28 Confined Spaces

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Introduction

1. This chapter sets out the procedures and guidance for the management of confined spaces. For MOD infrastructure projects specific additional requirements are specified in JSP 375, Volume 3, Chapter 6 (which amplifies this chapter) in accordance with statutory requirements.

2. JSP 375, Volume 3, Chapter 6 does not apply to military training conducted on the Defence estate that involves confined spaces, however, co-operation and co-ordination will be required between those organising the training and those with responsibility for the control of the confined spaces.

3. A confined space can be any space which is substantially but not always entirely enclosed where there is a risk of death or serious injury from hazardous substances or dangerous conditions, e.g. a lack of oxygen. A significant number of people are killed or seriously injured in confined spaces each year in the UK. Those killed include not only people working in the confined space but those who try to rescue them without proper training and / or equipment.

4. Some confined spaces are fairly easy to identify, e.g. enclosures with limited openings:

   a. storage tanks;

   b. sewers, tunnels and pipes;

   c. some machinery spaces;

   d. trenches and pits; and

   e. ships compactors and ballast tanks.

5. Other confined spaces may be less obvious, but can be equally dangerous, e.g. unventilated or poorly ventilated work spaces. Some places may become confined spaces when work is carried out, or during their construction, fabrication or subsequent modification.

6. The risks to health and safety are exacerbated when personnel work in a confined space and there is:

a. a lack of oxygen;

b. a build-up of poisonous gas, fumes or vapours;

c. potential for fire and / or explosion;

d. a build-up of dust in high concentrations;

e. hot and cold conditions leading to a dangerous increase or decrease in body temperature;

f. difficulties in effecting rescues which in normal circumstances would be routine; and

g. flooding (liquid or liquefaction of solids).

7. Some of the above conditions may already be present; however, some may arise through the work being carried out or due to nearby activities.

Roles and Responsibilities

Commanding Officer (CO) / Head of Establishment (HoE)

8. The CO / HoE should ensure that all confined spaces within their area of responsibility are identified, recorded in a register, risk assessed, and access controlled. This may include the use of a permit to work system see JSP 375, Volume 1, Chapter 30 (Permit to Work) or JSP 375, Volume 3, Chapter 6 (Work in Confined Spaces). All procedures are to be audited regularly to ensure compliance and action taken immediately to correct any failures.

Managers

9. Managers should ensure that all tasks / activities carried out in confined spaces under their control are risk assessed (JSP 375, Volume 1, Chapter 8), Safe Systems of Work are implemented and that relevant Permits to Work are raised (JSP 375, Volume 1, Chapter 30). Suitable and sufficient assessments of risk to persons, either directly or indirectly employed and to others who may become involved in the treatment or safe evacuation of personnel from within the confined space. Control measures identified in the assessment must be implemented, communicated to, and understood by all personnel involved in the task / activity, and monitored for effectiveness.

All Personnel

10. Defence personnel are required to co-operate with managers and comply with all control measures put in place for the safe access and undertaking of tasks or activities within confined spaces. Defence personnel should inform the relevant manager if they identify changes or if they consider the risk assessment fails to

identify appropriate control measures for a task or activity which requires access to a confined space.

Assessing and Managing the Risk

Avoiding Confined Space Working

11. Entry or work in confined spaces is to be avoided unless it has been determined that there is no reasonably practical alternative.

12. If the intended work is unavoidable the following should be considered:

a. modification of the confined space so that entry is not necessary;

b. have the work done from outside, e.g. inspection; sampling and cleaning operations can sometimes be done from outside the space using appropriate intrinsically safe equipment and tools; and

c. intrinsically safe remote cameras may be used for internal inspection of confined spaces.

Risk Assessment

13. If confined space working cannot be avoided, line managers should carry out a suitable and sufficient risk assessment of the activity (JSP 375, Volume 1, Chapter 8). For work in confined spaces this means identifying the hazards present, who will be exposed to the hazards, assessing the risks and determining what precautions to take. The assessment should include consideration of:

a. the normal hazards associated with the task or activity;

b. the working environment (lighting levels, cramped conditions, etc.);

c. if access is needed to be controlled with standing instructions or a Permit-to-work (PTW).

d. working materials and intrinsically safe tools;

e. the suitability and competence of those carrying out the task or activity;

f. communications; and

g. arrangements for emergency rescue.

14. When assessing and planning work involving confined spaces the following should be considered prior to the start of work. The following guidance is not exhaustive and line managers are to ensure they are satisfied that, so far as is reasonably practicable, all hazards are identified and adequately controlled. The flow diagram at Annex A may be of assistance in following the management process.

