Reportable dangerous occurrences

Dangerous occurrences are certain, specified near-miss/near hit events. Not all such events require reporting. There are 27 categories of dangerous occurrences that are relevant to most workplaces, for example:

- the collapse, overturning or failure of load-bearing parts of lifts and lifting equipment.
- plant or equipment coming into contact with overhead power lines.
- the accidental release of any substance which could cause injury to any person.

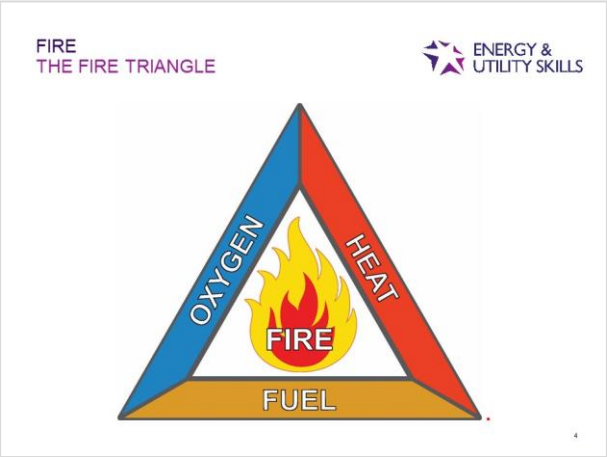
Specific to Gas - Reportable gas incidents

Distributors, fillers, importers and suppliers of flammable gas must report incidents where someone has died, lost consciousness, or been taken to hospital for treatment to an injury arising in connection with that gas. Such incidents should be reported using the HSE online form.

Registered gas engineers (under the Gas Safe Register) must provide details of any gas appliances or fittings that they consider to be dangerous, to such an extent that people could die, lose consciousness or require hospital treatment. The danger could be due to the design, construction, installation, modification or servicing of that appliance or fitting, which could cause:

- an accidental leakage of gas
- incomplete combustion of gas or
- Inadequate removal of products of the combustion of gas.

Slide 4 - FIRE | THE FIRE TRIANGLE



Trainer to:

- Introduce the Fire Triangle and explain how fire needs all three elements to exist.
- Explain that in order to understand how to address a fire emergency (and, for example, to understand how fire extinguishers work) you need to know how a fire works. The fire triangle illustrates this.
- Explain:
    - There needs to be enough oxygen to sustain combustion.
    - There needs to be enough heat to raise the material to its ignition temperature – e.g. electric arcs and sparks, static electricity, hot surfaces, friction and mechanical sparks, chemical reaction and sparks, spontaneous combustion.
    - There needs to be some sort of fuel or combustible material.
    - You then get the chemical reaction that is fire.
- Explain that essentially, fire extinguishers put out the fire by taking away one or more elements of the fire triangle. At its most basic, fire safety works on the principle of keeping fuel sources and ignition sources apart.
- Describe the scenario where a fire started and spread quickly e.g. Bradford City Stadium Fire – 1985*, Great Fire of London – 1666.
- Ask the group if they know of any similar scenarios. If so, what happened? (use the supporting notes below in the 'DID YOU KNOW?' facts)
- Facilitate a discussion.
- Reveal the next slide.

DID YOU KNOW? CASE STUDY - BRADFORD CITY STADIUM FIRE 1985*

The Bradford City stadium fire occurred during an English League Third Division fixture between Bradford City and Lincoln City on Saturday, 11 May 1985, killing 56 and injuring at least 265.

The Valley Parade stadium, long-established home to Bradford City Football Club, was known for its antiquated design and facilities, including the wooden roof of the main stand. Warnings had been given about a major build-up of litter just below the seats. The stand had been officially condemned and was due for demolition.

The match against Lincoln City had started in a celebratory atmosphere, with the home-team receiving the Football League Third Division trophy. At 3.40 p.m., a small fire was reported by TV commentator John Helm, but in less than four minutes, in windy conditions, it had engulfed the whole stand, trapping some people in their seats.

In the panic that ensued, fleeing crowds had to break down locked exits to escape, and many were burnt to death at the turnstiles, which were also locked. There were many cases of heroism, with more than 50 people receiving police awards or commendations.

The disaster led to new safety standards in UK football grounds, including the banning of new wooden grandstands.

DID YOU KNOW?

