HSE
Health and Safety Executive

Safe work in confined spaces

Confined Spaces Regulations 1997

Approved Code of Practice and guidance

L101 (Third edition, published 2014)

This Approved Code of Practice (ACOP) and guidance is for those who work or control work in confined spaces.

It explains the definition of a confined space in the Regulations and gives examples. It will help you assess the risk of working within a particular confined space and put precautions in place for work to be carried out safely.

This edition brings the ACOP up to date with regulatory and other changes. The guidance has been simplified to make the understanding and use of the document easier, particularly with clarifying the definition of a confined space.

Other changes include a flowchart to help in the decision-making process, additional examples including new workplace risks (such as specifically created hypoxic environments, fire suppression systems etc), and amendments relating to the need to check, examine and test equipment.

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Approved Code of Practice

This Code has been approved by the Health and Safety Executive, with the consent of the Secretary of State. It gives practical advice on how to comply with the law. If you follow the advice you will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. You may use alternative methods to those set out in the Code in order to comply with the law.

However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way or a court will find you at fault.

Guidance

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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Introduction

About this book

1 This Approved Code of Practice (ACOP) and associated guidance provide practical advice on how you can comply with the requirements of the Confined Spaces Regulations 1997 (SI 1997/1713).

2 This book is for employers and self-employed people, referred to in this document as dutyholders, as well as anyone who has responsibility for controlling work which may need to be carried out in a confined space, such as managers and supervisors. Throughout this book we have referred to those who have duties as 'you'. Where the guidance is addressed to someone other than the dutyholder, for example a competent person, the text is clear about who it is intended for.

3 Changes in this edition include:

(a) expansion of the guidance on the definition of a 'confined space';
(b) inclusion of a flowchart to help in the decision-making process;
(c) additional examples of confined spaces to clarify new workplace risks, eg specifically created hypoxic environments, fire suppression systems etc;
(d) those required to accommodate legislative or guidance changes, eg the smoking ban, changes to the testing procedures for lifting equipment and breathing apparatus;
(e) amendments to the provisions relating to the need to check, examine and test equipment (monitors, personal protective equipment (PPE), respiratory protective equipment (RPE)) to clarify the requirements of the Control of Substances Hazardous to Health Regulations (COSHH) and the Lifting Operations and Lifting Equipment Regulations (LOLER).

Involving workers

4 Workplaces where employees are involved in taking decisions about health and safety are safer and healthier. Collaboration with your employees helps you to manage health and safety in a practical way by:

(a) helping you spot workplace risks;
(b) making sure health and safety controls are practical;
(c) increasing the level of commitment to working in a safe and healthy way.

5 Employers must consult employees in good time on health and safety matters. In workplaces where a trade union is recognised, this will be through union health and safety representatives. In non-unionised workplaces, consult either directly or through other elected representatives.

6 Consultation involves employers both giving information to employees and listening to them, taking account of what they say before making health and safety

decisions. See the HSE leaflet *Consulting employees on health and safety: A brief guide to the law* INDG232 (see Further reading) and our website (www.hse.gov.uk/involvement) for more information. Issues you should consult employees on include:

(a) risks arising from their work;
(b) proposals to manage and/or control these risks;
(c) the best ways of providing information and training.

About ACOPs

7 ACOPs are approved by the HSE Board with the consent of the Secretary of State (see Appendix 1 Notice of Approval for details).

8 The ACOP describes preferred or recommended methods that can be used (or standards to be met) to comply with the Regulations and the duties imposed by the Health and Safety at Work etc Act 1974 (the HSW Act). The accompanying guidance also provides advice on achieving compliance, or it may give information of a general nature, including explanation of the requirements of the law, more specific technical information or references to further sources of information.

9 The legal status of ACOP and guidance text is given on the copyright page (page 2).

Presentation

10 The ACOP text is set out in **bold** and the accompanying guidance in normal type, the text of the Regulations is in *italics*. Coloured borders also indicate each section clearly.

11 Some of the regulations are preceded by a short summary of the main duties imposed by that regulation to help the reader navigate the document. This is for information only.

Meaning of 'confined space'

CONFINED SPACES REGULATIONS 1997

Regulation 1 Citation, commencement and interpretation

Regulation 1

(1) These Regulations may be cited as the Confined Spaces Regulations 1997 and shall come into force on 28th January 1998.

(2) In these Regulations, unless the context otherwise requires —

"confined space" means any place, including any chamber, tank, vat, silo, pit, trench, pipe, sewer, flue, well or other similar space in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk;

"diving project" has the meaning assigned thereto by regulation 2(1) of the Diving at Work Regulations 1997;

"free flowing solid" means any substance consisting of solid particles and which is of, or is capable of being in, a flowing or running consistency, and includes flour, grain, sugar, sand or other similar material;

"mine" has the meaning assigned thereto by section 180 of the Mines and Quarries Act 1954;

"specified risk" means a risk of —

- *(a) serious injury to any person at work arising from a fire or explosion;*
- *(b) without prejudice to paragraph (a) —*
  - *(i) the loss of consciousness of any person at work arising from an increase in body temperature;*
  - *(ii) the loss of consciousness or asphyxiation of any person at work arising from gas, fume, vapour or the lack of oxygen;*
- *(c) the drowning of any person at work arising from an increase in the level of liquid; or*
- *(d) the asphyxiation of any person at work arising from a free flowing solid or the inability to reach a respirable environment due to entrapment by a free flowing solid;*

"system of work" includes the provision of suitable equipment which is in good working order.

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Definition of 'confined space'

12 Under these Regulations a 'confined space' must have both of the following defining features:

(a) it must be a space which is substantially (though not always entirely) enclosed; and
(b) one or more of the specified risks must be present or reasonably foreseeable.

13 Some confined spaces are fairly easy to identify, for example sewers and closed tanks used to store chemicals. However, identification may not always be so easy, as a confined space is not necessarily:

(a) enclosed on all sides – some, such as vats, silos and ships' holds, may have open tops or sides;
(b) small and/or difficult to work in – some, like grain silos and ships' holds, can be very large;
(c) difficult to get in or out of – some have several entrances/exits, others have quite large openings or are apparently easy to escape from; or
(d) a place where people do not regularly work – some confined spaces (such as those used for spray painting in car repair centres) are used regularly by people in the course of their work.

14 A place not usually considered to be a confined space may become one if there is a change in the conditions inside or a change in the degree of enclosure or confinement, which may occur intermittently. For example, an enclosed space may be free of contaminants and have a safe level of oxygen but the work to be carried out in it may change this, such as:

(a) welding that would consume some of the oxygen;
(b) a spray booth during paint spraying; or
(c) using chemicals for cleaning purposes which can add contaminants.

15 In such cases the space may be defined as a confined space while that work is ongoing and until the level of oxygen recovers or the contaminants have dispersed by ventilating the area.

16 Some confined spaces may be created deliberately, for example reduced oxygen (hypoxic) environments, where the oxygen level is depleted either by reducing the oxygen concentration or increasing the concentration of another gas such as nitrogen. Situations where hypoxic environments are used include to prevent ignition of fires in archives or to delay oxidation in fresh food preservation for fruit and vegetables.

17 Some spaces may meet the criteria to be a confined space when they are used to store certain specific items. Examples include:

(a) a store of gas cylinders (carbon dioxide, argon etc) held in an enclosed space (which if discharged would affect the atmosphere sufficiently to represent a specified risk);
(b) a store of material used as part of a fire suppression system (which would represent a specified risk if discharged); or
(c) a storage facility for wooden pellets used as fuel in heating systems.

18 When a space is identified as a confined space these Regulations will apply in full, even where the specified risk is controlled. The status of a space can change depending on circumstances as can the risks, for example heavy rain may present

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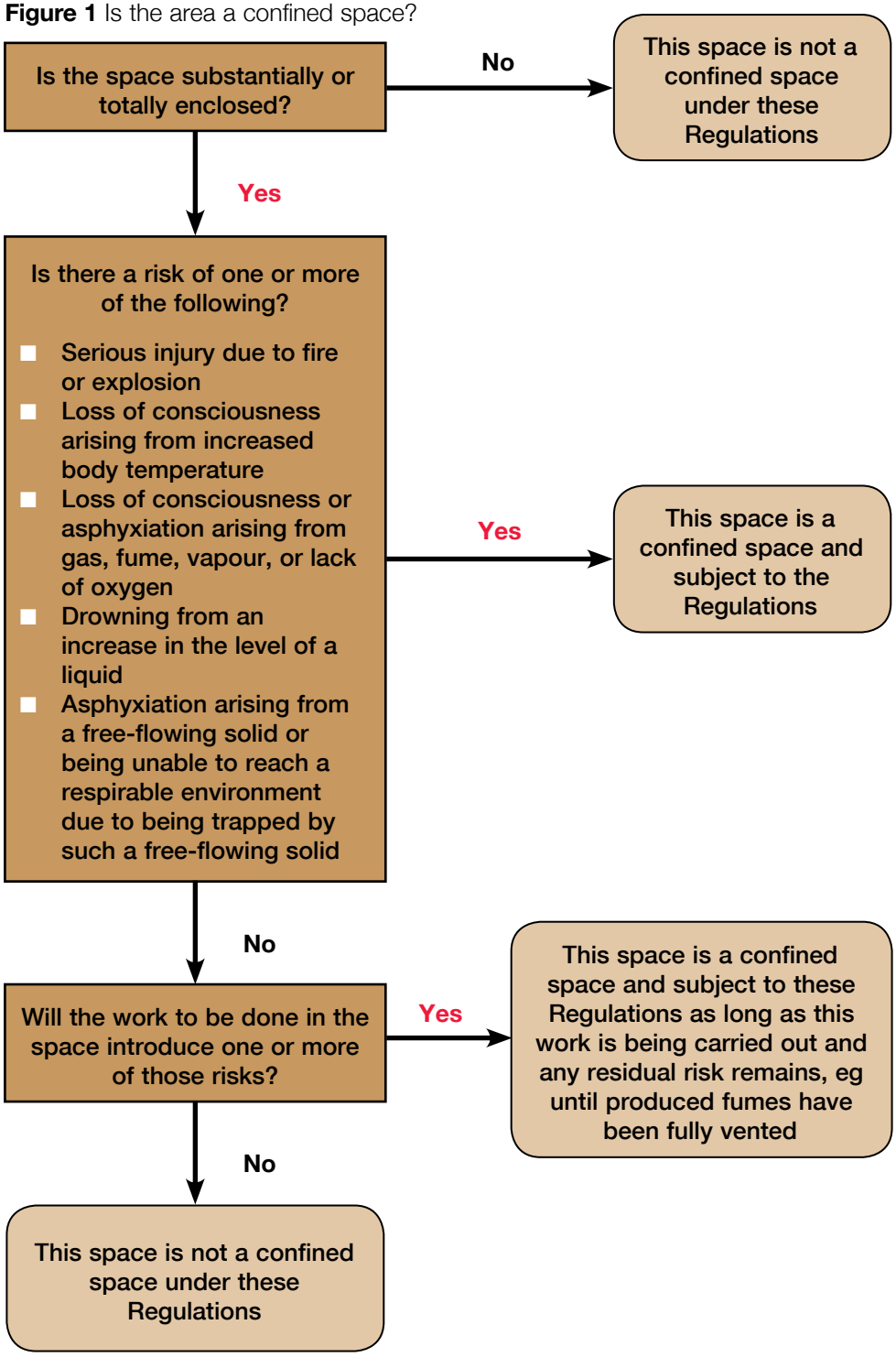
a foreseeable risk of drowning in a space not usually considered confined. The space may be defined as a confined space because of the work being carried out in it, and may cease to be a confined space when the 'specified risk' is removed and the atmosphere tested as safe, eg if the specified risk is due to fumes when cleaning with chemicals, the space may cease to be confined when the fumes have been removed by ventilation. Actions taken to mitigate a risk should be monitored to ensure they are working effectively and continue to do so throughout the task.

19 Figure 1 can help you with the decision-making process. It describes the specified risks – there must be at least one of these present or reasonably foreseeable to make any enclosed space a confined space within these Regulations.

Figure 1 Is the area a confined space?



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Examples of a confined space

20 In addition to the places referred to in regulation 1(2), the expression 'confined space' may also refer to the following locations and other similar places, but only where there is also the presence of or a reasonably foreseeable risk of one of the specified risks to the health and safety of those working in the space:

(a) ducts, culverts, tunnels, boreholes, bored piles, manholes, shafts, excavations and trenches, sumps, inspection and under-machine pits, cofferdams;
(b) freight containers, ballast tanks, ships' engine rooms and cargo holds;
(c) buildings, building voids;
(d) some enclosed rooms (particularly plant rooms) and compartments within them;
(e) enclosures for the purpose of asbestos removal;
(f) areas used for storage of materials that are likely to oxidise (such as store rooms for steel chains or wood pellet hopper tanks);
(g) unventilated or inadequately ventilated rooms and silos;
(h) structures that become confined spaces during fabrication or manufacture; and
(i) interiors of machines, plant or vehicles.