Safe Systems of Work

15. If confined space working is unavoidable the manager should ensure a Safe System of Work is established and implemented. The following elements of a Safe System of Work should be adopted:

a. the appointment of a Person in Charge (PIC);

b. use the results of the risk assessment to help identify the necessary precautions and control measures to reduce the risk of injury;

c. make sure that the Safe System of Work, including all the control measures identified, is developed and put into practice;

d. ensure everyone involved is appropriately trained and instructed to make sure they know what to do and how to do it safely; and

e. additional emergency procedures and recovery techniques.

Permit-to-work (PTW)

16. Where the risk assessment requires the use of a PTW, this should be implemented in accordance with JSP 375, Volume 1, Chapter 30 or by adoption of the PTW system in JSP 375, Volume 3, Chapter 6. A PTW allows a formal check to be undertaken to ensure all the elements of a Safe System of Work are in place before people are allowed to enter or work in the confined space. It is also a means of communication between management and those carrying out the task / activity.

Suitability of Persons to do the Work

17. Persons conducting the work must be competent, this will include suitable and sufficient experience of the type of work to be carried out and a suitable and sufficient level of training. Where risk assessment highlights constraints as a result of the physical layout, the suitability of the individuals build and / or fitness may need to be considered. The PIC should consider other factors, e.g. concerning claustrophobia or fitness to wear breathing apparatus, and medical advice on an individual’s suitability may be needed.

Personal Protective Equipment (PPE)

18. PPE should be used where risks cannot otherwise be adequately controlled and must be suitable and sufficient to provide the required levels of protection (JSP 375, Volume 1, Chapter 15). When working in confined spaces, the selection of suitable PPE needs to take into consideration the environment in which it is to be worn to ensure that it does not introduce new risks, e.g. bulky clothing used to protect workers from extremes of temperature may restrict movement and limit effective rescue.

Provision of Special Tools and Lighting

19. Non-sparking tools and specially protected lighting (intrinsically safe) must be used where flammable or potentially explosive atmospheres are likely. In certain confined spaces (e.g. inside metal tanks) suitable precautions to prevent electric shock will need to be assessed; suitable control measures may include use of extra low voltage equipment and / or residual current devices.

Communications

20. Effective communications should be established between people inside and outside the confined space and to summon help in an emergency; this may be simple verbal contact or require the use of intrinsically safe communication equipment depending on the nature of the task or activity and the environment in which it takes place.

21. Effective communications should be maintained by the PIC to ensure all persons who may be affected by the work or whose actions may affect the work, are informed and all necessary control measures are identified, put in place and the effectiveness monitored.

Accessibility

22. An assessment should be made to ensure entrances and exits are big enough to allow workers wearing all the necessary equipment and PPE; and provide ready access and egress in an emergency, e.g. the size of the opening may mean choosing air-line breathing apparatus in place of self-contained equipment which is more bulky and therefore likely to restrict ready passage. The assessment should consider the types of equipment used by emergency teams, especially local Fire and Rescue Services as it may impact on the minimum sizes of entrances and exits that they can operate in.

Testing the Air

23. Where the requirement to test the air is identified in the risk assessment, confined spaces should be checked by a competent person, before entry, to ensure that they are free from flammable and toxic gases or vapours, and that the atmosphere is fit to breathe. Testing should be carried out by a competent person using a suitable gas detector which is correctly calibrated. Records of the tests should be formally recorded, and the results passed to the PIC. Where the risk assessment indicates that conditions may change, or as a further precaution, continuous monitoring of the air will be necessary.

24. Testing for toxic or flammable atmospheres will not indicate oxygen deficient atmospheres, therefore testing regimes should include checking for suitable levels of oxygen. Atmospheres that are toxic, flammable or oxygen deficient may vary in different levels within the confined space; therefore, the testing regime adopted should take this into consideration and appropriate readings taken.

Provision of Ventilation

25. When assessing the levels of ventilation required, consideration should be given to the work activity to be performed and the equipment used as they will have an impact on the rate of oxygen usage and possible build-up of toxic atmospheres. If it is not possible to increase the number of openings and therefore improve ventilation, mechanical ventilation may be necessary to ensure an adequate supply of fresh air. This is essential where portable gas cylinders and diesel fuelled equipment are used inside the space because of the dangers from build-up of engine exhaust. Carbon monoxide in the exhaust from petrol-fuelled engines is so dangerous that use of such equipment in confined spaces should never be allowed.