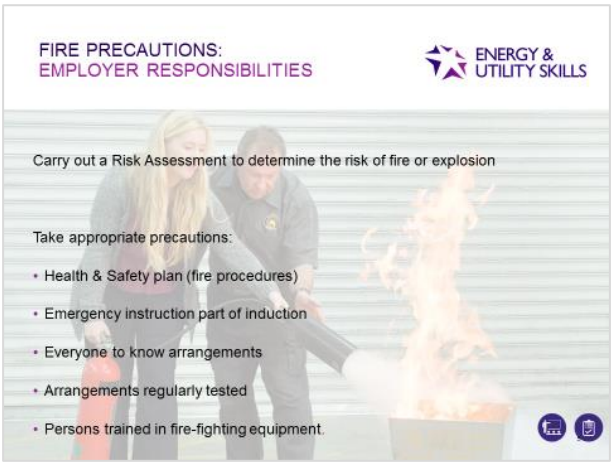
Fire is FAST! In less than 30 seconds a small flame can turn into a major fire. It only takes minutes for thick black smoke to fill a house or for it to be engulfed in flames.

Fire is HOT! Heat is more threatening than flames. Room temperatures in a fire can be 100 degrees at floor level and rise to 600 degrees at eye level. Inhaling this super-hot air will scorch your lungs and melt clothes to your skin.

Fire is DARK! Fire starts bright, but quickly produces black smoke and complete darkness.

Fire is DEADLY! Smoke and toxic gases kill more people than flames do. Fire produces poisonous gases that make you disoriented and drowsy. Asphyxiation is the leading cause of fire deaths, exceeding burns by a three-to-one ratio.

Slide 5 - FIRE PRECAUTIONS | EMPLOYER RESPONSIBILITIES



Trainer to:

- Click to reveal the Employer's responsibilities.
- Explain that the employer is responsible for assessing the risk of fire or explosion, and taking preventative measures.
- Explain that fire procedures should form part of the Health and Safety Plan and everyone should know the emergency arrangements. This should be part of the company induction for new starters and plans should be tested regularly. There will be people trained in the use of fire extinguishers and other equipment.
- Ask the group a list of questions to encourage discussion.
- Explain that this is a 'test' of what they know about their own organisation:
    - What happens if the fire alarm is raised?
    - Who calls the emergency services?
    - Who is your competent person that takes control in the event of an emergency?

- What do you do with any plant that is working (e.g. isolation, emergency shutdown, making any processes safe?)
- Do you know your emergency fire plan?

- Remind the group: 'if you don't know the answers, you should! You should have been trained in your organisation's emergency procedures.'
- Complete **Mandatory Activity 20** – Exiting the Building.
- Reveal the next slide.

DID YOU KNOW?

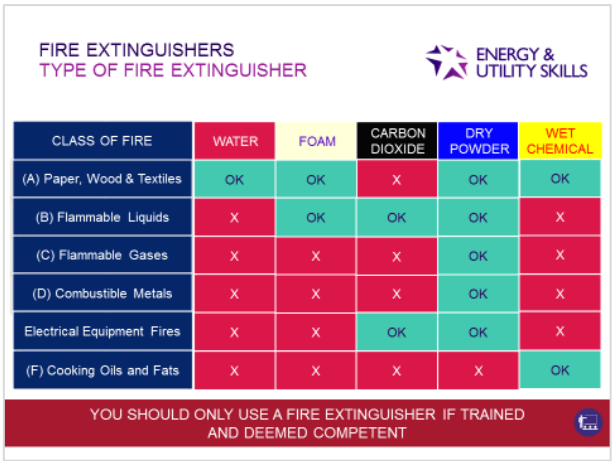
The marked fire exit isn't always the quickest way to exit a building. When you are somewhere which is unfamiliar, ALWAYS check out your NEAREST EXIT. It could be the entrance you came in (not necessarily fire stairs or exit). Entrance doors are not marked as FIRE EXITS, but they could be your quickest route out. Plan your exit!

ACTIVITY 20 – Exiting the Building (8 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Arrange the group into 3 groups and ask each to plan their exit from this building.
- Explain that their exits need to be based on the quickest exit route and from information they noticed on their way in to the building this morning (5 mins).
- Remind the group to **ALWAYS** check out your nearest exit route whenever you enter an unfamiliar building.
- Stop the group after 5 minutes and feedback their route to the rest of the group.
- Discuss the importance of checking your exit route from an unfamiliar building.



