

STORM WATER RETENTION TANKS

MAINTENANCE INFORMATION FOR HEALTH AND SAFETY FILE

As required under the
Construction (Design and Management) Regulations 2007 ACoP

STORM WATER RETENTION (DRAINAGE) TANKS

The information and recommendations given in this document are for inclusion in the Health and Safety File of the project in which the installation of Storm Water Retention Tanks (The Tanks) have been undertaken.

This information is designed to alert those responsible for the use, maintenance, repair and cleaning of the Tanks to any significant Health and Safety Risks, of which Tubosider (UK) Ltd are aware, at the date of installation. It is not meant to absolve those responsible, for the any of the above activities, from carrying a full and proper Risk Assessment before commencement of any activities associated with repair or entry to the Tanks.

Due to the potentially long time-scales involved, it is not possible for Tubosider (UK) Ltd to draw up precise Safe Working Procedures and associated Emergency Rescue Plans, for entry to tanks. However, the points to be considered, by those responsible for the formulation of the Safe Working Procedures and Rescue Plans, are given below. These points are based on the Health and Safety legislation in force at the time the Tanks were installed.

It should also be noted by those responsible for repair/entry to the Tanks, that Tubosider (UK) Ltd does not have a duty to update this document, if additional information comes to light, and it is the responsibility of those responsible for the repair/entry to the Tanks to ensure that all Health and Safety legislative requirements are being met.

It is anticipated that over the typical 50 year design lifetime of the Storm Water Retention Tanks there will be requirements for man access to the inside of the tank for inspection and/or maintenance purposes. For example, these operations could include the refurbishment of the zinc coating of the tank wall and/or the bituminous compounds within the tank. This may involve the use of solvent based paints requiring special precautions to be taken for those workers undertaking the painting. Any in situ repair to the steel wall of the tank, whether inside or outside, would require that the work be considered as welding within a confined space.

Sludge removal would concern consideration of jetting or suction requirements together with an understanding of the potential release of toxic gases when the sludge is disturbed.

Tubosider (UK) Ltd stress that any access to these tanks is potentially very hazardous and all proper precautions, related to confined space entry, should be taken at all times.

To aid those responsible for the maintenance of these tanks the following minimum recommendations, which are commensurate with 1997 Confined Space Regulations, should be adhered to when entry to the tanks is necessary.

It should also be stressed that the recommendations contained in this document only deal with the minimum of considerations to be taken on entry to the tanks.

Any operations to be undertaken in the tanks will require additional information and a further proper Risk Assessments.

As recommended by the Health and Safety Executive, Tubosider (UK) Ltd considers that a "Permit to Work" system should be set up by those requiring entry to the tanks. In setting up a "Permit to Work" details of the work to be done, the precautions to be taken in the correct sequence, and also records an acknowledgement of the hazards by those planning and undertaking the work.

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1. STORM WATER RETENTION TANKS - CONSIDERATIONS FOR ENTRY

Serious accidents can occur when work is undertaken in what the Health and Safety Executive describe as "confined spaces". All Storm Water Retention Tanks MUST be considered as a confined space.

Confined spaces can harbour dangerous concentrations of toxic and/or flammable gases and vapours.

Ignorance of the potential dangers can lead to tragic results. Unplanned rescue attempts can also lead to tragic results for both the rescuer and the injured party.

The above concerns are applicable to any installation which employs Tubosider (UK) Ltd Storm Water Retention Tanks.

Generally it would be safe to assume that there will NOT be enough natural ventilation to keep the air fit to breathe within any Storm Water Retention Tank. Over a long period of time dangerous situations can occur within a tank. Methane production from decaying vegetation etc., within the sludge, may create an explosive atmosphere. These gases might not be evident when the initial air checks were made but could be given off when the sludge is disturbed by people walking through the sediment. An oxygen deficient atmosphere can be caused by oxidation taking place at the walls of the tank.

It should also be noted that the smaller tanks (below 1.5m diameter) can provide restricted access which makes it very difficult to provide illumination, ventilation and rescue. With larger tanks, those above 1.5m diameter, although access can be easier they may still present the same toxic or flammable gas hazard.