21 This is not an exhaustive list and there may be other types of confined space.

22 Not all enclosed workplaces are subject to the Regulations; an enclosed workplace without a 'specified risk' is not a confined space that is subject to the Regulations even where there are other risks due to the size or difficulty of working in it. In ceiling voids, lofts and some cellars, if the space is cramped you may need to consider other risks, such as musculoskeletal disorders, or how people would be evacuated if they had a fall or injury. However, these areas would not be 'confined spaces' under the Regulations unless they met the requirements on being enclosed and having one or more of the specified risks. They would require a risk assessment and consideration of the relevant regulations, eg the Manual Handling Operations Regulations 1992 or the Workplace (Health, Safety and Welfare) Regulations 1992.

The hazards

23 The hazards that the Confined Spaces Regulations address arise through the combination of the confined nature of the place of work and the possible presence of substances or conditions which, taken together, can increase the risk to safety or health. Hazards can exist in the space (eg fumes or a flammable atmosphere) or they can be introduced to a substantially enclosed space that otherwise would be safe (eg fumes released when using chemical cleaners). The most likely hazards are as follows.

Flammable substances and oxygen enrichment

24 A risk of fire or explosion can arise:

(a) from the presence of flammable substances, for example from fumes left in a tanker previously used for transporting petrol;
(b) from an excess of oxygen in the atmosphere, for example caused by a leak from an oxygen cylinder forming part of welding equipment;
(c) from the presence of chemicals that can combust or spark in enriched (or in some cases normal) oxygen levels;
(d) from the ignition of airborne flammable contaminants such as flour dust; or
(e) due to leaks from adjoining plant or processes that have not been effectively isolated.

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Excessive heat

25 Hot conditions can lead to a dangerous rise in core body temperature and this can be made worse by wearing PPE, highly physical or strenuous work, or working at a high work rate. In extreme cases heat stroke and unconsciousness can result.

26 Excessive heat can occur where:

(a) work is being done in hot conditions or where, for example, boilers or furnaces have not been allowed sufficient time to cool before entering to undertake maintenance work;
(b) the confined space is exposed to the sun or another heat source;
(c) equipment has been steam cleaned to remove hydrocarbons; or
(d) hot work is being carried out, eg using welding equipment for repair.

27 A slower heat build-up in the body can also cause heat stress. If action is not taken to cool the body there is a risk of heat stroke and unconsciousness.

Toxic gas, fume or vapour

28 The presence of toxic gas, fume or vapour can lead to asphyxia or unconsciousness.

29 These contaminants can occur due to:

(a) previous processing or storage in the space, eg fumigation, decaying material;
(b) sludge or other deposits, for example when disturbed by cleaning. Hydrocarbon vapour can still be present under scale even after cleaning;
(c) them entering the space from adjoining plant that has not been effectively isolated or from exhausts of equipment being used, eg generators for lighting;
(d) the work being done, such as:
    (i) welding, flame cutting;
    (ii) lead lining;
    (iii) brush and spray painting, or moulding using glass-reinforced plastics;
    (iv) use of adhesives or solvents; or
    (v) from the products of combustion;
(e) plant failure, eg build-up of ammonia if refrigeration plant fails or accumulation of carbon dioxide following leaks from compressed gas cylinders;
(f) naturally occurring biological processes producing toxic gases in sewers, storage tanks, storm water drains, wells, slurry pits etc or produced as a result of fermentation in sealed silos where crops are stored;
(g) build-up in some spaces, such as sewers or manholes, due to contaminated ground or leaks from behind vessel linings, rubber, lead, brick etc;
(h) actions outside the space, for example due to hot work (welding on the exterior surfaces) or from equipment outside the space (such as exhaust fume from mobile plant, especially on construction sites, petrol-driven pumps, ventilation equipment or generators being used to provide light within the confined space).

Oxygen deficiency

30 A lack of oxygen in the atmosphere may also lead to asphyxia or unconsciousness.

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31 Oxygen deficiency can result from many processes and the storage of many different products, including:

(a) purging the confined space with an inert gas to remove flammable or toxic gas, fume, vapour or aerosols;
(b) naturally occurring biological or chemical processes consuming oxygen, for example:
  (i) in fermentation vessels during brewing;
  (ii) in cargo holds from the carriage of timber or timber products;
  (iii) from steel turnings, swarf or scrap metal;
  (iv) from vegetable products, grain or coal etc;
(c) the transport or storage of wood pellets used as biofuel, which under certain circumstances can both consume oxygen and produce carbon monoxide gas;
(d) leaving a vessel completely closed or poorly ventilated for some time (particularly one constructed of or containing items made from steel) since the process of rust formation on the inside surface consumes oxygen. Newly fabricated or shot-blasted carbon steel vessels are especially vulnerable to rusting, particularly those with a large surface area such as heat exchangers, separators, filters etc;
(e) increased levels of carbon dioxide from limestone chippings associated with drainage operations when they get wet;
(f) burning operations and work such as welding and grinding which consume oxygen;
(g) displacement of air during pipe freezing, for example with liquid nitrogen;
(h) a gradual depletion of oxygen as workers breathe in confined spaces and where provision of replacement air is inadequate, particularly where the work is strenuous or the rate of breathing is increased due to the ambient temperature in the space. Both heat and cold can cause changes in a person's respiration rate;
(i) a deliberate reduction in the oxygen level, designed to inhibit fire (eg in archives, libraries and IT server rooms) or to extend the shelf-life of produce, or to reduce the effects of oxidation.

The ingress or presence of liquids

32 Liquids can flow into the confined space and lead to drowning, for example the ingress of liquid when working in sewers or from other plant which has not been adequately isolated in an industrial situation. The presence of a liquid can also lead to other serious injury or health effect depending on the nature of the liquid, such as its corrosivity or toxicity. Drowning can occur in even a small depth of liquid.

Solid materials which can flow

33 Free-flowing solids can submerge a person, preventing breathing. Materials which create this hazard include grain, sugar, flour, sand, coal dust and other substances in granular or powder form. In a confined space the risk is increased because there is no space for the material to flow away.

Other hazards not specific to confined spaces

34 Other hazards (such as electricity, noise, collapse or subsidence of or within the space, loss of structural integrity and those arising from mechanical equipment and working space) can be identified when assessing the risk from the need to

Guidance 1

enter or work in a confined space. These hazards are not unique to confined spaces working and are not dealt with in the Regulations or this document. Where these hazards are present in a confined space, the precautions will almost always be more extensive because of the enclosed nature of the confined space.

35 Specific regulations and supporting guidance already deal with many of these other hazards, for example:

(a) Electricity at Work Regulations 1989;
(b) Provision and Use of Work Equipment Regulations 1998;
(c) Control of Noise at Work Regulations 2005;
(d) Workplace (Health, Safety and Welfare) Regulations 1992;
(e) Control of Lead at Work Regulations 2002;
(f) Control of Asbestos Regulations 2012.

36 The Control of Substances Hazardous to Health Regulations 2002 (COSHH) also apply to all substances hazardous to health (other than lead or asbestos), such as toxic fume and injurious dust. The Ionising Radiations Regulations 1999 may apply where radon gas can accumulate in confined spaces (eg sewers) and where industrial radiography is used (eg to look at weld integrity in vessels). See 'Further reading'.

Application of the Regulations

CONFINED SPACES REGULATIONS 1997

Regulation 2 Disapplication of Regulations

Regulation 2

These Regulations shall not apply to or in relation to —

(a) the master or crew of a sea-going ship or to the employer of such persons in respect of the normal ship-board activities carried out solely by a ship's crew under the direction of the master; or

(b) any place below ground in a mine; or

(c) any diving project to and in relation to which the Diving at Work Regulations 1997 apply by virtue of regulation 3 of those Regulations.

Regulation 8 Extension outside Great Britain

Summary

Regulation 8 does not impose any duties, but identifies the geographic limits for where the Regulations apply outside Great Britain. Within Great Britain the Confined Spaces Regulations apply in all premises and work situations subject to the HSW Act except those referred to in regulation 2.

Regulation 8

These Regulations shall, subject to regulation 2 above, apply to and in relation to the premises and activities outside Great Britain to which sections 1 to 59 and 80 of the 1974 Act apply by virtue of paragraphs (a), (b), (d) and (e) of article 8 of the Health and Safety at Work etc Act 1974 (Application Outside Great Britain) Order 1995 as they apply within Great Britain but they shall not apply in any case where at the relevant time article 4, 5, 6 or 7 of the said Order applies.*

* See paragraph 41.

Guidance 8

37 The Confined Spaces Regulations apply in all premises and work situations subject to the HSW Act, with the exception of diving operations, and below ground in a mine. Specific legislation deals with confined spaces in these cases, and guidance is available (see Further reading).

38 In addition, the Regulations do not apply to the master or crew of a seagoing ship or to the employer of such people in respect of the normal shipboard activities carried out solely by a ship's crew under the direction of the master. There are marine regulations which provide very similar requirements for the master and crew of seagoing ships, covering the same risks, which apply wherever a UK ship is in the world.

ACOP 8

39 Where an operation involves a ship's crew and shoreside workers working together aboard ship, the provisions will apply, thereby imposing duties on masters, crew and their employers, as well as the shoreside workers involved and their employers. They must cooperate so far as is necessary to ensure that their duties in relation to these matters are discharged, agreeing procedures and establishing who is in overall control as required under regulation 11 of the Management of Health and Safety at Work Regulations.

40 When entering compression chambers or diving bells provided for the support of diving operations to conduct pre- and post-diving procedures, setting-to work (ie commissioning equipment), or maintenance procedures, the Confined Spaces Regulations will apply because these activities are not defined as diving operations under the Diving at Work Regulations 1997.

Guidance 8

41 The Regulations also extend outside Great Britain in a limited number of cases where the HSW Act applies by virtue of paragraphs (a), (c), (f), and (g) of article 11 of the Health and Safety at Work etc Act 1974 (Application outside Great Britain) Order 2013 (SI 2013/240), which has replaced the provisions of the 1995 Order.

ACOP 8

42 The Confined Spaces Regulations apply to certain activities aboard installations 'stacked' out of use in the territorial sea that are not defined as 'offshore installations', such as the activities of shore-based workers undertaking repair, maintenance or cleaning.

Duties under the Regulations

CONFINED SPACES REGULATIONS 1997

Regulation 3 Persons upon whom duties are imposed by these Regulations

Regulation 3

(1) Every employer shall —

(a) ensure compliance with the provisions of these Regulations in respect of any work carried out by his employees; and

(b) ensure compliance, so far as is reasonably practicable, with the provisions of these Regulations in respect of any work carried out by persons other than his employees insofar as the provisions relate to matters which are within his control.

(2) Every self-employed person shall —

(a) comply with the provisions of these Regulations in respect of his own work; and

(b) ensure compliance, so far as is reasonably practicable, with the provisions of these Regulations in respect of any work carried out by other persons insofar as the provisions relate to matters which are within his control.

ACOP 3

43 References to 'dutyholders' within this document mean employers or self-employed people with responsibilities under these Regulations. Where dutyholders have duties in relation to people at work who are not their employees the duty is to do what is 'reasonably practicable' in the circumstances. In many cases, they will need to liaise and cooperate with others (eg other employers) to agree the respective responsibilities in terms of the Regulations and duties.

44 You should take all reasonably practicable steps to engage competent contractors and ensure there is a clear understanding of who has responsibility for doing what. In this way, those in control can be clear about what they can reasonably do to ensure that those undertaking the work in the confined space comply with these and other relevant regulations.

Risk assessment

THE MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS 1999, REGULATION 3

(See Appendix 2)

Guidance 3

Management Regulations

45 The Management of Health and Safety at Work Regulations 1999 (the Management Regulations) apply across all industries and all work activities. The principal duty, regulation 3, requires a dutyholder to identify the measures they need to take to manage risk by means of a suitable and sufficient assessment of all risks to workers and any others who may be affected by their work activities (insignificant risks can be ignored). Employers with five or more employees are required to record the significant findings of the assessment.

46 This risk assessment should identify whether a space is a confined space under these Regulations. Some spaces will become confined spaces because of the work to be carried out in them or because of changes in their use or changes to the level of enclosure.

47 In accordance with regulation 4(1) of the Confined Spaces Regulations 1997, the priority when carrying out a risk assessment is to identify measures to avoid work in confined spaces. If, in the light of the risks identified, it cannot be considered reasonably practicable to carry out the work without entering the confined space, then you must secure a safe system for working within the confined space in accordance with regulation 4(2). The risk assessment will help identify the necessary precautions to be included in the safe system of work.