CLASS OF FIRE	WATER	FOAM	CARBON DIOXIDE	DRY POWDER	WET CHEMICAL
(A) Paper, Wood & Textiles	OK	OK	X	OK	OK
(B) Flammable Liquids	X	OK	OK	OK	X
(C) Flammable Gases	X	X	X	OK	X
(D) Combustible Metals	X	X	X	OK	X
Electrical Equipment Fires	X	X	OK	OK	X
(F) Cooking Oils and Fats	X	X	X	X	OK

Slide 6 - FIRE EXTINGUISHERS | TYPE OF FIRE EXTINGUISHER

Trainer to:

- Display the title slide only.
- Where appropriate, complete **Optional Activity** – Using Fire Extinguishers.
- Reveal the next slide transitions.
- Click to reveal the last slide transition and the red banner emphasising the importance on only using a fire extinguisher if you are trained and deemed competent.

- Reveal the next slide.

OPTIONAL ACTIVITY – Using Fire Extinguishers (8 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Arrange the group into pairs.
- Provide each pair with a piece of flipchart paper and pen.
- Ask each pair to draw a grid and include the types of fire extinguisher appropriate for each type of fire listed, placing an X (not suitable) or an OK (suitable) next to each one as appropriate. (Allow 5 minutes)
- Stop the group after 5 minutes and ask each pair to feedback their answers.
- Click the slide transition to reveal the correct answers.

DID YOU KNOW?

Why aren't all fire extinguishers dry powder? Dry powder fire extinguishers can choke a fire out, but they do not have a very good cooling effect, so if the fire is not 100% extinguished it could return. You must also be careful not to inhale the powder, so do not use these extinguishers in a confined space. Clean-up can be arduous too – the powder can damage soft furnishings, like carpets and fabrics, and computer hard drives.

What happens if you use water on an electrical fire? The danger of using a water fire extinguisher on an electrical fire is that you put yourself at risk of receiving an electric shock. Water conducts electricity, and although the fire may be preoccupying your thoughts and appear to be the only danger, there is still an electrical current to deal with. Water fire extinguishers have a low firefighting rating because they are cumbersome (to cope with more aggressive fires) and can only be used on certain types of fire. Environmentally friendly additives, however, can be found in some types of water extinguisher that reduce their conductivity, making them safe to accidentally use on an electrical fire.

Never, ever use a fire extinguisher unless you are trained to do so and deemed competent. You must 'get out, stay out, call out'.

Slide 7 - HEALTH & SAFETY (FIRST AID) REGULATIONS (1981)

Trainer to explain that when it comes to First Aid, there are a few things that every member of staff must know.

These include: Who are your first-aiders? Where are they? Where's the kit? What is your company procedure for reporting accidents? What is the emergency response procedure?

Trainer to click to reveal all of the slide transitions.

Trainer to explain that this should be in line with what we have seen already under RIDDOR.

Trainer to facilitate a 5-minute discussion by asking the group:

- WHAT they think an employer must provide and WHAT first aid provision is required?
- WHO in the group knows who their first aiders are?

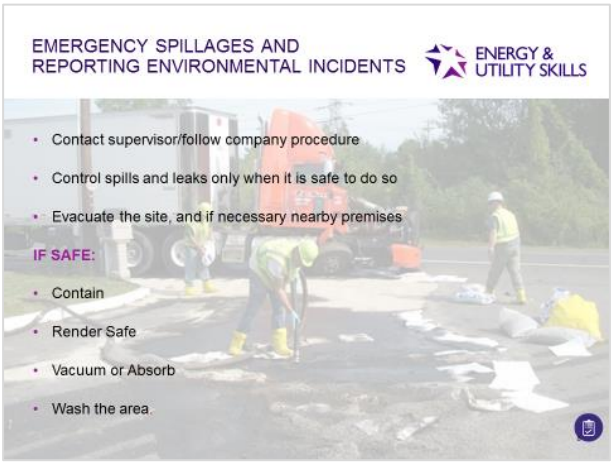
Trainer to explain you should know who the first aiders are and where to find them.

- WHERE – are the first aid supplies are?

Trainer to explain that they need to know the location.

Trainer to reiterate: Do you know all you need to? If not, make it a priority to find out when you get back to work.