It is recommended that tanks be emptied before entry, and the atmosphere within the tank tested for the levels of oxygen and flammable/toxic gases. The results of these tests will then indicate the correct type of breathing apparatus to be used by any person entering the tank.

1. Initiating Event

- a. In general, over the 50 year design lifetime of the Storm Water Retention Tanks, it will be necessary for requirements, such as maintenance inspection, where man access to the inside of the tank will be necessary. It is recommended by Tubosider (UK) Ltd that these inspections take place at a maximum of 10 year intervals.
- b. Depending on the storage capacity and the length of the pipe work making up the tanks, entrance to the tanks will be made through (a minimum of at least one) properly designed access shafts.

2. General Requirements for entering a Storm Water Retention Tank.

- a. To be fully aware of:
 - i. Gas Detection Testing requirements and results.
 - ii. Risk Assessments.
 - iii. Emergency Rescue Plans and Procedures.
- b. To ensure that the proper protective equipment is available if required:
 - i. Safety Boots.
 - ii. Self-Contained Breathing Apparatus (SCBA).

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- iii. Safety Harness and Lifeline (possibly connected to a winch).
 - iv. Safety Goggles/Visor.
 - v. Protective Gloves.
 - vi. Overalls.
- c. Operatives are competent to perform the required task.
 - d. To ensure that all persons involved understand their functions and responsibilities and are competent to perform their required tasks eg: Site Manager, Stand-by Man, Operatives undertaking task.

3. Legislation

- a. Those with an interest in entering the Storm Water Retention Tanks must understand that the legislation listed below is in force at the time of preparation of the Health and Safety File for the project for which the Tanks have been installed.
- b. Those responsible should ensure that, at the time of any entry to the tanks, this legislation is valid.
- c. They must also work to any new legislation which came into force following installation.
- d. The relevant legislation in operation **AT INSTALLATION** of the tanks is as follows:
 - i. The Construction (Design and Management) Regulations 2007 (ACoP) incorporating The Construction (Health, Safety and Welfare) Regulations 1996.
 - ii. The Health and Safety at Work etc Act 1974.
 - iii. The Management of Health and Safety at Work Regulations 1999.
 - iv. The Manual Handling Operations Regulations 1992 (as amended in 2002).
 - v. The Personal Protective Equipment at Work Regulations 1992. (as Amended)
 - vi. The Provision and Use of Work Equipment Regulations 1998.
 - vii. The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995. (as Amended)
 - viii. The Workplace (Health, Safety and Welfare) Regulations 1992.

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Tasks		Key Points	
1.1.	Before any entry ensure that all persons involved with the work are aware of Emergency Rescue Plan.	1.1.1.	Understanding of the Emergency Rescue Plan is necessary to ensure that all individual responsibilities are understood.
		1.1.2.	Keep rescue equipment, including breathing apparatus, winches etc near entrance to the tanks.
1.2.	Ensure all operators are aware of task requirements and the hazards that may be presented.	1.2.1.	Hazards will be identified in the Risk Assessments.
		1.2.2.	Additional hazards may be presented by the physical conditions of the tanks and site.
		1.2.3.	If painting/welding to take place mechanical/forced ventilation is required.
		1.2.4.	Ensure that all sources of ignition are removed and all working plant is positioned away from the Tanks entrance area.
		1.2.5.	Ensure that the area is designated as "NO SMOKING".
1.3.	Ensure that water inlets to Tank are blocked off or that watcher will advise on any decline in weather conditions to those working in the Tanks.	1.3.1.	Ensure watcher is FULLY aware of this responsibility – watcher should remain on station all the time.
		1.3.2.	Rain can quickly cause a rapid influx of water into the Tanks leading to flooding.
1.4.	Ensure all necessary equipment (any plant plus PPE) is present and accessible.		
1.5.	Use gas detection equipment to test atmosphere for oxygen level within the Tank.	1.5.1.	Lower equipment into Tank and test for oxygen deficiency / enrichment.
		1.5.2.	Ensure tank is monitored throughout task.
1.6.	Use gas detection equipment to test for flammable / toxic gases within the Tank.	1.6.1.	Lower equipment into Tank and test for toxic gases such as carbon monoxide, carbon dioxide, natural gas and organic gases.
		1.6.2.	Ensure tank is monitored throughout task.