ACOP 3

Management Regulations

48 If it is not reasonably practicable to avoid the need to work in a confined space the dutyholder must assess the risks connected with entering or working in the space. The assessment should identify the risks to those entering or working there, and also any others, for example other workers including contractors and the general public in the vicinity who could be affected by the work to be undertaken. The risk assessment must be carried out by someone competent to do so.

49 A competent person for these purposes will be someone with the necessary skills, knowledge and experience of, and familiarity with, the relevant processes, plant and equipment so that they understand the risks involved and can devise necessary precautions to meet the requirements of the Confined Spaces Regulations. In complex cases more than one person may be needed to assess the risks relating to specific areas.

50 Where a number of confined spaces (eg sewers or manholes) are broadly the same, in terms of the conditions and the activities being carried out, and if the risks and measures to deal with them are the same, it may be possible to devise a 'model' or generic risk assessment covering them all. Any

ACOP Management Regulations 3

differences in particular cases that would alter the conclusions of the model risk assessment must be identified. Failure to include relevant information in the risk assessment could lead to inadequate precautions in the subsequent system of work.

Guidance Management Regulations 3

51 When carrying out an assessment, you should make use of all relevant information available about the confined space. For example, there may be information from engineering drawings, working plans or about relevant soil or geological conditions. Assess this information in conjunction with information on any processes that have already taken place or will take place in the course of the work which could affect the condition of the confined space.

52 Employees and their representatives should be consulted when assessing the risks connected with entering or working in a confined space.

53 Give particular attention to situations where the work circumstances are changing (for example at construction sites or steel fabrications) or where there are temporary workers who are likely to have limited knowledge of the conditions and dangers in the confined space. You should use this assessment to help identify the correct individual to carry out the work, eg those with the correct training, physically able to carry out the task etc.

ACOP Management Regulations 3

Factors to be assessed

General condition of the confined space

54 You should assess the general condition of the confined space to identify what might be present or not present, and cause a problem, for example is the concentration of oxygen normal or is there any evidence of damage or corrosion? Any records relating to the confined space should be checked for relevant information. Consideration should be given to:

Previous contents

55 Information about any substances previously held, however briefly, in the confined space, will give an indication of what kind of hazard may be expected, for example toxic or flammable gases etc. Fires and explosions have been caused by ignition of substances thought to have been 'removed' some considerable time before, but which were, in fact, still present.

Residues

56 Dangers may arise from chemical residues or scale, rust, sludge or other residues in a confined space. For example, dangerous gas, fume or vapour can be released when scale, sludge or animal slurry is disturbed. Where there are residues, safe working procedures should assume that disturbance of the residue etc will release gas, fume or vapour.

Contamination

57 Contamination may arise from adjacent plant, processes, gas mains or surrounding land, soil or strata. Gases and liquids may leak, or may have leaked, into the confined space from adjacent plant, installations, processes or landfill sites. This is a particular risk where confined spaces are below ground because they can be contaminated by substances from installations many metres away.

ACOP 3

58 In certain situations, water in ground strata and/or gases may enter the confined space from the surrounding land, soil or strata. For example, acid groundwater acting on limestone can lead to dangerous accumulations of carbon dioxide.

59 Methane can occur from a number of sources including the decay of organic matter and can be released from groundwater. Methane and other gases can leach into groundwater and be released at distances remote from the source. Sewers can be affected over long distances by water surges, for example following sudden heavy rainfall upstream of where work is being carried out.

Oxygen deficiency and oxygen enrichment

60 There are substantial risks if the concentration of oxygen in the atmosphere varies significantly from normal (ie 20.9%). For example, oxygen enrichment will increase flammability of clothing and other combustible materials. Conversely, a relatively small reduction in the oxygen percentage can lead to impaired mental ability, and can adversely affect others with pre-existing medical conditions such as respiratory infections, asthma etc. The effects are very rapid and generally there will be no warning to alert the senses. This can happen even in circumstances where only a person's head is inside a confined space. Very low oxygen concentrations (ie below 16%) can lead to unconsciousness and death. Any difference in oxygen content from normal should be investigated, the risk assessed, and appropriate measures taken in the light of the risk.

61 Particular care should be taken in environments created with a specifically reduced oxygen concentration in the atmosphere produced by removing oxygen or increasing concentration of another gas, usually nitrogen (a hypoxic environment). This should include restrictions on access and alarm systems to alert workers when oxygen limits drop below a safe limit.

Physical dimensions

62 You must consider the possible effects of the dimensions and layout of the confined space. Air quality can differ if the space contains remote or low-lying compartments. You should also take account of isolated pockets or regions within the space when choosing ventilation methods.

Hazards arising from the work

63 You should assess hazards that arise directly from the work to be undertaken in the confined space. The work itself may produce the hazard. Alternatively, conditions may become hazardous when work is done in conjunction with residues, contamination etc. Work being done on the exterior of the confined space (eg external welding) could also generate hazardous conditions within. Hazards that can be introduced into a space that may otherwise be safe include:

Cleaning chemicals

64 Chemicals used for cleaning could affect the atmosphere directly or interact with residual substances present in the confined space.

Sources of ignition

65 Welding could act as a source of ignition for flammable gases, vapours (eg from residues), dusts, plastics and many other materials which may burn leading to a fire or explosion. Welding on the outside of a confined space can

Management Regulations

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easily ignite materials in contact with the metal on the inside. Tools and equipment, including lighting, may need to be inherently safe or specially protected where they are likely to be used in potentially flammable or explosive atmospheres so that they do not present a source of ignition.

Increasing temperature

66 Hot work may cause a significant increase in temperature within the confined space. Welding, for example either within the confined space or on the outside, can increase the temperature. Strenuous work activity can also have an effect on thermal comfort of workers, particularly where PPE is worn to protect workers from other risks to safety and health.

Hazards from outside the space

67 You should assess the need to isolate the confined space to prevent dangers arising from outside. For example:

Ingress of substances

68 There may be a risk of substances (liquids, gases, steam, water, raw materials) from nearby processes and services entering the confined space. This could be caused by the inadvertent operation of machinery. You should normally disconnect power to such equipment and take measures to ensure that it cannot be reconnected until it is safe to do so, taking care not to isolate vital services such as sprinkler systems, communications etc. Also, measures are needed to prevent the substance normally held in the confined space from being automatically delivered. There may also be a risk of carbon monoxide, carbon dioxide and nitrogen dioxide present in the exhaust of combustion engines entering the confined space.

Emergency rescue

69 You should assess the requirements for emergency rescue arrangements. Possible emergencies should be anticipated and appropriate rescue arrangements made. The likely risks, and therefore the equipment and measures needed for a rescue by nearby employees, must be identified and the equipment made available for use.

Management Regulations

Preventing the need for entry

CONFINED SPACES REGULATIONS 1997

Regulation 4 Work in confined spaces

Regulation 4

(1) No person at work shall enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry.

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70 Dutyholders should not enter a confined space and should prevent employees, or others who are to any extent within their control, such as contractors, from entering or working inside a confined space where it is reasonably practicable to thoroughly undertake the work without entering the space.

71 In every situation, the dutyholder must consider what measures can be taken to enable the work to be carried out properly without the need to enter the confined space. The measures might involve modifying the confined space itself to avoid the need for entry, or to enable the work to be undertaken from outside the space. In many cases it will involve modifying working practices.

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72 Examples of modified working practices preventing the need for entry include:

(a) testing the atmosphere or sampling the contents of confined spaces from outside using appropriate long tools and probes etc;
(b) cleaning a confined space, or removing residues from it, from the outside using water jetting, steam or chemical cleaning, long-handled tools, or in-place cleaning systems;
(c) clearing blockages in silos where grain or other solids can 'bridge' or where voids can form, using remotely-operated rotating flail devices, vibrators and air purgers which avoid the need to enter the space;
(d) using built-in measures to see what is happening inside without going in by looking in through a porthole, sight-glass, grille or hole. If the sight-glass tends to become blocked, it can be cleaned with a wiper and washer. Lighting can be provided inside or by shining in through a window. The use of closed-circuit television systems (CCTV) may be appropriate in some cases;
(e) using remote visual inspection (RVI) to carry out examinations but only if this will provide the same results and safeguards as entry would.

Duties with regard to the design and construction of confined spaces

HEALTH AND SAFETY AT WORK ETC ACT 1974, SECTION 6

(See Appendix 2)

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2007, REGULATION 11

(See Appendix 2)

Guidance

HSW Act
CDM regulation 11

73 Section 6 of the HSW Act places a duty on designers, manufacturers, importers and suppliers of articles for use at work to ensure, so far as reasonably practicable, that the article is designed and constructed so that it will be safe and without risk to health.

74 The Provision and Use of Work Equipment Regulations 1998 (regulation 4) place a duty on employers to ensure that work equipment is constructed or adapted so that it will not affect the health or safety of any person when used or provided for the intended purpose.

75 Where plant and equipment unavoidably include confined spaces, designers, manufacturers, importers, suppliers, erectors and installers should eliminate or, where this is not possible, minimise the need to enter such spaces both during normal use or working, and for cleaning and maintenance.

76 Regulation 11 of the Construction (Design and Management) Regulations 2007 (CDM) places a duty on designers to ensure that any design includes adequate regard to the need to avoid foreseeable risks to the health and safety of any person on the structure at any time.

77 You can take a variety of measures to remove the need for people to have to enter a confined space to work. However, there may be specific methods of working such as tunnelling, which despite creating a confined space may nevertheless be the best overall option in view of the risk assessment. Engineers, architects, contractors and others who design, construct or modify buildings, structures etc should aim to eliminate or minimise the need to enter a confined space. For example, conical bases on process vessels can be designed so that in-place cleaning systems can flush out debris effectively.

78 Normal working, cleaning and inspection, and maintenance work should be considered at the design stage to ensure entirely new hazards are not introduced. Designers should consult users carefully about their requirements. Where it is not

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HSW Act
CDM regulation 11

reasonably practicable to avoid entry, the design should incorporate easy access, taking account of requirements in the event of emergencies. For example:

(a) the design should incorporate manholes sited at the bottom or low down in the structure;
(b) the suitability of access and working platforms etc should be considered; and
(c) design of the space itself should reduce the need for entry, eg by incorporating sample points, rodding eyes, nozzles etc for atmospheric testing.

Safe working in confined spaces

CONFINED SPACES REGULATIONS 1997

Regulation 4 Work in confined spaces

Regulation 4

(2) Without prejudice to paragraph (1) above, so far as is reasonably practicable, no person at work shall enter or carry out any work in or (other than as a result of an emergency) leave a confined space otherwise than in accordance with a system of work which, in relation to any relevant specified risks, renders that work safe and without risks to health.

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79 Where it is not reasonably practicable to avoid entering a confined space to undertake work, the dutyholder is responsible for ensuring that a safe system of work is used. In designing a safe system of work, they should give priority to eliminating the source of any danger before deciding what precautions are needed for entry.

80 To be effective, a safe system of work should be in writing and set out the work to be done and the precautions to be taken. When written down it is a formal record that all foreseeable hazards and risks have been considered in advance, and the necessary precautions have been taken and are in place before the work is allowed to begin. The safe procedure consists of all appropriate precautions taken in the correct sequence. In practice, a safe system of work will only ever be as good as its implementation.

Precautions to be included in the safe system of work

81 The precautions required in a safe system of work will depend on the nature of the confined space and the results of the risk assessment. For example, the risks involved and precautions needed for cleaning car interiors with solvents will be relatively straightforward by comparison with those involved when undertaking welding work inside a chemical reactor vessel, or work in a sewer.

82 The main elements to consider when designing a safe system of work, and which may form the basis of a 'permit-to-work', are:

(a) supervision;
(b) competence for confined spaces working;
(c) communications;
(d) testing/monitoring the atmosphere;
(e) gas purging;
(f) ventilation;
(g) removal of residues;
(h) isolation from gases, liquids and other flowing materials;

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(i) isolation from mechanical and electrical equipment;
(j) selection and use of suitable equipment;
(k) PPE and RPE;
(l) portable gas cylinders and internal combustion engines;
(m) gas supplied by pipes and hoses;
(n) access and egress;
(o) fire prevention;
(p) lighting;
(q) static electricity;
(r) smoking;
(s) emergencies and rescue;
(t) limited working time.

Supervision

83 The degree of supervision should be based on the findings of the risk assessment. In some cases an employer might simply instruct an employee how to do the work and then periodically check that all is well, for example if the work is routine, the precautions straightforward, and all the arrangements for safety can be properly controlled by the person carrying out the work. It is more likely that the risk assessment will identify a level of risk that requires the appointment of a competent person (see paragraph 49) to supervise the work and who may need to remain present while the work is being undertaken.

84 It will be the supervisor's role to ensure that the permit-to-work system, where applicable, operates properly, the necessary safety precautions are taken, and that anyone in the vicinity of the confined space is informed of the work being done.