Slide 8 - EMERGENCY SPILLAGES AND REPORTING ENVIRONMENTAL INCIDENTS



Trainer to:

- Display the title slide only.
- Explain that staff should be trained in the duties they need to perform in the event of an emergency spillage, and on-site emergency plans address procedures for dealing with emergency situations involving loss of containment in general terms.
- Ask the following key questions:
    - Who informs the emergency services?
    - Who informs the local authorities?
    - Who is responsible for any evacuation procedure?
- Reveal the slide transition.
- Complete **Activity 21** – Emergency Spill Kit.
- Reveal the next slide.

DID YOU KNOW?

What to do in the event of a spillage? In simple terms there are three basic steps to carry out in the event of an emergency spillage:

1. Raise the alarm.
2. Control the spill and/or leak only when safe to do so.
3. Evacuate the site and nearby premises if the spill/leak can't be controlled.

However, of course, it's never that easy is it? Let's look at the procedure in more detail:

- First raise the alarm, before tackling the spillage if, and only if, it is safe to do so. Evacuate the immediate area and, if necessary, the wider area as well.
- Spills involving hazardous substances should first be contained to stop it spreading, thereby minimising the effects and limiting danger to people, environment and property.

This may involve the use of temporary diking, sand bags, dry sand, earth or proprietary booms/absorbent pads.

- If you can, treat with other chemicals to render the spill safe, either by diluting it down or by stabilising it.
- Do not brush up powders. Always absorb them or vacuum them and then dispose into an inert carrier bag to allow it to be disposed of safely.
- Of course, prevention is the best approach so always keep work areas clean and tidy. Do not allow waste to accumulate.
- Maintain fire hoses and extinguishers in good condition.

Emergency procedures for major chemical spills:

1. Avoid breathing vapours.
2. Quickly identify the spilled material if you can do so safely.
3. If the spill involves a flammable liquid, turn off all ignition sources if you can do so safely.

Alert people in the area and evacuate, closing all doors.

ACTIVITY 21 – Emergency Spill Kit (8 minutes)

Resources: Flipchart & pen, blank paper

Trainer to:

- Arrange the group into groups of 3/4 individuals depending on the size of the group.
- Provide each group with a sheet of flipchart paper and a pen.
- Ask the group, 'What is contained in your emergency spill kits? And what are their uses?' and write down their answers on the flipchart provided.
- Stop the group after 5 minutes.

Expect to see:

- Absorbent pads – to absorb liquids.
- Absorbent socks – to circle spills and contain liquids.
- Pillows – like pads but absorb a higher volume of liquid.
- Goggles – should be worn when cleaning up spills to protect the eyes.
- Gloves – protective gloves to protect from hazardous materials.
- Bags with ties – to dispose of used absorbent material.

AND LAST BUT NOT LEAST - Instruction sheet – each spill kit should have instructions.

- Ask the groups to feedback their suggestions to the rest of the group.
- Provide feedback.

Slide 9 - ROLE AND POWER OF HSE ENFORCEMENT INSPECTORS

Trainer to:

- Display the title slide only.
- Explain that the Health & Safety Executive (HSE) inspectors have a range of rights and powers.
- Click to reveal the slide transition to display the Enforcement Inspector's rights and powers.
- Explain if they suspect a health and safety breach, they are well within their rights to pay you a visit with no warning at any "reasonable time of day". They can interview you and you must co-operate. They are able to issue enforcement notices and investigate accordingly, including removing documents (including confidential ones), articles and substances. They can take photographs and will expect your assistance.

If the HSE visits your workplace and finds that you are in material breach of health and safety law, you will have to pay for the time it takes them to identify what is wrong and to help you put things right. This is called a fee for intervention (FFI). If you do not break the law, you won't pay anything. The fee payable is £124 per hour and will be based on the amount of time it takes HSE to identify and conclude its regulatory action in relation to the material breach.

Explain that if you are found to be in breach of H&S regulations, you can spend up to twelve months in prison and be fined up to £20,000. In Crown or High Court, the fine is unlimited. The total costs can be much more far-reaching. For example, the stress and emotional toll on you and your family.

Click to reveal the final slide transition and read the red banner to reinforce the point made in this section.

Reveal the next slide.

DID YOU KNOW?

