

RenewableUK: Health and Safety Circular

Managing Confined Spaces: Overview of Principles and Practices

2015 | H&S Circular 01

Overview

This circular is intended to provide an overview on confined space risks as they relate to onshore and offshore wind energy projects. It aims to support existing guidance including:

- HSE Guidance:
 - Safe work in confined spaces – Confined Spaces Regulations (“CSR”) 1997 – Approved Code of Practice and guidance (L101)
- RenewableUK Guidance:
 - Onshore Wind H&S Guidelines (2015)
 - Offshore Wind and Marine Energy H&S Guidelines (2014)

The circular aims to reinforce what should be accepted safe working practice but highlight in particular:

- Duty holders and especially designers, contractors and employers should take every opportunity to avoid the need to work in a confined space – prevention is invariably quicker, safer and more efficient.
- Confined space hazards are a potential significant risk in the wind sector when present by location (e.g. monopile) or created by work activity (e.g. recharging N2 accumulators / welding in Hub or Blade). Compliance with the applicable regulations is not a “tick box” exercise as situations, hazards and risks can change rapidly. Failure to manage confined space work effectively could and does have fatal consequences.
- The changing nature of the working environment is such that policies and procedures for managing confined spaces need to be kept under regular review. Supervisors and workers needed to be “situationally aware” (i.e. Keep Alert) with a clear understanding that a perceived “safe” working environment can quickly become an unsafe confined space as a result of a new work activity or other change.
- Training (theoretical & practical) is essential. It should be appropriate to the level of risk concerned and be reviewed and refreshed on a regular basis. Managers and supervisors also need a clear appreciation of the risks and precautions involved.

- Managing confined space risks should not be done in isolation but should be integrated into other health & safety arrangements including emergency response planning, first aid, and any governing Safety Rules applicable.

Definitions & Hazards

Under the Confined Space Regulations 1997 a ‘confined space’ must have both of the following defining features:

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

Potential spaces in the wind sector that are substantially (though not always entirely) enclosed include, but not necessarily limited to:

- Hubs
- Nacelles
- Yaw decks
- Blades
- Access tower sections
- Transition pieces
- Air tight deck
- Foundations
- Switch gear rooms
- Transformer rooms
- Substations (specified locations)
- Excavations
- Battery rooms

Specified risks in the wind sector that are present or are reasonably foreseeable include, but not necessarily limited to:

- Serious injury or death due to fire or explosion
 - Fires from hot work, gearbox failures, electrical faults etc.
- Explosions from switchgear, transformers, batteries, stored flammable materials (e.g. H₂ gas from pitch batteries).

- Loss of consciousness arising from increased body temperature
 - Routine maintenance (e.g. in blade, hub, nacelle) during extreme weather conditions
 - Heat stress/strain due to excessive physical activity in an area of limited ventilation (e.g. work in blade internals)
- Loss of consciousness or asphyxiation arising from gas, fume, vapour, or lack of oxygen
 - Fume and chemical exposure from welding and related hot work
 - Chemical vapours from painting, blade repair
 - Exposure to naturally occurring toxic gases in soils & bedrock (e.g. H₂S)
 - Oxygen displacement in foundations due to naturally occurring gases in soils and bedrocks (e.g. H₂S, CO₂ etc.)
 - Oxygen displacement from release of heavier than air Sulphur Hexafluoride (SF₆) in substations, switch rooms)
 - Oxygen displacement due to corrosion of certain structural materials (e.g. foundations)
 - Oxygen displacement due to release of inert gases (e.g. nitrogen in hydraulic accumulators, and/or recharge bottles)
 - Ingress of ground or sea water into foundations and transition pieces
 - Any location with inadequate natural or forced air changes
 - Release of asphyxiants (e.g. CO₂) from fire suppression systems (noting isolation procedures are usually installed)

Although not explicitly covered by the CSR, it is good practice to also consider low temperature hazards in any risk assessments carried out.

Legal Duties

The duties to manage confined space risks are set out in – Confined Spaces Regulations 1997 (“CSR 97”) – Approved Code of Practice and Guidance. In addition to fulfilling the requirements of the CSR 97 employers may also have additional duties under the following:

- Health & Safety at Work etc. Act 1974
- Management of Health & Safety at Work Regulations 1999
- Supply of Machinery (Safety) Regulations 2008
- Construction (Design & Management) Regulations 2015
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013

Other regulations are listed in the ACoP.