Competence for confined spaces working

85 Workers must have adequate training and experience in the particular work involved to be competent to work safely in a confined space. Training standards must be appropriate to the task, and to the individual's roles and responsibilities, so that work can be carried out safely. Where the risk assessment indicates that properly trained individuals can work for periods without supervision, you should check that they are competent to follow the established safe system of work and have been provided with adequate information and instruction about the work to be done.

Communications

86 An adequate communication system must be in place and should enable communication:

(a) between those inside the confined space;
(b) between those inside the confined space and those outside; and
(c) to summon help in case of emergency.

87 Whatever system is used, and it can be based on speech, tugs on a rope, the telephone, radio etc, all messages should be able to be communicated easily, rapidly and unambiguously between relevant people. Consider whether the communication methods are appropriate for any workers wearing breathing apparatus. The communication system should also cover the need for those outside the space to raise the alarm and set in motion emergency rescue procedures.

88 Equipment such as telephones and radios should be specially protected so that it does not present a source of ignition where there is a risk of flammable or potentially explosive atmospheres.

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Testing/monitoring the atmosphere

89 Prior to entry, the atmosphere within a confined space should be tested to check the oxygen concentration or for the presence of hazardous gas, fume or vapour. Testing should be carried out where knowledge of the confined space (eg from information about its previous contents or chemicals used in a previous activity in the space) indicates that the atmosphere might be contaminated or to any extent unsafe to breathe, or where any doubt exists as to the condition of the atmosphere. Testing should also be carried out if the atmosphere was known to be contaminated previously, was ventilated as a consequence, and needed to be tested to check the result.

Retesting

90 Where the atmosphere in the space may not be safe to breathe and requires testing, the findings of the risk assessment should indicate whether testing should be carried out on each occasion that the confined space is re-entered, even where the atmosphere initially was found to be safe to breathe. Regular monitoring may be necessary to ensure that there is no change in the atmosphere while the work is being carried out, particularly where there is a known potential for adverse changes during the work.

91 The conditions should be continuously monitored when, for example, forced ventilation is being used, and where the work activity could give rise to changes in the atmosphere. The exact testing, retesting and monitoring requirements should be defined by a competent person within the safe system of work. This regular monitoring of the atmosphere in a confined space may be through the use of fixed monitors used within an area to protect a number of workers or through the use of personal/portable monitors worn by individual workers.

Monitoring and detecting equipment

92 The choice of monitoring and detecting equipment will depend on the circumstances and knowledge of possible contaminants and you may need to take advice from a competent person when deciding on the type that best suits the situation. For example, when testing for toxic or asphyxiating atmospheres suitably calibrated chemical detector tubes or portable atmospheric monitoring equipment may be appropriate.

93 Monitoring equipment should be in good working order. Where necessary, it should be calibrated and tested at least in accordance with the manufacturer's recommendations, or in line with some other schedule (identified from the findings of the risk assessment) that may differ from the manufacturer's requirements. Testing and calibration may be included in daily operator checks (a response check) where identified as necessary.

94 Where there is a potential risk of flammable or explosive atmospheres, equipment specifically designed to measure for these will be required. All such monitoring equipment should be specifically suited for use in potentially flammable or explosive atmospheres. Explosimeters/flammable gas monitors must be calibrated for the different gases or vapours which the risk assessment has identified could be present and these may need alternative calibrations for different confined spaces. The manufacturer will be able to identify the appropriate calibrations for the possible gases.

Oxygen content

95 Inhaling an atmosphere that contains no oxygen can cause loss of consciousness in a matter of seconds.

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96 Testing to measure the oxygen content should be carried out before testing for concentration of flammable gases, followed by any further tests for toxic gases, vapours and dusts. Additional tests may be required for the presence of contaminants in liquid or solid form when the risk assessment indicates that they may be present. Some flammable substances also have toxic properties, which may need to be considered as part of the testing process.

Competent testers

97 Testing should be carried out by people who are competent in the practice and aware of the existing standards for the relevant airborne contaminates being measured and are also instructed and trained in the risks involved in carrying out such testing in a confined space. Those carrying out the testing should also be capable of interpreting the results and taking any necessary action. Records should be kept of the results and findings.

Testing from outside

98 The atmosphere in a confined space can often be tested from the outside, without the need for entry, by drawing samples through a long probe. Where flexible sample tubing is used, ensure that it is not impeded by kinks, blockages, or blocked or restricted nozzles and that sufficient time is allowed for samples of the atmosphere to displace the normal air in the probe. The atmosphere in sufficiently representative samples of the space should be tested to check for pockets of poor air quality, especially if there is any doubt about the thoroughness of ventilation. If it becomes necessary for the tester to enter the confined space, the work then should be carried out in accordance with the advice in this guidance.

Emergencies

99 Local emergency services attending an emergency incident may necessarily require the immediate use of self-contained breathing apparatus, under controlled and monitored entry conditions, without following the testing procedures. This is due to the constraints on affecting an immediate rescue.

Gas purging

100 Where the risk assessment has identified the presence or possible presence of flammable or toxic gases or vapours, there may be a need to purge the gas or vapour from the confined space. This can be done with air or an inert gas where toxic contaminants are present, but with inert gas only where there are flammable contaminants. You can only use inert gas for purging flammable gas or vapour because any purging with air could produce a flammable mixture within the confined space. Where purging has been carried out, the atmosphere must be tested to check that purging has been effective, and that it is safe to breathe, before allowing people to enter.

101 When removing a flammable or explosive hazard by purging with inert gas, for instance using nitrogen displacement, if the work cannot be carried out from a safe position outside the confined space, you must put in place a permit-to-work system that identifies the standard of protection of all exposed people (workers, those providing emergency help, and others in the vicinity of the space). This would include use of full breathing apparatus.

102 Take account of the possibility of exposure both to employees and non-employees from vented gases as a result of purging. During purging, take precautions to protect those outside the confined space from toxic, flammable, irritating gases and vapours etc.

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Ventilation

103 Some confined spaces require mechanical ventilation to provide sufficient fresh air to replace the oxygen that is being used up by people working in the space, and to dilute and remove gas, fume or vapour produced by the work. This can be done by using a blower fan and trunking and/or an exhaust fan or ejector and trunking (provided that there is an adequate supply of fresh air to replace the used air). Fresh air should be drawn from a point where it is not contaminated either by used air or other pollutants. Never introduce additional oxygen into a confined space to 'sweeten' the air as this can lead to oxygen enrichment in the atmosphere that can render certain substances (eg grease) liable to spontaneous combustion, and will greatly increase the combustibility of other materials. Oxygen above the normal concentration in air may also have a toxic effect if inhaled.

104 When considering the ventilation method, take account of the layout of the space, the position of openings etc and the properties of the pollutants, so that circulation of air for ventilation is effective. Natural ventilation may suffice if there are sufficient top and bottom openings in a vessel. For example, if a small tank containing heavy vapour has a single top manhole it may be sufficient to exhaust from the bottom of the tank with a ventilation duct while allowing 'make-up' air to enter through the manhole.

105 For complicated spaces where several pockets of gas or vapour might collect, a more complex ventilation system will be needed to ensure thorough ventilation. Forced ventilation or ventilation providing a combination of exhaust and supply of fresh air may be more effective.

106 Extract ventilation should be routed away from possible sources of re-entry, and to a place that will not create additional risks. In all cases an airline or trunking should be introduced at, or extend to, the bottom of the vessel to ensure removal of heavy gas or vapour and effective circulation of air; such airline or trunking should not hinder access to or egress from the confined space.

Removal of residues

107 Cleaning or removal of residues is often the purpose of confined space work. In some cases residues will need to be removed to allow other work to be undertaken safely. Appropriate measures should be taken where risks from the residues are identified. For example, dangerous substances (such as hazardous gas, fume or vapour) can be released when residues are disturbed or, particularly, when heat is applied to them. The measures might include the use of powered ventilation equipment, specially protected electrical equipment for use in hazardous atmospheres, respiratory protective equipment and atmospheric monitoring. The cleaning or removal process might need to be repeated to ensure that all residues have been removed, and may need to deal with residues trapped in sludge, scale or other deposits, brickwork, or behind loose linings, in liquid traps, in joints in vessels, in pipe bends, or in other places where removal is difficult.

Isolation from gases, liquids, and other flowing materials

108 Confined spaces should be securely isolated from ingress of substances that could pose a risk to those working within the space.

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109 An effective method is to disconnect the confined space completely from every item of plant either by removing a section of pipe or duct or by inserting blanks. If blanks are used, the spectacle type with one lens solid and the other a

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ring makes checking easier. When disconnection cannot be done in this way one alternative is a suitable, reliable valve that is locked shut, providing there is no possibility of it allowing anything to pass through when locked, or of being unlocked when people are inside the confined space.

110 Barriers such as a single brick wall, a water seal, or shut-off valves or those sealed with sand or loam to separate one section of plant from another, are sometimes present at a confined space and offer some degree of isolation of the space. However, these barriers are usually provided for normal working and may not provide the level of safety protection necessary for the high risks often found in confined spaces. A more substantial means of isolation may therefore be needed. Whatever means of isolation is used it must be tested to ensure it is sufficiently reliable by checking for substances to see if isolation has been effective.

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Isolation from mechanical and electrical equipment

111 Some confined spaces contain electrical and mechanical equipment with power supplied from outside the space. Unless the risk assessment specifically enables the system of work to allow power to remain on, either for the purposes of the task being undertaken or as vital services (ie lighting, vital communications, firefighting, pumping where flooding is a risk, or cables distributing power to other areas), the power should be disconnected, separated from the equipment, and a check made to ensure isolation has been effective.

112 Isolation could include locking off the switch and formally securing the key in accordance with a permit-to-work, until it is no longer necessary to control access. Lock and tag systems can be useful here, where each operator has their own lock and key giving self-assurance of the inactivated mechanism or system. Check there is no stored energy of any kind left in the system that could activate the equipment inadvertently.

Selection and use of suitable equipment

113 Any equipment provided for use in a confined space must be suitable for the purpose. Where there is a risk of a flammable gas seeping into a confined space and which could be ignited by electrical sources (eg a portable hand lamp), specially protected electrical equipment should be used, for example a lamp certified for use in explosive atmospheres. Note that specially designed low-voltage portable lights, while offering protection against electrocution, could still present ignition sources and are not in themselves safer in flammable or potentially explosive atmospheres. All equipment should be carefully selected bearing in mind the conditions and risks where it will be used. Earthing should be considered to prevent static charge build-up. In addition to isolation, mechanical equipment may need to be secured against free rotation, as people may tread or lean on it, and risk trapping or falling.

Personal protective equipment and respiratory protective equipment

114 So far as reasonably practicable you should ensure that a confined space is safe to work in without the need for personal protective equipment (PPE) and respiratory protective equipment (RPE). PPE and RPE should be a last resort, except for rescue work (including the work of the emergency services), because its use can make movement more difficult, it can add to the effects of hot temperature and can be heavy.

115 Your risk assessment may identify the need for PPE and RPE, in which case it should be suitable and should be provided and used by those entering and working in confined spaces. Such equipment is in addition to engineering controls and safe systems of work.

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116 The type of PPE provided will depend on the hazards identified but, for example, might include safety lines and harnesses, and suitable breathing apparatus (self-contained or constant flow airline). Take account of foreseeable hazards that might arise, and the need for emergency evacuation.

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117 Wearing RPE and PPE can contribute to heat stress. In extreme situations, cooling air may be required for protective suits. Footwear and clothing may also require insulating properties, for example to prevent softening of plastics that could lead to distortion of components such as visors, air hoses and crimped connections.

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Portable gas cylinders and internal combustion engines

118 Never use petrol-fuelled internal combustion engines in confined spaces because of the fumes they produce and the ease with which petrol vapour ignites.

119 Gas cylinders should not normally be used within a confined space unless special precautions are taken. Portable gas cylinders (for heat, power or light), and diesel-fuelled internal combustion engines are nearly as hazardous as petrol-fuelled engines, and are inappropriate unless exceptional precautions are taken.

120 Where the use of diesel internal combustion engines cannot be avoided, adequate ventilation must be provided to prevent a build-up of harmful gas, and to allow them to operate properly. The exhaust from engines should be vented to a safe place well away from the confined space, downwind of any ventilation intakes for the confined space, and the exhaust ducting or pipes should be checked for leakage within the confined space. In tunnelling, normal practice is to provide a high level of ventilation and additional precautions to minimise emissions. Using such equipment within the space requires constant atmospheric monitoring.

121 Portable diesel engine-driven equipment should only be fuelled outside the confined space except in rare cases where it is not reasonably practicable to do so, such as in some tunnelling work.

122 Check gas equipment and gas pipelines for leaks before taking them into the confined space. At the end of every work period remove gas cylinders, including those forming welding sets, from the confined space in case a slow leak contaminates the atmosphere.