On 1 February 2016, the new sentencing guidelines for health and safety offences came into force. They direct the courts to consider the sentencing of offending organisations by way of a step-by-step approach, primarily examining culpability, the seriousness of harm risked and the likelihood of harm, which are divided into a number of different levels to reflect the scale within each category. In light of a number of preceding Court of Appeal judgements expressing the same view, the guidelines now require an assessment of turnover, in order to set a starting point for a fine that is intended "to bring the message home to

the directors and shareholders of offending organisations", as stated by the Judge in the environmental prosecution of Thames Water. The majority of the other sentencing steps relate to the consideration of increasing or decreasing the level of fine according to a range of factors. There are similar guidelines for the sentencing of individuals for health and safety offences, with a stronger focus on the risk of a custodial sentence for those found guilty of serious breaches.

Ever since the Sentencing Council proposed these new guidelines, the health and safety industry has anticipated a revolutionary impact on the levels of fines, compared to those that have historically been handed down for simple health and safety breaches committed by corporate entities. Although we are still in an initial phase, we can begin to analyse the influence the guidelines have had on the courts to date and we can also consider the extent to which they may affect future sentencing trends.

The Guidelines in Practice

February 2016 heralded a new era in sentencing for health and safety offences. On the 8th of the month, ConocoPhillips (UK) Limited became the first very large organisation to be convicted and sentenced under the new regime, although the hearing actually commenced prior to the date on which the new guidelines came into force. The company, which has a turnover of £4.8 billion, pleaded guilty to three breaches of relevant health and safety regulations, for a series of uncontrolled and unexpected gas releases at one of its offshore installations.

Although nobody was actually injured as a result of the breaches, due to a communication breakdown workers were sent to investigate the incident while there was still gas present. When sentencing, the Judge commented that the risk of death or serious injury would have been extremely high had there been a gas ignition. In applying the guidelines, this may have been regarded as a Harm Category 1 case due to the seriousness of the harm risked and the high likelihood of harm.

Although the company had procedures and safeguards in place, the Judge noted there was a failure to properly identify and control risks. The level of culpability in this case may have been classed as "Medium" as systems were in place but they were not sufficiently adhered to or implemented.

A number of cases heard weeks before the Guideline came into effect also illustrated the prescriptive and uniform approach to be adopted by the courts (in the spirit of the 2016 Guidelines) for health and safety breaches. Four different Crown Courts imposed fines of £1m or more against large companies for health and safety breaches (all of which followed early guilty pleas):

Company	Date	Injury	Company	Fine
Port Operating Company	21 January 2016	Arm injury	£25m turnover	£1.8m
Large Contracting Company	25 January 2016	Fatality	£8.8bn group turnover	£1m
Company C	25 January 2016	Broken leg	£3bn turnover	£1m
Large Energy Company	26 January 2016	Fatality	£1bn turnover	£1m

Slide 10 - ENVIRONMENT AGENCIES

Trainer to explain that each nation of the UK has their own environmental authority.

Trainer to click though the slide transitions to reveal the bullet points and read each authority and the country to which they operate.

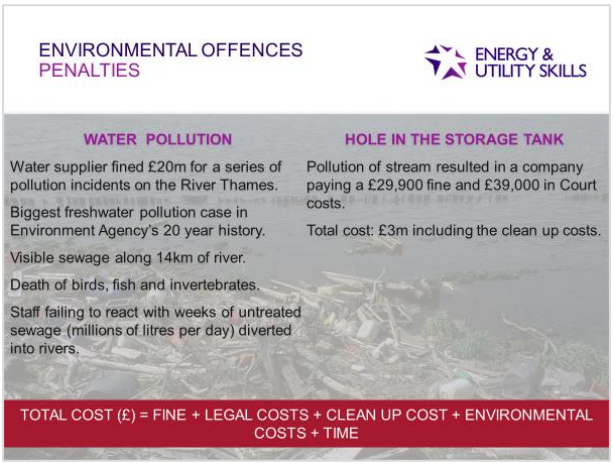
Trainer to explain that:

The Environment Agencies' responsibilities include:

- Works in flood risk areas.
- Works with potentially polluting activities.
- Works affecting rivers and groundwater.
- Regulates major industry and waste.
- Treatment of contaminated land.
- Authorisations and permits.
- Enforcement.
- Advisory role.

Trainer to reveal the next slide.

Slide 11 - ENVIRONMENTAL OFFENCES | PENALTIES



Trainer to:

- Describe the costs caused by damage to the environment.
- Reveal the slide transition to display the heading 'water pollution'.
- Facilitate a discussion with the group relating to the penalties displayed on the slide.

- Reveal the next slide transition headed ‘Hole in the storage tank’ and facilitate a discussion.
- Reveal the final slide transition and read the red banner to describe how the costs accumulate.
- Reveal the next slide.