Risk Assessment

Employers are required to undertake suitable and sufficient assessment of all significant risks to workers and any others who may be affected by their work activities. The risk assessment and supporting arrangements would be expected to consider and where necessary record:

- Is the space (or could it become) a confined space (see Figure 1)
- The measures to avoid work in confined spaces



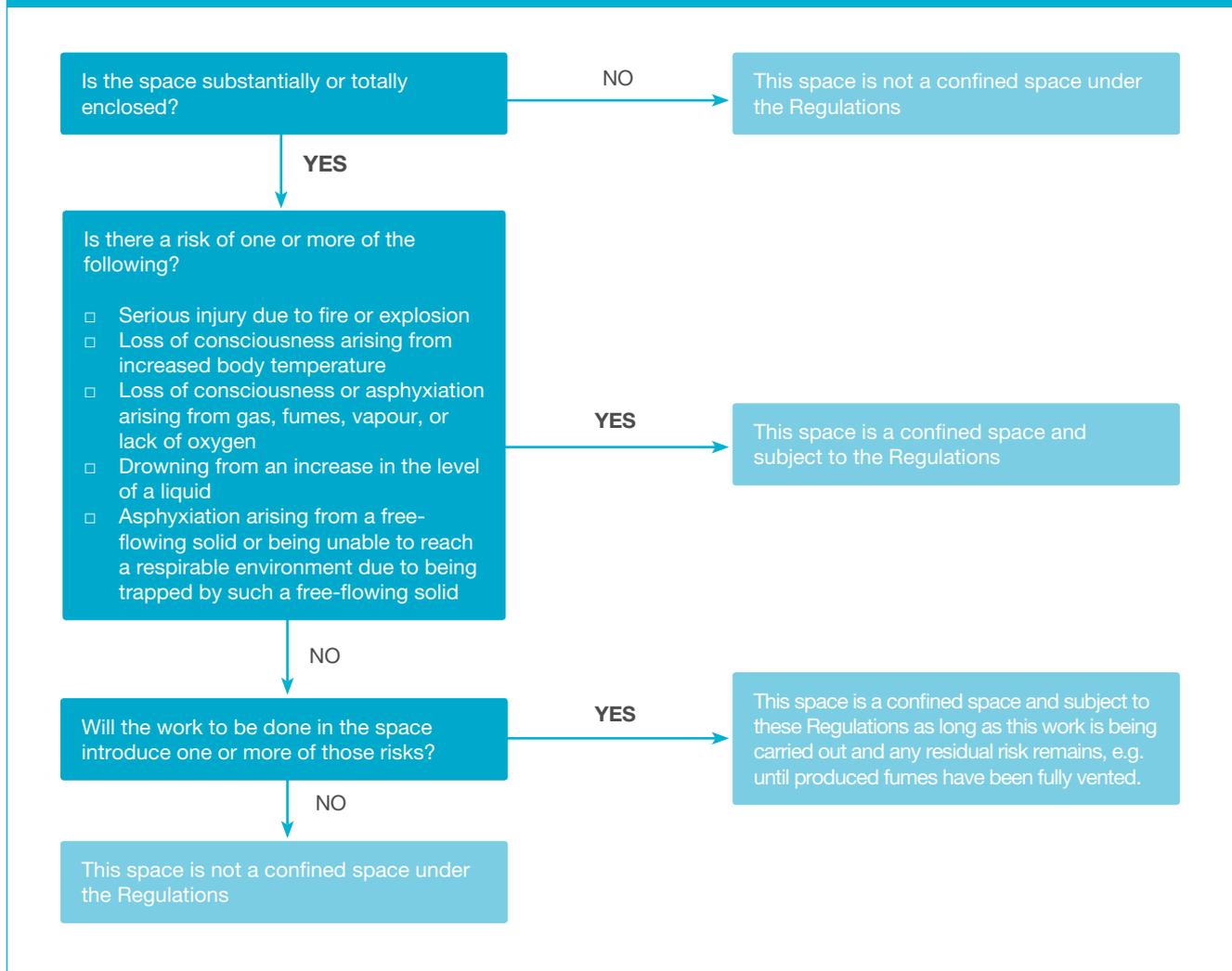
- Necessary precautions to be included in the safe system of work
- Suitable emergency and rescue procedures, equipment, resources, and competent staff
- Provision of information training instruction and supervision

Risk assessments should be based on all relevant information about the confined space. This could include:

- As built engineering drawings and relevant information and instructions supplied by OEM's and designers
- Modified and updated plans (e.g. post commissioning)
- Information on the residual risks supplied by OEM's in accordance with the Machinery Directive
- Relevant equipment information detailing hazards (e.g. SF₆ in transformers or nitrogen in hydraulic transformers)
- Relevant geotech/geophys data on soils or geological conditions – in particular relevant for foundations and transition pieces
- Meteorological data (relevant to inform on extremes of temperature)

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

For sites operating under Wind Turbine Safety Rules (“WTSR”) other nominated competent persons such as authorising engineers, authorised technicians, competent technicians, operational controllers and other selected persons should be involved and informed of the risk assessments performed.