Gas supplied by pipes and hoses

123 The use of pipes and hoses for conveying oxygen or flammable gases into a confined space should be controlled to minimise the risks. It is important that at the end of every working period, other than during short interruptions, the supply valves for pipes and hoses should be securely closed before the pipes and hoses are withdrawn from the confined space to a place that is well ventilated. Where pipes and hoses cannot be removed, they should be disconnected from the gas supply at a point outside the confined space and their contents safely vented.

Access and egress

124 You should provide a safe way in and out of the confined space. Wherever possible allow quick, unobstructed and ready access. The means of escape must be suitable for use by the individual who enters the confined space so that they can quickly escape in an emergency. Suitable means to

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prevent access should be in place when there is no need for anybody to work in the confined space. The safe system of work should ensure that everyone has left the confined space during 'boxing-up' operations, particularly when the space is complicated and extensive (for example in boilers, cableways and culverts where there can be numerous entry/exit points).

125 The size of openings to confined spaces should be adequate. Openings affording safe access to confined spaces, and through divisions, partitions or obstructions within such spaces, should be sufficiently large and free from obstruction to allow the passage of people wearing the necessary protective clothing and equipment, and to allow adequate access for rescue purposes. Guidance on the dimensions for manhole openings can be found in the 'Plant and equipment' section.

126 An appropriate, clear and conspicuous safety sign that prohibits unauthorised entry should be placed alongside openings that allow for safe access.

Fire prevention

127 Wherever possible, flammable and combustible materials should not be stored in confined spaces that have not been specifically created or allocated for that purpose. If they accumulate as a result of work they should be removed as soon as possible and before they begin to create a risk.

128 Where flammable materials need to be located in a confined space, the quantity of the material should be kept to a minimum. In most cases flammable materials should not be stored in confined spaces. However, there may be special cases where this is necessary, for example in tunnelling. In these cases they should be stored in suitable fire-resistant containers. If there is a risk of flammable or potentially explosive atmospheres, take precautions to eliminate the risk such as removal by cleaning, effective use of thorough ventilation, and control of sources of ignition.

Lighting

129 Adequate and suitable lighting, including emergency lighting, should be provided. For example, the lighting should be specially protected if used where flammable or potentially explosive atmospheres are likely to occur. Other gases may be present that could break down thermally on the unprotected hot surfaces of a lighting system and produce other toxic products. Lighting may need to be protected against knocks (eg by a wire cage), and/or be waterproof. Where water is present in the space, suitable plug/socket connectors capable of withstanding wet or damp conditions should be used and protected by residual current devices (RCDs). The position of lighting may also be important, for example to give ample clearance for work or rescue to be carried out unobstructed.

Static electricity

130 Exclude static discharges and all sources of ignition if there is a risk of a flammable or explosive atmosphere in the confined space. All conducting items, such as steel trunking and airlines, should be bonded and effectively earthed. If cleaning operations are to be carried out, assess the risks posed by the use or presence of high-resistivity materials (such as synthetic plastics) in and adjacent to the confined space.

Guidance 4

131 Some equipment is prone to static build-up due to its insulating characteristics, eg most plastics. There is also a high risk of electrostatic discharge from some equipment used for steam or water jetting. Static discharges can also arise from clothing containing cotton or wool. Consider selecting safer alternative equipment and anti-static footwear and clothing.

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Smoking

132 The Smoking, Health and Social Care (Scotland) Act 2005 (for Scotland) and the Health Act 2006 (for England and Wales) prohibit smoking in most workplaces, including rest rooms, many rest areas and enclosed workplaces.

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133 The results of the risk assessment may indicate that it is necessary to set an exclusion area for smoking to a suitable distance beyond the confined space, for example where there is a risk of explosion.

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Emergencies and rescue

134 The arrangements for emergency rescue, required under regulation 5 of the Confined Spaces Regulations, must be suitable and sufficient. If necessary, equipment to enable resuscitation procedures to be carried out should be provided. The arrangements should be in place before any person enters or works in a confined space.

135 A major cause of death and injury in confined spaces incidents is due to ill-conceived attempts to save others who have collapsed or ceased to respond. You should not enter a confined space without ensuring you will not also be affected.

Guidance 4

Limiting working time

136 There may be a need to limit the time period that individuals are allowed to work in a confined space, for example where RPE is used, or under extreme conditions of temperature and humidity, or if the confined space is so small that movement is severely restricted. For a large confined space and multiple entries, a logging or tally system may be necessary to check everyone in and out and to control duration of entry.

137 There may be additional risks to consider when entry to a confined space is required. These could include the integrity of the confined space (eg corroded structure, cold temperatures, loss of rigidity when a tank is drained, trip hazards, noise etc). While these are not specific risks or limited to confined spaces, they should still be considered as part of the general risk assessment and tackled as far as reasonably practicable.

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Use of a permit-to-work procedure

138 A permit-to-work system is a formal written system and is usually required where there is a reasonably foreseeable risk of serious injury in entering or working in the confined space. The permit-to-work procedure is an extension of the safe system to work, not a replacement for it. The use of a permit-to-work system does not, by itself, make the job safe. It supports the safe system, providing a ready means of recording findings and authorisations required to proceed with the entry. It also contains information, for example time limits on entry, results of the gas testing, and other information that may be required during an emergency and which, when the job is completed, can also provide historical information on original entry conditions.

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139 A permit-to-work system is appropriate, for example:

(a) to ensure that the people working in the confined space are aware of the hazards involved and the identity, nature and extent of the work to be carried out;
(b) to ensure there is a formal check undertaken confirming elements of a safe system of work are in place. This must take place before people are allowed to enter or work in the confined space;
(c) where there is a need to coordinate or exclude, using controlled and formal procedures, other people and their activities where they could affect work or conditions in the confined space;
(d) if the work requires the authorisation of more than one person, or there is a time-limit on entry. It may also be needed if communications with the outside are other than by direct speech, or if particular RPE and/or PPE is required.

140 A permit-to-work should be cancelled once the operations to which it applies have finished.

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141 The nature of permit-to-work procedures will vary in their scope depending on the job, and the risks. A permit-to-work system is unlikely to be needed where, for example:

(a) the assessed risks can be controlled easily; and
(b) the system of work is very simple; and
(c) you know that other work activities being carried out cannot affect safe working in the confined space.

142 If an assessed risk is subsequently eliminated entirely, and there is no foreseeable chance of it recurring, you may consider removing the need for the permit-to-work restrictions on entry provided the above conditions apply.

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143 The decision not to adopt a permit-to-work system should be taken by a competent person, where necessary following consultation with specialists, and bearing in mind the findings of the risk assessment and the requirement to ensure a safe system of work.

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144 Information relating to the general preparation and application of permits-to-work can be found in *Guidance on permit-to-work systems: A guide for the petroleum, chemical and allied industries* (see 'Further reading').

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Suitability for work in confined spaces

145 The competent person carrying out the risk assessment for work in confined spaces should consider the suitability of individuals in view of the particular work to be done. Where the risk assessment highlights exceptional constraints from the physical layout, the competent person should check that individuals are of suitable build. This may be necessary to protect both the individual and others who could be affected by the work to be done.

146 The competent person should also consider other factors about an individual, for example concerning pre-existing medical conditions (claustrophobia, respiratory conditions like asthma etc) or physical strength and abilities (eg wearing heavy breathing apparatus), and other advice on an individual's suitability for the work.

Emergency procedures

CONFINED SPACES REGULATIONS 1997

Regulation 5 Emergency arrangements

Summary

Regulation 5 requires that no one should enter or work in a confined space unless there are emergency arrangements in place that are appropriate for the level of risk involved in the task/space. These should include making provision for extracting workers from the confined space and making provision for first-aid equipment (including resuscitation equipment) where the need can be foreseen.

Regulation 5

(1) Without prejudice to regulation 4 of these Regulations, no person at work shall enter or carry out work in a confined space unless there have been prepared in respect of that confined space suitable and sufficient arrangements for the rescue of persons in the event of an emergency, whether or not arising out of a specified risk.

Without prejudice to the generality of paragraph (1) above, the arrangements referred to in that paragraph shall not be suitable and sufficient unless —

(a) they reduce, so far as is reasonably practicable, the risks to the health and safety of any person required to put the arrangements for rescue into operation; and
(b) they require, where the need for resuscitation of any person is a likely consequence of a relevant specified risk, the provision and maintenance of such equipment as is necessary to enable resuscitation procedures to be carried out.

(2) Whenever there arises any circumstance to which the arrangements referred to in paragraph (1) above relate, those arrangements, or the relevant part or parts of those arrangements, shall immediately be put into operation.

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147 You must make suitable arrangements for emergency rescue which will depend on the nature of the confined space, the risks identified and the likely nature of an emergency rescue. You should not rely on the public emergency services. You should consider accidents arising from a specified risk, and any other accident in which a person needs to be recovered from a confined space, for example incapacitation following a fall. To be suitable and sufficient the arrangements for rescue and resuscitation should cover:

(a) rescue and resuscitation equipment;
(b) raising the alarm and rescue;

ACOP 5

(c) safeguarding the rescuers;
(d) fire safety;
(e) control of plant;
(f) first aid;
(g) public emergency services;
(h) training.

Rescue and resuscitation equipment

148 Rescue equipment provided should be appropriate in view of the likely emergencies identified in the risk assessment, and should be properly maintained.

149 Rescue equipment will often include lifelines and lifting equipment (since even a strong person is unlikely to be able to lift or handle an unconscious person on their own using only a rope), additional sets of breathing apparatus and first-aid equipment, including automatic external defibrillators (AEDs) and other resuscitation equipment.

Guidance 5

150 'Self-rescue' emergency breathing apparatus may be appropriate for use in situations where there will be time to react to an anticipated emergency situation, for example smoke logging in tunnels or reacting to atmospheric monitoring devices. They should be made available only where the type provided is suitable for the hazard expected in the emergency situation. They are not a substitute for RPE.

ACOP 5

151 If resuscitation has been identified as a likely consequence, appropriate training should be provided to enable resuscitation procedures to be carried out. This may include use of appropriate resuscitation equipment. Knowledge of previous incidents should be considered when determining if resuscitation is likely to be needed.

152 Resuscitation procedures include respiratory and circulatory resuscitation procedures. These are simple procedures that most people would be capable of carrying out provided they have been trained. The speed with which resuscitation is started is often as important as how well it is done.

153 Ancillary equipment may be needed for oral resuscitation – these avoid direct contact between the mouths of the victim and rescuer, for example by using special tubes and mouthpieces. However, if resuscitation is needed as a result of exposure to toxic gases, oral methods are not appropriate since they could put the rescuer at risk. In some cases equipment for artificial respiration as a follow-up to, or in place of, oral resuscitation is appropriate. This equipment should only be operated by someone with the necessary specialist training, or it can be kept available, properly maintained, on site for use by a person providing professional medical help.

Raising the alarm and rescue

154 There should be measures to enable those in the confined space to communicate to others outside the space who can initiate rescue procedures or summon help in an emergency. The emergency can be communicated in a number of ways, for example by the tug of a rope, by radio or by means of a 'lone worker' alarm. Whatever the system it should be reliable and tested frequently. Exceptionally (if justified on grounds of risk or from knowledge of

ACOP 5

previous incidents involving similar work), one or more people dedicated to the rescue role, and outside the confined space, will be required to keep those inside in constant direct visual sight in case of emergency.

Safeguarding the rescuers

155 Multiple fatalities have occurred when rescuers have been overcome by the same conditions that have affected the people they have tried to rescue. To prevent this, those who have been assigned a rescue role, for example members of an in-house or works rescue team, must be aware of the risks within the space and protected against the cause of the emergency. The precautions necessary to protect the rescuers should be considered during the risk assessment, and adequate provisions made when preparing suitable and sufficient emergency arrangements.

Fire safety

156 Advice on fire safety precautions and measures can be obtained from the local fire service. This can include ensuring that these measures do not create additional risks, ie using carbon dioxide extinguishers may displace the oxygen which is also being depleted by the fire. Inert gas flooding of the confined space must not take place when people are within the space.

Guidance 5

157 Where there is a risk of fire, appropriate fire extinguishers may need to be kept in the confined space at the entry point. In some situations, a sprinkler system may be appropriate. In the event of a fire, the local fire service should be called in case the fire cannot be contained or extinguished. Care is needed when deciding whether or not the ventilation system should be kept working or switched off because either course may affect the chances of escape or rescue. Continued use of the ventilation system may also affect the development of the fire, because forced air may fan the flames.

Control of plant

158 There may be a need to shut down adjacent or nearby plant before attempting an emergency rescue, either because the plant could be the cause of the emergency or safe entry cannot be gained without the plant being shut down.

First aid

159 Appropriate first-aid equipment should be provided and available for emergencies and to provide first aid until professional medical help arrives. First-aiders should be trained in its use and to deal with the foreseeable injuries.