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Tasks		Key Points	
1.7.	Determine whether any mechanical or natural ventilation is required (Refer to 1.2.3.). If in any doubt use mechanical ventilation.	1.7.1.	Determined by Site Manager. DO NOT enter Tank yet.
		1.7.2.	Note that when sludge's and residues are disturbed dangerous gases can be produced inside the tanks.
1.8.	If Self-Contained Breathing Apparatus (SCAB) is to be used ensure that it is working correctly and tanks are full.	1.8.1.	Inspection must be undertaken by a competent person.
		1.8.2.	Equipment must only be worn and used by operatives who have been sufficiently trained.
1.9.	Ensure stand-by man is on station ready to observe person inside Tank.	1.9.1.	DO NOT enter Tank yet.
		1.9.2.	Stand-by man to remain on station and to ONLY undertake observation / communication tasks.
1.10.	If applicable, ensure any personal communications system is operational.	1.10.1.	For example this could be a two-way radio - must be intrinsically safe (e.g. avoid explosive gas ignition) and operate underground.
			Stand-by man should remain in regular contact with person(s) inside Tank.
		1.10.2.	
1.11.	Ensure adequate illumination is available.	1.11.1.	Illumination method has to be intrinsically safe (e.g. avoid explosive gas ignition).
1.12.	If required set up any winch apparatus.	1.12.1.	Winch will be set up for access and also to aid emergency rescue.
1.13.	Attach harnesses with lifelines.	1.13.1.	All persons going inside Tank should have lifelines attached to a secure point outside the work area.
1.14.	Attach lanyard to winch and harness using Karabiner.	1.14.1.	Ensure all lanyards, lifelines, harnesses and karabiners have been inspected by a competent person and are suitable for purpose.
		1.14.2.	Ensure all equipment is rated with the correct Safe Working Loads (SWLs).

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Tasks		Key Points	
1.15.	If step 1.12. is not acceptable then: Use fitted access internal ladder or secured temporary ladder and descend into tank.	1.15.1.	Entry should only be permitted by Site Manager when air is breathable: If air is not breathable then ventilation techniques should be repeated until it is.
		1.15.2.	Ensure that temporary ladder has been inspected by a competent person and is "in date".
1.16.	Ensure stand-by man is in attendance until all persons evacuate the tank.		
1.17.	Ensure all drainage inlets are unblocked, then clean / hose down area.		
1.18.	On completion of task make sure all equipment is removed from the Tanks.		
1.19.	Record work details etc in the project Health and Safety file.		

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2. STORM WATER RETENTION TANKS - EMERGENCY PLAN CONSIDERATIONS

Serious accidents can occur when work is undertaken in what the Health and Safety Executive describe as "confined spaces". All Storm Water Retention Tanks MUST be considered as a confined space.

Confined spaces can harbour dangerous concentrations of toxic and/or flammable gases and vapours.

Ignorance of the potential dangers can lead to tragic results. Unplanned rescue attempts can also lead to tragic results for both the rescuer and the injured party.

The above concerns are applicable to any installation which employs Tubosider (UK) Ltd Storm Water Retention Tanks.

For example, dangerous effects can occur which create oxygen deficiency in the Tanks can be caused by methane production from decaying vegetation, etc in the sludge or even oxidation effects taking place in the walls of the tank. These gases might not be evident when the initial air checks were made but would be given off when disturbed.

It should also be noted that the smaller tanks (below 1.5m diameter) can provide restricted access which makes it very difficult to provide illumination, ventilation and rescue. With larger tanks, those above 1.5m diameter, although access can be easier they may still present the same toxic or flammable gas hazard.

Procedures for Emergency Rescue have to be formulated BEFORE entry into any confined space can occur. This is due to the extreme hazards that are posed by this type of working environment.