Source: https://www.gov.uk/government/news/thames-water-ordered-to-pay-record-20-million-for-river-pollution

DID YOU KNOW?

The Guardian reported in May 2017 that Businesses are paying between £1,500 and £375,000 in “enforcement undertakings” as an alternative to prosecutions for breaking environmental laws by polluting rivers, breaching permit conditions or avoiding recycling. The money on the new list of enforcement undertakings from 26 companies – including six paying six-figure sums – totals £1,535,992.

It will go to 30 charities and projects to clean up stretches of rivers and restock waterways with native species, and for community groups to invest in public parkland, the Environment Agency said.

£375,000 was paid by Northumbrian Water for pumping raw sewage into a tributary of the River Tyne, while Anglian Water Services has made two separate payments of £100,000 for pollution incidents that killed fish.

The six-figure fines:

- Northumbrian Water £375,000
- Filippo Berio UK £253,906
- Anglian Water Services two payments of £100,000
- Heineken UK £160,000
- Kerry Ingredients UK £127,975
- Sandoz £120,932

The sentencing guidelines for environmental offences (effective from 2014):

- Organisations can be fined between £100 and £3 million.
- If tried at Crown Court unlimited fine maximum.
- If tried in Magistrates Court £50,000 maximum.
- Individuals can be given between a conditional discharge and up to 3 years custody.
- Could be sentenced to 5 years custody and/or unlimited fine if tried in Crown Court.
- Or if tried in a magistrates court between £50,000 and / or 6 months custody.

Slide 12 – HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT | EFFECTS WHEN NEGLECTED

Trainer to display the title slide only - 'effects when neglected'.

Trainer to ask the group to call out some suggestions and then click to reveal the bullet points and relate them back to the group's answers.

HSE statistics reveal the human and financial cost of failing to address health and safety. Each year:

- Millions of working days are lost due to work-related illness and injury.
- Thousands of people die from occupational diseases.
- Around a million workers self-report suffering from a work-related illness.
- Several hundred thousand workers are injured at work.
- A worker is fatally injured almost every working day.
- Organisations can incur further costs – such as uninsured losses and loss of reputation.

Trainer to reveal the next slide.

Slide 13 – HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT | BENEFITS FOR EMPLOYERS AND EMPLOYEES

Trainer to:

- Display the 'benefits for employers and employees' title slide only.
- Trainer states addressing health and safety should not be seen as a regulatory burden: it offers significant opportunities.
- Ask the group to call out some suggestions and then click to reveal

the bullet points and relate them back to the group's answer.

- Explain that addressing health and safety should not be seen as a regulatory burden: it offers significant opportunities.
- Complete Activity 22 – What have you learnt about health & safety?

DID YOU KNOW?

The Ken Woodward Story (as explained by Ken himself). In November 1990 Ken Woodward was working at a Coca Cola Schweppes factory in Sidcup, Kent (UK). He was an acting Team Leader on a line handling returnable bottles at the time of the accident.

When changing product from one drink to another, the lines have to be cleaned and sterilised. A CIP clean was the process used to keep the drink production system clean.

The normal chemical they used was a proprietary cleaner called "Solchlor", a mixture of Caustic Soda and Sodium Hypochlorite (bleach). They ran out of the pre-mix solution several weeks before, instead opting to mix their own by ordering the chemicals separately. As the mixing machine was broken the process was carried out in open containers. Despite a couple of unreported near-misses, this cheap shortcut had become the norm.

On the day of Ken's accident, he was asked at the end of his shift to carry out the CIP clean. He had never done this before, but was prepared to help his boss and make sure the day shift didn't have to do it. Although experienced staff were around, there was that feeling of anxiety to get home as the end of the shift drew closer.

Ken tried to find the appropriate personal protective equipment (PPE) (a chemical suit and eye goggles) but there was nothing available. He later found out that the chemical suit was in such a poor condition it would have been unusable anyway.

When the two chemicals were mixed together there was an instantaneous violent reaction that flew in to Ken's face – just 18 inches away from the explosion. The reaction was so extreme it hit the 70ft high factory ceiling. His life was saved by his colleagues who manhandled him into a nearby emergency shower and held him in while he struggled to get out.

The last person Ken would ever see was his friend and manager Grahame Norris.

Ken was severely burned and eventually it was confirmed that he had lost his sight (his eyes had to be removed), his sense of smell and sense of taste (absent, except from the occasional really strong curry).