Public emergency services

160 In some circumstances, for example where there are prolonged operations in confined spaces and the risks justify it, there may be advantage in prior notification to the local emergency services (eg local fire or ambulance service or more specific specialist teams) before the work is undertaken. If such notification is thought necessary, the emergency services should be consulted to establish what information they would find useful in preparing a potential response.

Guidance 5

161 Reliance on the emergency services alone will not be sufficient to comply with these Regulations. Employers must put in place adequate emergency arrangements before the work commences.

162 In all cases, however, arrangements should be in place for the rapid notification of the relevant emergency services should an accident occur. The emergency services should be given all the available information about the conditions and risks of entering and/or leaving the confined space before entering it to attempt a rescue. This information is then available at the scene of an incident where a necessarily dynamic risk assessment by the local emergency services can be undertaken.

Training

163 Those likely to be involved in any emergency rescue should be trained for that purpose. The training needs for each individual will vary according to their designated role. Refresher training should be organised and available on a regular basis, for example annually. Training should, where appropriate, include the following:

(a) the likely causes of an emergency;
(b) use of rescue equipment, eg breathing apparatus, lifelines, and where necessary a knowledge of its construction and working;
(c) the check procedures to be followed when donning and using apparatus;
(d) checking of correct functioning and/or testing of emergency equipment (for immediate use and to enable specific periodic maintenance checks);
(e) identifying defects and dealing with malfunctions and failures of equipment during use;
(f) works, site or other local emergency procedures including the initiation of an emergency response;
(g) instruction on how to shut down relevant process plant as appropriate (this knowledge would be required by anyone likely to perform a rescue);
(h) resuscitation procedures and, where appropriate, the correct use of relevant ancillary equipment and any resuscitation equipment provided (if intended to be operated by those receiving emergency rescue training);
(i) emergency first aid and the use of the first-aid equipment provided;
(j) use of firefighting equipment;
(k) liaison with local emergency services in the event of an incident, providing relevant information about conditions and risks, and providing appropriate space and facilities to enable the emergency services to carry out their tasks; and
(l) rescue techniques including regular and periodic rehearsals/exercises. This could include the use of a full-weight dummy. Training should be realistic and not just drill based, and should relate to practice and familiarity with equipment.

164 Regulated qualifications in emergency rescue and casualty recovery from confined spaces are available. Regulated qualifications are delivered by training centres recognised by a regulated 'awarding organisation' (AO). These AOs are regulated by the qualification regulators* against standards for the design, delivery and award of qualifications. As part of the regulated standards, AOs must have dedicated quality assurance processes to approve and monitor their recognised training centres.

* Ofqual is the regulator of qualifications, examinations and assessments in England. SQA (the Scottish Qualifications Authority) and the Welsh Government carry out similar functions in Scotland and Wales.

Plant and equipment

LEGAL DUTIES IN RESPECT OF PLANT AND EQUIPMENT FOR USE IN CONFINED SPACES ARE SET OUT IN APPENDIX 2

Guidance

Size of openings to enable safe access to and egress from confined spaces

165 Experience has shown that the minimum size of an opening to allow access with full rescue facilities including self-contained breathing apparatus is 575 mm diameter, although the openings for some confined spaces may need to be larger depending on the circumstances, for example, to take account of a fully equipped employee, or the nature of the opening.

166 Existing plant may have narrower openings. It will therefore be necessary to check that a person wearing suitable equipment can safely and readily pass through such openings. Choice of airline breathing apparatus in such cases offers a more compact alternative to bulkier self-contained apparatus. Examples of plant where there are narrower openings include rail tank wagons and tank containers where an opening of 500 mm diameter is common, and in road tankers where the recognised size is 410 mm. Even smaller openings can be found in the highly specialised nature of access to certain parts of aircraft, such as to fuel tanks in wings. Precautions need to take account of such special cases.

167 The size and number of access and egress points should be assessed individually depending on the activities being carried out and the number of people involved. Large-scale evacuations may need larger routes and openings to prevent them becoming bottlenecks.

168 Top openings to vessels, tanks etc should be avoided due to difficulty of access and rescue. Bottom or low manholes are preferable and may need access platforms. There may be occasions when access and egress is so tortuous, for example in the double bottom of a ship, that temporary openings may be needed.

169 Different criteria apply when the critical entry dimensions extend over a significant length or height, as in the case of sewers, pipes, culverts, small tunnels and shafts. For example:

(a) It is recommended that people should not normally enter sewers of dimensions smaller than 0.9 m high by 0.6 m wide. Even this ‘minimum size’ may in certain circumstances be too small for reliance on a safe system of work alone.

Guidance

(b) Additional measures may be needed if there is a long distance between access points or the siting of the sewer invert. Structural alterations to improve access may be appropriate.
(c) In the case of a shaft containing a ladder or step irons, 900 mm clear space is recommended between the ladder/steps and the back of the shaft.
(d) The spacing of manholes on sewers or, in the case of large gas mains etc, the absence of such access over considerable lengths may affect both the degree of natural ventilation and the ease with which people can be rescued.

170 Further guidance on appropriate recognised standards relevant to manholes and other confined spaces is contained in Appendix 3.

171 Practice drills including emergency rescues will help to check that the size of openings and entry procedures are satisfactory.

ACOP

Respiratory protective equipment

172 In circumstances where RPE is required, provided or used in connection with confined space entry or for emergency or rescue, it should be suitable for the purpose for which it is intended, ie correctly selected and matched to the job, the environment and the wearer, including fit testing. RPE will not normally be suitable unless it is breathing apparatus. For most cases breathing apparatus, which provides clean air for the worker to breathe would provide the standard of protection for entry into confined spaces. Any RPE should comply with the Personal Protective Equipment Regulations 2002 (displaying a 'CE mark').

Guidance

173 Some types of respiratory equipment are not appropriate for entry into or work in most confined spaces. It may not adequately protect against the risk of being overcome, for example it does not provide adequate protection against high concentrations of gases and vapours. Respirators should never be used in oxygen-deficient atmospheres. A detailed risk assessment would be needed to assess the possibility of high gas concentration or oxygen deficiency which would be likely to require specialist breathing equipment and training. If you are uncertain what equipment is appropriate, check with your RPE manufacturer.

174 However, respirators may have a role if their limitations are taken into account and where the risk is of exposure to low concentrations of hazardous contaminants. These limitations include duration of use, in some cases only about 15 minutes, which should be considered to see whether it would be sufficient to allow escape. This should be checked against the equipment supplier's information. You should also check that they are still within their useable shelf life.

175 In some circumstances entry into a confined space will require the continuous wearing of breathing apparatus. To determine whether RPE is necessary you should:

(a) carry out a risk assessment and put in place a safe system of work including all required controls, for example thorough and continuous general ventilation;
(b) establish the nature of any airborne contamination, ie whether it is toxic/non-toxic, or present in high concentrations or concentrations well below the relevant occupational exposure limits; and
(c) establish whether the oxygen level is adequate.

176 Where emergency breathing apparatus is provided to ensure safe egress or escape, or for self-rescue in case of emergency, the type commonly called an

Guidance

'escape breathing apparatus' (escape set) or 'self-rescuer' may be suitable. These types are intended to allow the user time to exit the hazard area. They are generally carried by the user or stationed inside the confined space, but are only used for emergency escape and not for working applications. This equipment can only be used for a short duration (up to 15 minutes) to allow the user to move to a place of safety or refuge. Longer duration (up to 60 minutes) devices are available which supply oxygen by a chemical reaction. Examples of emergency breathing apparatus or self-rescuers include:

(a) the rebreathable type which consists of a tube and mouthpiece (and may also contain a mask and hood);
(b) the 'escape set' which consists of a cylinder-fed positive pressure face mask or hood.

ACOP

Other equipment

177 Equipment provided or used for or in connection with confined space entry, or for emergency rescue or resuscitation, should be suitable for the purposes for which it is intended, and account taken of any appropriate recognised standards. Such equipment could include ropes, harnesses, fall arrest gear, lifelines, first-aid equipment, and protective clothing etc.

178 When a safety harness and line are used, the free end of the line must be secured so that it can be used as part of the rescue procedure. In most cases the line should be secured outside the entry to the confined space. The harness and line should be adjusted and worn so that the wearer can be safely drawn through any manhole or opening. Lifting equipment may be necessary for this purpose. An appropriate harness fitted to the line should be of suitable construction, and made of suitable material to recognised standards capable of withstanding both the strain likely to be imposed and attack from chemicals.

Maintenance of equipment

179 All equipment provided or used for the purposes of securing the health and safety of people in connection with confined space entry, or for emergency or rescue, should be maintained in an efficient state, in efficient working order and in good repair. This should include periodic examination and testing as necessary. Some types of equipment, for example breathing apparatus, should be inspected each time before use.

Guidance

180 The manufacturer or supplier's instructions will often provide advice on the frequency and type of examination.

Inspection and testing of equipment used in connection with confined space entry

181 The inspection and testing of RPE will comprise a visual inspection of all parts of the respirator or breathing apparatus, looking particularly at the integrity of any straps, face-pieces, filters and valves or other attachments including hoods, masks and visors. Any defects discovered on inspection, and which would undermine safe operation, should be remedied before further use.

Guidance

182 The inspection and testing of resuscitation equipment should be undertaken in accordance with the manufacturer's instructions and should include all accessories and ancillary equipment. Automatic external defibrillators (AEDs) should also be tested in accordance with the manufacturer's instructions and should include regular battery checks. Many pieces of resuscitation equipment (including defibrillator pads) are single-use and care should be taken during inspection to ensure that packaging is not damaged and that the product is within its expiry date.

183 The inspection and testing of other special equipment, including protective clothing, will consist of thorough visual inspection of all parts for deterioration and damage, and testing where appropriate. Inspection and testing should be carried out regularly. In the case of protective clothing that is used only occasionally or where the conditions of use are unlikely to damage it, the interval between inspections may be greater.

184 Atmospheric monitoring equipment and special ventilating or other equipment provided or used in connection with confined space entry must be properly maintained. It should be tested, inspected, and where necessary calibrated in accordance with the intervals and recommendations accompanying the equipment or, if these are not specified, at such intervals considered suitable. The manufacturer's instructions, where they are available, are also relevant. You should keep records of all testing, inspection and calibration.

185 Regular inspection and testing of lifting equipment may be required where continued safe operation is dependent on the condition of the equipment and there is a risk of deterioration from ongoing use. Most manufacturers of lifting equipment can provide guidance on the frequency and scope of such inspection. Inspections will normally include visual and functional checks and can help to identify rapid wear, failure through repeated use and component malfunction.

186 You should keep a record of any inspection and testing that you undertake – particularly of any significant findings or defects and any remedial action that you take.

Thorough examination of RPE

187 RPE, including respirators, breathing apparatus and emergency escape-type RPE are subject to the requirements of the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

188 RPE must undergo thorough examination at suitable intervals to ensure that all parts are present, correctly fitted, and the equipment is in good working order, including (where appropriate) ensuring that it delivers at least the manufacturer's recommended minimum air volume flow rate.

189 There are separate and specific HSE publications providing guidance on COSHH (see 'Further reading' for details).

Thorough examination of lifting equipment

190 Equipment used for lifting used in confined spaces working (such as ropes, harnesses, lifelines, rings, shackles, carabiners etc) is subject to the requirements of the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

Guidance

191 Such lifting equipment will have a certificate of test/declaration of conformity and safe working load or minimum breaking load when purchased. Ensure it is not further tested as this could weaken it. If it becomes damaged, it should be scrapped. Failing that, it should be returned to the manufacturer or other competent repairer who can carry out the necessary remedial work and supply a new certificate of test and safe working load for the repaired equipment.

192 Lifting equipment must undergo periodic thorough examination. This is the systematic and detailed examination of the lifting equipment by a competent person to detect any deterioration or defects that are or might become dangerous. Where lifting equipment is used for lifting people, which is likely in this case, the thorough examination must happen every six months. (Lifting equipment must also be inspected regularly between thorough examinations.)

193 There is separate and specific HSE guidance on LOLER (see 'Further reading' for details).

Training

HEALTH AND SAFETY AT WORK ETC ACT 1974, SECTION 2(2)(C)

(See Appendix 2)

ACOP

HSW Act Section 2(2)(c)

194 Specific training for work in confined spaces will depend on an individual's previous experience and the type of work they will be doing. This training will need to cover:

(a) an awareness of the Confined Spaces Regulations and in particular the need to avoid entry to a confined space, unless it is not reasonably practicable to do so, in accordance with regulation 4(1);
(b) an understanding of the work to be undertaken, the hazards, and the necessary precautions;
(c) an understanding of safe systems of work, with particular reference to 'permits-to-work' where appropriate;
(d) how emergencies arise, the need to follow prepared emergency arrangements, and the dangers of not doing so.