Figure 1 – Is the area a confined space? (Source: HSE-L101)

Safe Systems of Work

All work carried out in a confined space must be carried out in accordance with a safe system of work (SSoW) addressing all significant specified risks. The development of SSoW would be expected to take account of the:

- Particular characteristics of the site, turbine or associated balance of plant
- Specified risks that are identified or foreseeable
- Interface and/or alignment with existing safety rules or procedures (e.g. WTSR)
- Any additional requirements arising out of legal obligations that may apply
- Competencies and experience of the individual operatives for dealing with both operations and emergency situations
- Availability of equipment and additional resource should it be required (e.g. isolated work locations)

Emergency Rescue

CSR 97 and supporting guidance requires duty holders to make suitable arrangements for emergency rescue. This will depend on the nature of the confined space, the risks identified and the likely nature of an emergency rescue. To be suitable and sufficient the arrangements for rescue and resuscitation should cover:

- Rescue and resuscitation equipment
- Raising the alarm and rescue
- Safeguarding the rescuers
- Fire safety
- Control of plant
- First aid
- Public emergency services
- Training

Effective communication protocols need to be in place to ensure all these arrangements are promptly and effectively made available to all parties (internal and external) who may need to be informed.

Training

Confined space awareness

The HSE ACoP states that specific training for work in confined spaces will depend on an individual's previous experience and the type of work they will be doing.

In most cases wind technicians and other nominated competent persons with authorised access to wind turbine and designated locations within will have undertaken significant training including recognised industry courses (e.g. RenewableUK/GWO), technical training for the work involved and company/site inductions and tool box talks. In such cases limited additional formal confined space training will be required to address the general awareness training required by the ACoP. A suitable gap analysis of training should however still be performed (& documented) to identify the specific gaps in confined space knowledge as it applies at a local level. This could include:

- Details on the specific rescue arrangements in place for that site/ turbine
- Site communications protocols in place
- Particular confined space hazards at that site
- How Safety Rules (e.g. WTSR) are applied at that site and how they relate to any confined space arrangements in place

In most cases any gaps in knowledge can be addressed via in house and/or site training and induction programmes.

Entry into a confined space

In situations where entry into a confined space is required then formal training is likely to be required. There are currently no wind specific qualifications, however regulated qualifications exist for emergency rescue and casualty recovery from confined spaces are available. These include Level 2 to Level 5 qualifications depending on the hazard classification of the confined space (low to high) and the role any individual is expected to perform, (e.g. team member, top man, manager etc.)

Important Message

There remains some debate in the wind industry about the terms used to define confined and/or restricted spaces. It is emphasised that irrespective of whether a location/ specified risk is classed as a confined space or not, employers will in every case have a responsibility to:

- Carry out suitable risk assessments of the task & working space
- Ensure measure are taken to avoid the need to enter a confined or restricted space
- Put in place suitable health & safety arrangements and safe systems of work
- Ensure emergency procedures are in place and tested as effective
- Ensure all plant and equipment is suitable and safe for the work environment
- Provide adequate training for all persons at risk and in particular rescuers

Further Information & Links

- HSE Safe work in confined spaces – Confined Spaces Regulations 1997 – Approved Code of Practice and guidance (L101 – Third edition 2014)
- HSE guidance on Management of Confined Spaces
- RenewableUK – Onshore Wind H&S Guidelines (2015 – Issue 1)
- Offshore Wind and Marine Energy H&S Guidelines (2014: Issue 2)
- Wind Turbine Safety Rules v3 & Supporting Guidance (2015: Issue 1)

Disclaimer

The contents of this circular are intended for information and general guidance only, do not constitute advice, are not exhaustive and do not indicate any specific course of action. Detailed professional advice should be obtained before taking or refraining from action in relation to any of the contents of this circular or the relevance or applicability of the information herein.



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