"The subsequent investigation revealed that there had been at least two previous near misses that were not investigated properly…"

Many of his colleagues were severely traumatised by what they had witnessed at their shift changeover time and needed counselling. Lee Birks (Ken's closest friend) blamed himself for not stopping Ken carrying out the procedure he knew little or nothing about. Although he saved Ken's life by holding him in the shower, he never truly came to terms with letting his friend down.

The subsequent investigation revealed that there had been at least two previous near misses that were not investigated properly and merely put down to operator clumsiness. A lab test had been carried out on the CIP process used at the plant, the results of which were sent via internal mail and arrived 7 hours too late after Ken's accident. Had they been transmitted to the plant immediately; the accident would never have occurred.

The chemical reaction was found to be down to stabilisers in the two chemicals that acted as catalysts in the resulting exothermic reaction.

Safety glasses would have saved Ken's eyesight.

The company was fined under COSHH regulations. It is estimated that after lost production time, compensations and fines the company took a total financial loss of £2.6 million. They changed their systems and procedures and introduced their Zero Accident Behaviours (ZAB) programme, using Ken and Lattitude Safety consultant Martin Woodall to change the way they thought about and acted upon safety. One site not only stopped their annual fatality record, but had a motivated workforce that increased productivity by 15%, working safer than ever before. The company went from a “Chase the case” culture to a safe behaviours culture.

Since his accident Ken has:

- Ridden a Harley Davidson motorcycle.
- Been tandem freefall parachuting.
- Driven at over 90mph around a race track.
- Learned how to play guitar.
- Abseiled three times.
- Lectured in Europe, Asia, North America and Australasia.
- Was key note speaker at the 2002 IOSH Conference.
- Presented to 1420 people in a single training session in Ireland.
- Flew a plane around the British Isles to raise funds for the RNIB.
- Landed on Blackpool beach in a helicopter.

In one year: made 112 flights, 19 overseas trips and 285 presentations to stop others being hurt.

DID YOU KNOW?

Mid & West Wales Fire & Rescue recognised that its leadership must demonstrate accountability for H&S:

- The director of service policy and planning was nominated as the health and safety director for the service
- The director implemented a revised health and safety framework, which included a programme of fire station visits to engage the workforce, and placed a renewed emphasis on improving incident reporting, investigation and monitoring procedures.

The service has reported:

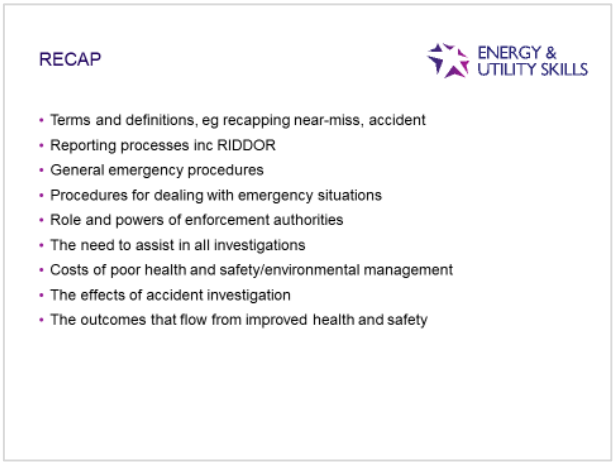
- £100,000 reduction in insurance liability premiums in one year through improved corporate strategic risk management;
- 50% reduction in sickness absence through work related injury over a two year period;
- 50% reduction in injury incidence rate over a three year period.

ACTIVITY 22 – What have you learnt about health and safety? Resources:
None Required.

Trainer to suggest: Let’s end on a positive note. What does health and safety mean to you NOW?

Trainer to ask each individual what health and safety means to them, and if there’s anything they would change about their own (or someone else’s) behaviour following this programme?

Trainer to provide feedback and comment as appropriate.



Slide 14 - RECAP

Trainer to summarise the topic areas covered in Module 9.

Trainer to ask the group if they have any questions; this will provide an opportunity for the trainer to formatively assess the group's understanding of the topic areas.

Trainer to remind the group to place any notes out of sight.

Trainer to administer the assessment for Module 9.

Slide 15 - MODULE COMPLETE

Trainer to exit module presentation, navigate towards the 'training materials' menu and initiate module assessment.

Trainer to thank the delegates for their involvement in today's programme and wish them a safe onward journey.