Guidance

HSW Act Section 2(2)(c)

195 Training should also take into account the practical use of safety features and equipment, the identification of defects and, where appropriate, it should involve demonstrations and practical exercises. Trainees should be familiar with both equipment and procedures before working for the first time in confined spaces. Qualifications in confined space working and entry are available.

196 Practical refresher training should be organised and available. The frequency with which refresher training is provided will depend upon how long since the type of work was last done, or if there have been changes to methods of work, safety procedures or equipment.

197 Training in specific safety features may include any or all of the following:

(a) use of atmospheric testing equipment, and the action to take depending on the readings;
(b) use of breathing apparatus and escape sets (self-rescuers), their maintenance, cleaning and storage;
(c) use of other items of PPE;
(d) instruction in the communication methods to be used while in the confined space.

CONFINED SPACES REGULATIONS 1997

Regulation 6 Exemption certificates

Regulation 6

(1) Subject to paragraph (2) below, the Health and Safety Executive may, by a certificate in writing, exempt —

(a) any person or class of persons; or
(b) any type or class of confined space,

from the application of any of the requirements or prohibitions imposed by these Regulations, and any such exemption may be granted subject to conditions and to a limit of time and may be revoked at any time by the said Executive by a further certificate in writing.

(2) The Executive shall not grant any such exemption unless, having regard to the circumstances of the case, and in particular to —

(a) the conditions, if any, which it proposes to attach to the exemption; and
(b) any other requirements imposed by or under any enactments which apply to the case,

it is satisfied that the health and safety of persons who are likely to be affected by the exemption will not be prejudiced in consequence of it.

Regulation 7 Defence in proceedings

Regulation 7

(1) In any proceedings for an offence for a contravention of regulation 5(3) of these Regulations it shall be a defence for the person charged to prove —

(a) that the contravention was due to the act or default of another person not being one of his employees (hereinafter called "the other person"); and
(b) that he took all reasonable precautions and exercised all due diligence to avoid the contravention.

The person charged shall not, without leave of the court, be entitled to rely on the defence referred to in paragraph (1) above unless, within a period ending seven clear days —

(c) before the hearing to determine mode of trial, where the proceedings are in England or Wales; or
(d) before the trial, where the proceedings are in Scotland,

he has served on the prosecutor a notice in writing giving such information identifying or assisting in the identification of the other person as was then in his possession.

(2) Where a contravention of the provision referred to in paragraph (1) above by any person is due to the act or default of some other person, that other person shall be guilty of the offence which would, but for any defence under this regulation available to the first-mentioned person, be constituted by the act or default.

Regulation 9 Repeal and revocations

Regulation 9

(1) Section 30 of the Factories Act 1961 is hereby repealed.

(2) The instruments set out in column 1 of the Schedule to these Regulations are hereby revoked to the extent shown in column 3 of the said Schedule.

Schedule Revocations

Schedule

Regulation 9(2)

(1)	(2)	(3)
Instrument revoked	Reference	Extent of revocation
Shipbuilding and Ship-repairing Regulations 1960	SI 1960/1932; relevant amending instruments are SI 1989/635 and SI 1992/2966	Regulations 48 to 52 and 54
The Shipbuilding (Reports on Breathing Apparatus etc.) Order 1961	SI 1961/114	The whole Order
The Breathing Apparatus, etc. (Report on Examination) Order 1961	SI 1961/1345	The whole Order
The Agriculture (Poisonous Substances) Act 1952 (Repeals and Modifications) Regulations 1975	SI 1975/45	The whole Regulations
The Kiers Regulations 1938 (Metrication) Regulations 1981	SI 1981/1152	The whole Regulations
The Docks Regulations 1988	SI 1988/1655	Regulation 18

Appendix 1 Notice of Approval

By virtue of section 16(4) of the Health and Safety at Work etc Act 1974, and with the consent of the Secretary of State for Work and Pensions, the Health and Safety Executive has on 3 December 2014 approved the revised Code of Practice entitled *Safe work in confined spaces* (Third edition, 2014 L101).

The revised Code of Practice gives practical guidance with respect to the Confined Spaces Regulations 1997, the Management of Health and Safety at Work Regulations 1999, the Health and Safety at Work etc Act 1974, the Personal Protective Equipment Regulations 2002 and the Personal Protective Equipment at Work Regulations 1992, the Construction (Design and Management) Regulations 2007, the Control of Substances Hazardous to Health Regulations 2002, the Provision and Use of Work Equipment Regulations 1998, and the Lifting Equipment and Lifting Operations Regulations 1998. The Code of Practice comes into effect on 19 December 2014.

This revised edition replaces the previous version of the code entitled *Safe work in confined spaces,* which came into effect on 4 September 1997.

Signed

TERESA QUINN
Secretary to the Board of the Health and Safety Executive

17 December 2014

Appendix 2 Relevant general health and safety law

MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS 1999

Regulation 3 Risk assessment

Regulation 3

Management Regulations

(1) Every employer shall make a suitable and sufficient assessment of —

(a) the risks to the health and safety of his employees to which they are exposed whilst they are at work; and
(b) the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking,

for the purpose of identifying the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions ...

(2) Every self-employed person shall make a suitable and sufficient assessment of —

(a) the risks to his own health and safety to which he is exposed whilst he is at work; and
(b) the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking,

for the purpose of identifying the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions.

(3) Any assessment such as is referred to in paragraph (1) or (2) shall be reviewed by the employer or self-employed person who made it if —

(a) there is reason to suspect that it is no longer valid; or
(b) there has been a significant change in the matters to which it relates; and where as a result of any such review changes to an assessment are required, the employer or self-employed person concerned shall make them.

(4) An employer shall not employ a young person unless he has, in relation to risks to the health and safety of young persons, made or reviewed an assessment in accordance with paragraphs (1) and (5).

Regulation 3

Management Regulations

(5) In making or reviewing the assessment, an employer who employs or is to employ a young person shall take particular account of —

(a) the inexperience, lack of awareness of risks and immaturity of young persons;
(b) the fitting-out and layout of the workplace and the workstation;
(c) the nature, degree and duration of exposure to physical, biological and chemical agents;
(d) the form, range, and use of work equipment and the way in which it is handled;
(e) the organisation of processes and activities;
(f) the extent of the health and safety training provided or to be provided to young persons; and
(g) risks from agents, processes and work listed in the Annex to Council Directive 94/33/EC on the protection of young people at work.

(6) Where the employer employs five or more employees, he shall record —

(a) the significant findings of the assessment; and
(b) any group of his employees identified by it as being especially at risk.

Regulation 7 Health and safety assistance

Regulation 7

Management Regulations

(1) Every employer shall, subject to paragraphs (6) and (7), appoint one or more competent persons to assist him in undertaking the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions ...

(2) Where an employer appoints persons in accordance with paragraph (1), he shall make arrangements for ensuring adequate co-operation between them.

(3) The employer shall ensure that the number of persons appointed under paragraph (1), the time available for them to fulfil their functions and the means at their disposal are adequate having regard to the size of his undertaking, the risks to which his employees are exposed and the distribution of those risks throughout the undertaking.

(4) The employer shall ensure that —

(a) any person appointed by him in accordance with paragraph (1) who is not in his employment —
(i) is informed of the factors known by him to affect, or suspected by him of affecting, the health and safety of any other person who may be affected by the conduct of his undertaking, and
(ii) has access to the information referred to in regulation 10; and
(b) any person appointed by him in accordance with paragraph (1) is given such information about any person working in his undertaking who is —
(i) employed by him under a fixed-term contract of employment, or
(ii) employed in an employment business,
as is necessary to enable that person properly to carry out the function specified in that paragraph.

(5) A person shall be regarded as competent for the purposes of paragraphs (1) and (8) where he has sufficient training and experience or knowledge and other qualities to enable him properly to assist in undertaking the measures referred to in paragraph (1).

Regulation 7

(6) Paragraph (1) shall not apply to a self-employed employer who is not in partnership with any other person where he has sufficient training and experience or knowledge and other qualities properly to undertake the measures referred to in that paragraph himself.

Paragraph (1) shall not apply to individuals who are employers and who are together carrying on business in partnership where at least one of the individuals concerned has sufficient training and experience or knowledge and other qualities —

(a) properly to undertake the measures he needs to take to comply with the requirements and prohibitions imposed upon him by or under the relevant statutory provisions; and
(b) properly to assist his fellow partners in undertaking the measures they need to take to comply with the requirements and prohibitions imposed upon them by or under the relevant statutory provisions.

Management Regulations

(7) Where there is a competent person in the employer's employment, that person shall be appointed for the purposes of paragraph (1) in preference to a competent person not in his employment.

HEALTH AND SAFETY AT WORK ETC ACT 1974

Section 2 General duties of employers to their employees

HSW Act Section 2

(1) It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.

(2) Without prejudice to the generality of an employer's duty under the preceding subsection, the matters to which that duty extends include in particular —

(c) the provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees;

Section 6 General duties of manufacturers etc as regards articles and substances for use at work

HSW Act Section 6

(1) It shall be the duty of any person who designs, manufactures, imports or supplies any article for use at work or any article of fairground equipment —

(a) to ensure, so far as is reasonably practicable, that the article is so designed and constructed that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work;
(b) to carry out or arrange for the carrying out of such testing and examination as may be necessary for the performance of the duty imposed on him by the preceding paragraph;
(c) to take such steps as are necessary to secure that persons supplied by that person with the article are provided with adequate information about the use for which the article is designed or has been tested and about

HSW Act Section 6

any conditions necessary to ensure that it will be safe and without risks to health at all such times as are mentioned in paragraph (a) above and when it is being dismantled or disposed of; and

(d) to take such steps as are necessary to secure, so far as is reasonably practicable, that persons so supplied are provided with all such revisions of information provided to them by virtue of the preceding paragraph as are necessary by reason of its becoming known that anything gives rise to a serious risk to health or safety.

PERSONAL PROTECTIVE EQUIPMENT AT WORK REGULATIONS 1992 (PPEWR)

Regulation 4 Provision of personal protective equipment

Regulation 4

(1) Subject to paragraph (1A), every employer shall ensure that suitable personal protective equipment is provided to his employees who may be exposed to a risk to their health or safety while at work except where and to the extent that such risk has been adequately controlled by other means which are equally or more effective.

(1A) Where the characteristics of any policing activity are such that compliance by the relevant officer with the requirement in paragraph (1) would lead to an inevitable conflict with the exercise of police powers or performance of police duties, that requirement shall be complied with so far as is reasonably practicable.

(2) Every self-employed person shall ensure that he is provided with suitable personal protective equipment where he may be exposed to a risk to his health or safety while at work except where and to the extent that such risk has been adequately controlled by other means which are equally or more effective.

(3) Without prejudice to the generality of paragraphs (1) and (2), personal protective equipment shall not be suitable unless —

(a) it is appropriate for the risk or risks involved, the conditions at the place where exposure to the risk may occur, and the period for which it is worn;

(b) it takes account of ergonomic requirements and the state of health of the person or persons who may wear it, and of the characteristics of the workstation of each such person;

(c) it is capable of fitting the wearer correctly, if necessary, after adjustments within the range for which it is designed;

(d) so far as is practicable, it is effective to prevent or adequately control the risk or risks involved without increasing overall risk;

(e) it complies with any enactment (whether in an Act or instrument) which implements in Great Britain any provision on design or manufacture with respect to health or safety in any relevant Community directive listed in Schedule 1 which is applicable to that item of personal protective equipment.

(4) Where it is necessary to ensure that personal protective equipment is hygienic and otherwise free of risk to health, every employer and every self-employed person shall ensure that personal protective equipment provided under this regulation is provided to a person for use only by him.

PPEWR

Regulation 7 Maintenance and replacement of personal protective equipment

Regulation 7

PPEWR

(1) Every employer shall ensure that any personal protective equipment provided to his employees is maintained (including replaced or cleaned as appropriate) in an efficient state, in efficient working order and in good repair.

(2) Every self-employed person shall ensure that any personal protective equipment provided to him is maintained (including replaced or cleaned as appropriate) in an efficient state, in efficient working order and in good repair.

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002 (COSHH)

Regulation 7 Prevention or control of exposure to substances hazardous to health

Regulation 7

COSHH

(9) Personal protective equipment provided by an employer in accordance with this regulation shall be suitable for the purpose and shall —

(a) comply with any provision in the Personal Protective Equipment Regulations 2002 which is applicable to that item of personal protective equipment; or

(b) in the case of respiratory protective equipment, where no provision referred to in sub-paragraph (a) applies, be of a type approved or shall conform to a standard approved, in either case, by the Executive.

PROVISION AND USE OF WORK EQUIPMENT REGULATIONS 1998 (PUWER)

Regulation 4 Suitability of work equipment

Regulation 4

PUWER

(1) Every employer shall ensure that work equipment is so constructed or adapted as to be suitable for the purpose for which it is used or provided.