Provision of Breathing Apparatus

26. If the air inside the confined space cannot be made fit to breathe because of lack of oxygen or the presence of gas, fumes or vapours; positive pressure air fed masks should be used (see JSP 375, Volume 1, Chapter 15).

Isolation of Equipment and Services

27. If there is the potential for gas, fumes, liquid or vapour etc to be released into the confined space, the physical isolation of services etc should be a requirement of the PTW. In all cases a check should be made to ensure isolation is effective and does not compromise any safety critical systems.

Cleaning Confined Spaces Before Entry

28. If the risk assessment identifies that there is a risk of flammable / toxic gases or vapours etc being released in a confined space by the disturbance of residues etc., while a task or activity is being undertaken, the confined space should where practicable, be cleaned prior to any person entering into it.

Provision of Rescue Harnesses

29. Where the requirement to wear safety harnesses is identified in the risk assessment, all persons working within the confined space must be attached to an appropriate lifeline that feeds back to a manned point outside the confined space.

Additional Emergency Arrangements

30. When things go wrong people trying to help may unwittingly expose themselves to serious and immediate danger if they are not aware of the risks and the safe system for extracting casualties; therefore, effective additional arrangements for raising the alarm and carrying out rescue operations in an emergency should be developed, promulgated and implemented. These plans should be specific for each task or activity depending on the nature of the confined space, the risks identified and consequently the likely nature of an emergency rescue. The following factors should be considered in the emergency planning and effectively managed throughout the duration of the task or activity:

a. how can an emergency be effectively communicated from inside the confined space to people outside so that rescue procedures can start;

b. provision of suitable rescue and resuscitation equipment will depend on the likely emergencies identified;

c. where such equipment is provided for use by rescuers, training in correct operation is essential; and

d. the need for properly trained competent people, sufficiently fit to carry out their task, ready at hand and capable of using any equipment provided for rescue, e.g. breathing apparatus, lifelines, firefighting equipment etc. Rescuers also need to be protected against the cause of the emergency.

31. If it is intended as part of the emergency arrangements to involve the use of external agencies such as local Fire and Rescue Services and or specialist rescue groups to affect a rescue, they should be involved in the planning and provided with a copy of the plan. Where there is to be an involvement of outside agencies, the following issues should be included in the risk assessment:

a. the time delay between contacting the emergency service and attendance at site;

b. the effectiveness of contact arrangements;

c. the ability of the emergency services to affect a rescue, e.g. they may only have access to self-contained breathing apparatus which may limit accessibility; and

d. levels of support and assistance required by the emergency services.

32. Confined space working should never be conducted alone. Whilst Defence personnel are in a confined space, there should be a competent person stationed outside to take appropriate action (e.g. raising the alarm, liaison with emergency services) in the event of an emergency (under no circumstances should they enter the confined space). The competent person must remain outside the confined space until relieved or otherwise instructed by the emergency services.

Retention of Records

33. All records etc. are to be retained in accordance with JSP 375, Volume 1, Chapter 39 (Retention of Records).

Related Documents

34. The following documents should be consulted in conjunction with this chapter:

a. JSP 375, Volume 1;

(1) Chapter 08 - Risk Assessment;

(2) Chapter 09 - Dangerous Substances and Explosive Atmospheres (DSEAR);

(3) Chapter 15 - Personal Protective Equipment;

(4) Chapter 22 - Work Equipment;

(5) Chapter 30 - Permit to Work;

(6) Chapter 33 - Construction and Excavation;

(7) Chapter 34 - 4C System: The Management of Visiting Workers and Contractors; and

(8) Chapter 39 - Retention of Records.

b. JSP 375, Volume 3;

(1) Chapter 2 - Common Requirements; and

(2) Chapter 6 - Confined Spaces.

c. Other MOD Publications;

(1) DSA01.1 – Defence Policy for Health, Safety and Environmental Protection;

(2) DSA01.2 Chapter 2 – Requirement for Safety and Environmental Management Systems in Defence; and

(3) BR 875 (For use by the Royal Fleet Auxiliary) - Vol 5 Part 1 Chap 4.

d. Legislation and Guidance;

(1) Health and Safety at Work, etc. Act;

(2) Management of Health and Safety at Work Regulations;

(3) Confined Spaces Regulations;

(4) Dangerous Substances and Explosive Atmospheres Regulations;

(5) The Merchant Shipping (Entry into Dangerous Spaces) Regulations;

(6) HSE INDG 258 - Safe Working in Confined Spaces;

(7) HSE L101 - Safe Working in Confined Spaces Approved Code of practice.

Flow Diagram for work involving confined spaces outside the scope of JSP 375, Volume 3, Chapter 6