(2) In selecting work equipment, every employer shall have regard to the working conditions and to the risks to the health and safety of persons which exist in the premises or undertaking in which that work equipment is to be used and any additional risk posed by the use of that work equipment.

(3) Every employer shall ensure that work equipment is used only for operations for which, and under conditions for which, it is suitable.

(4) In this regulation "suitable" —

(a) subject to sub-paragraph (b), means suitable in any respect which it is reasonably foreseeable will affect the health or safety of any person;

Regulation 4
PUWER

(b) in relation to —
(i) an offensive weapon within the meaning of section 1(4) of the Prevention of Crime Act 1953 provided for use as self-defence or as deterrent equipment; and
(ii) work equipment provided for use for arrest or restraint,

by a person who holds the office of constable or an appointment as police cadet, means suitable in any respect which it is reasonably foreseeable will affect the health or safety of such person.

Regulation 5 Maintenance

Regulation 5
PUWER

(1) Every employer shall ensure that work equipment is maintained in an efficient state, in efficient working order and in good repair.

(2) Every employer shall ensure that where any machinery has a maintenance log, the log is kept up to date.

LIFTING OPERATIONS AND LIFTING EQUIPMENT REGULATIONS 1998 (LOLER)

Regulation 9 Thorough examination and inspection

Regulation 9
LOLER

(1) Every employer shall ensure that before lifting equipment is put into service for the first time by him it is thoroughly examined for any defect unless either —

(a) the lifting equipment has not been used before; and
(b) in the case of lifting equipment for which an EC declaration of conformity could or (in the case of a declaration under the Lifts Regulations 1997) should have been drawn up, the employer has received such declaration made not more than 12 months before the lifting equipment is put into service;

or, if obtained from the undertaking of another person, it is accompanied by physical evidence referred to in paragraph (4).

(2) Every employer shall ensure that, where the safety of lifting equipment depends on the installation conditions, it is thoroughly examined —

(a) after installation and before being put into service for the first time; and
(b) after assembly and before being put into service at a new site or in a new location,

to ensure that it has been installed correctly and is safe to operate.

(3) Subject to paragraph (6), every employer shall ensure that lifting equipment which is exposed to conditions causing deterioration which is liable to result in dangerous situations is —

(a) thoroughly examined —
(i) in the case of lifting equipment for lifting persons or an accessory for lifting, at least every 6 months;

Regulation 9

(ii) in the case of other lifting equipment, at least every 12 months; or
(iii) in either case, in accordance with an examination scheme; and
(iv) each time that exceptional circumstances which are liable to jeopardise the safety of the lifting equipment have occurred; and

(b) if appropriate for the purpose, is inspected by a competent person at suitable intervals between thorough examinations, to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

(4) Every employer shall ensure that no lifting equipment —

(a) leaves his undertaking; or
(b) if obtained from the undertaking of another person, is used in his undertaking, unless it is accompanied by physical evidence that the last thorough examination required to be carried out under this regulation has been carried out.

(5) This regulation does not apply to winding apparatus to which the Mines (Shafts and Winding) Regulations 1993 apply.

(6) Where lifting equipment was before the coming into force of these Regulations required to be thoroughly examined by a provision specified in paragraph (7), the first thorough examination under paragraph (3) shall be made before the date by which a thorough examination would have been required by that provision had it remained in force.

(7) The provisions referred to in paragraph (6) are —

(a) section 22(2), 25(2), 26(1)(d) and 27(2) of the Factories Act 1961;
(b) regulations 34(2) and 37(1) of the Shipbuilding and Ship-repairing Regulations 1960;
(c) regulations 28(3), 40 and 46(1) of the Construction (Lifting Operations) Regulations 1961;
(d) regulations 3(1) and (2) and 6(1) of the Offices, Shops and Railway Premises (Hoists and Lifts) Regulations 1968;
(e) regulation 6(1)(c) of and Part III of Schedule 1 to the Offshore Installations (Operational Safety, Health and Welfare) Regulations 1976;
(f) regulation 15 of the Docks Regulations 1988.

LOLER

Regulation 10 Reports and defects

Regulation 10

(1) A person making a thorough examination for an employer under regulation 9 shall —

(a) notify the employer forthwith of any defect in the lifting equipment which in his opinion is or could become a danger to persons;
(b) as soon as is practicable make a report of the thorough examination in writing authenticated by him or on his behalf by signature or equally secure means and containing the information specified in Schedule 1 to —
(i) the employer; and
(ii) any person from whom the lifting equipment has been hired or leased;
(c) where there is in his opinion a defect in the lifting equipment involving an existing or imminent risk of serious personal injury send a copy of the report as soon as is practicable to the relevant enforcing authority.

LOLER

Regulation 10

(2) A person making an inspection for an employer under regulation 9 shall —

(a) notify the employer forthwith of any defect in the lifting equipment which in his opinion is or could become a danger to persons;
(b) as soon as is practicable make a record of the inspection in writing.

(3) Every employer who has been notified under paragraph (1) shall ensure that the lifting equipment is not used —

(a) before the defect is rectified; or
(b) in a case to which sub-paragraph (c) of paragraph 8 of Schedule 1 applies, after a time specified under that sub-paragraph and before the defect is rectified.

(4) In this regulation "relevant enforcing authority" means —

(a) where the defective lifting equipment has been hired or leased by the employer, the Executive; and
(b) otherwise, the enforcing authority for the premises in which the defective lifting equipment was thoroughly examined.

LOLER

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2007 (CDM)

Regulation 11 Duties of designers

Regulation 11

(1) No designer shall commence work in relation to a project unless any client for the project is aware of his duties under these Regulations.

(2) The duties in paragraphs (3) and (4) shall be performed so far as is reasonably practicable, taking due account of other relevant design considerations.

(3) Every designer shall in preparing or modifying a design which may be used in construction work in Great Britain avoid foreseeable risks to the health and safety of any person —

(a) carrying out construction work;
(b) liable to be affected by such construction work;
(c) cleaning any window or any transparent or translucent wall, ceiling or roof in or on a structure;
(d) maintaining the permanent fixtures and fittings of a structure; or
(e) using a structure designed as a workplace.

(4) In discharging the duty in paragraph (3), the designer shall —

(a) eliminate hazards which may give rise to risks; and
(b) reduce risks from any remaining hazards,

and in so doing shall give collective measures priority over individual measures.

(5) In designing any structure for use as a workplace the designer shall take account of the provisions of the Workplace (Health, Safety and Welfare) Regulations 1992 which relate to the design of, and materials used in, the structure.

CDM

Regulation 11

CDM

(6) The designer shall take all reasonable steps to provide with his design sufficient information about aspects of the design of the structure or its construction or maintenance as will adequately assist —

(a) clients;
(b) other designers; and
(c) contractors,

to comply with their duties under these Regulations.

Appendix 3 Standards relevant to manholes and other access to confined spaces

BS EN 1992-3:2006 *Eurocode 2. Design of concrete structures. Liquid retaining and containing structures*

- Minimum openings specified as 600 mm x 900 mm

Silos. Draft design code for silos, bins, bunkers and hoppers

- Published by BSI in association with the British Materials Handling Board, this gives the minimum as 600 mm x 600 mm

BS 5502-50:1993+A2:2010 *Buildings and structures for agriculture. Code of practice for design, construction and use of storage tanks and reception pits for livestock slurry*

- Gives access hatches etc as not less than 600 mm x 600 mm

BS EN 752:2008 *Drain and sewer systems outside buildings. Table NA.22 Recommended dimensions for the construction of new manholes and manhole shafts (personnel entry)*

BS ISO 9669:1990 *Series 1 freight containers. Interface connections for tank containers*

Further reading

Workplace health, safety and welfare

Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice and guidance L24 (Second edition) HSE Books 2013 ISBN 978 0 7176 6583 9 www.hse.gov.uk/pubns/books/l24.htm

First aid at work

First aid at work: The Health and Safety (First-Aid) Regulations 1981. Guidance on Regulations L74 (Third edition) HSE Books 2013 ISBN 978 0 7176 6560 0 www.hse.gov.uk/pubns/books/l74.htm

Consulting employees

Consulting employees on health and safety: A brief guide to the law Leaflet INDG232(rev2) HSE Books 2013 www.hse.gov.uk/pubns/indg232.htm

Work equipment

Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22 (Fourth edition) HSE Books 2014 ISBN 978 0 7176 6619 5 www.hse.gov.uk/pubns/books/l22.htm

Safe use of lifting equipment. Lifting Operations and Lifting Equipment Regulations 1998. Approved Code of Practice and guidance L113 (Second edition) HSE Books 2014 ISBN 978 0 7176 6586 0 www.hse.gov.uk/pubns/books/l113.htm

Signs and signals

Safety signs and signals. The Health and Safety (Safety Signs and Signals) Regulations 1996. Guidance on Regulations L64 (Second edition) HSE Books 2009 ISBN 978 0 7176 6359 0 www.hse.gov.uk/pubns/books/l64.htm

Permits-to-work

Guidance on permit-to-work systems: A guide for the petroleum, chemical and allied industries HSG250 HSE Books 2005 ISBN 978 0 7176 2943 5 www.hse.gov.uk/pubns/books/hsg250.htm

PPE and RPE

Personal Protective Equipment at Work (Second edition). Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations L25 (Second edition) HSE Books 2005 ISBN 978 0 7176 6139 8 www.hse.gov.uk/pubns/books/l25.htm

Respiratory protective equipment at work: A practical guide HSG53 (Fourth edition) HSE Books 2013 ISBN 978 0 7176 6454 2 www.hse.gov.uk/pubns/books/hsg53.htm

Electricity

Memorandum of guidance on the Electricity at Work Regulations 1989. Guidance on Regulations HSR25 (Second edition) HSE Books 2007 ISBN 978 0 7176 6228 9 www.hse.gov.uk/pubns/books/hsr25.htm

COSHH

Control of substances hazardous to health (COSHH). The Control of Substances Hazardous to Health Regulations 2002 (as amended). Approved Code of Practice and guidance L5 (Sixth edition) HSE Books 2013 ISBN 978 0 7176 6582 2 www.hse.gov.uk/pubns/books/l5.htm

Noise

Controlling noise at work. The Control of Noise at Work Regulations 2005. Guidance on Regulations L108 (Second edition) HSE Books 2005 ISBN 978 0 7176 6164 0 www.hse.gov.uk/pubns/books/l108.htm

Asbestos

Managing and working with asbestos: Control of Asbestos Regulations 2012. Approved Code of Practice and guidance L143 (Second edition) HSE Books 2013 ISBN 978 0 7176 6618 8 www.hse.gov.uk/pubns/books/l143.htm

Lead

Control of lead at work. Control of Lead at Work Regulations 2002. Approved Code of Practice and guidance L132 (Third edition) HSE Books 2002 ISBN 978 0 7176 2565 9 www.hse.gov.uk/pubns/books/l132.htm

Ionising radiation

Work with ionising radiation: Ionising Radiations Regulations 1999: Approved Code of Practice and guidance L121 HSE Books 2000 ISBN 978 0 7176 1746 3 www.hse.gov.uk/pubns/books/l121.htm

Construction

Managing health and safety in construction. Construction (Design and Management) Regulations 2007. Approved Code of Practice L144 HSE Books 2007 ISBN 978 0 7176 6223 4 www.hse.gov.uk/pubns/books/l144.htm

Mines

The management and administration of safety and health at mines. Management and Administration of Safety and Health at Mines Regulations 1993. Approved Code of Practice L44 HSE Books 1993 ISBN 978 0 7176 0618 4 www.hse.gov.uk/pubns/books/l44.htm

Diving

Commercial diving projects offshore. Diving at Work Regulations 1997. Approved Code of Practice and guidance L103 (Second edition) HSE Books 2014 ISBN 978 0 7176 6592 1 www.hse.gov.uk/pubns/books/l103.htm

Commercial diving projects inland/inshore. Diving at Work Regulations 1997. Approved Code of Practice and guidance L104 (Second edition) HSE Books 2014 ISBN 978 0 7176 6593 8 www.hse.gov.uk/pubns/books/l104.htm

Recreational diving projects. Diving at Work Regulations 1997. Approved Code of Practice and guidance L105 (Second edition) HSE Books 2014 ISBN 978 0 7176 6594 5 www.hse.gov.uk/pubns/books/l105.htm

Media diving projects. Diving at Work Regulations 1997. Approved Code of Practice and guidance L106 (Second edition) HSE Books 2014 ISBN 978 0 7176 6595 2 www.hse.gov.uk/pubns/books/l106.htm

Scientific and archaeological diving projects. Diving at Work Regulations 1997. Approved Code of Practice and guidance L107 (Second edition) HSE Books 2014 ISBN 978 0 7176 6596 9 www.hse.gov.uk/pubns/books/l107.htm

Further information

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