Confined spaces can harbour dangerous concentrations of toxic and/or flammable gases and vapours. If someone has been overcome by such gases then a Rescue must be attempted ONLY by specifically identified and trained persons and ONLY following the Plans drawn up with the aid of this document.

1. Initiating Event

- a. In general, over the 50 year design lifetime of the Storm Water Retention Tanks, it will be necessary for requirements, such as maintenance inspection, where man access to the inside of the tank will be necessary. It is recommended by Tubosider (UK) Ltd that these inspections take place at a maximum of 10 year intervals.
- b. Depending on the storage capacity and the length of the pipe work making up the tanks, entrance to the tanks will be made through (a minimum of at least one) properly designed access shafts.
- c. During the maintenance tasks performed on the tanks, suitable and sufficient Emergency Rescue plans must be drawn up and those involved properly trained for the requirements of an emergency rescue from the confined space of the tanks.

2. General Requirements for Rescue Attempts.

- a. To be fully aware of:
 - i. Number of persons involved.
 - ii. Risk Assessments.

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- iii. Telephone numbers of the Emergency Services.
 - b. To ensure that the proper protective equipment is available if required:
 - i. Safety Boots.
 - ii. Self-Contained Breathing Apparatus (SCBA).
 - iii. Safety Harness and Lifeline (possibly connected to a winch).
 - iv. Safety Goggles/Visor.
 - v. Protective Gloves.
 - vi. Overalls.
 - c. Operatives are competent to perform the required task.
 - d. To ensure that all persons involved understand their functions and responsibilities and are competent to perform their required tasks eg: Site Manager, Stand-by Man, Operatives undertaking task.
3. Legislation
- a. Those with an interest in entering the Storm Water Retention Tanks must understand that the legislation listed below is in force at the time of preparation of the Health and Safety File for the project for which the Tanks have been installed.
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STORM WATER RETENTION TANKS EMERGENCY PLAN CONSIDERATIONS			
Tasks		Key Points	
2.1.	Ensure that all rescue equipment is available and positioned at entrance to tanks and that stand-by man must be aware of his responsibilities.	2.1.1.	Rescue equipment may include winch, lanyards, harnesses, First Aid kits, blankets etc.
2.2.	Stand-by man must be in audible contact with operative inside tank and should be in visual contact.	2.2.1.	Contact can be achieved by the use of 2-way radio.
		2.2.2.	Stand-by man must remain in regular contact
2.3.	Stand-by man to assess the extent of the incident.	2.3.1.	Can be determined by a loss of verbal communication or other suspicious circumstance.
		2.3.2.	DO NOT ENTER THE CONFINED SPACE.
		2.3.3.	Stand-by man must remain on station throughout.
2.4.	Stand-by man to raise alarm and ensure that this is correctly undertaken.	2.4.1.	This will have been arranged prior to task commencement and will have been communicated to all operatives involved.
		2.4.2.	Call emergency services BEFORE any other action is taken.
2.5.	Operate winch to haul operative to the surface.	2.5.1.	If operative is hauled to surface then trained first-aider to apply revival techniques as appropriate.
		2.5.2.	If operative becomes stuck then follow step 2.6.
2.6.	If it has been agreed that it will be safe to attempt a rescue then inform trained rescue team.	2.6.1.	Site Manager will decide if it is safe to make rescue attempt.
2.7.	Stand-by man will inform the rescuing team / authorities of the nature of the incident and any other relevant details.	2.7.1.	Stand-by man will supply as much additional information as possible.
2.8.	Enter all details of incident in on site Accident Book.	2.8.1.	Ensure that this is achieved as soon as possible after the incident to ensure accuracy in reporting.
2.9.	Stand-by man to arrange the reporting of the incident to the enforcing authorities.		

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Tasks		Key Points	
2.10.	Ensure that Tanks are properly secured to ensure that unauthorised access is prevented.		
2.11.	Ensure all rescue equipment is removed from site.		
2.12.	Record work details etc. in the project Health and Safety File.	2.12.1.	To ensure that details of events are communicated to others so details can be taken into consideration in the formulation of subsequent tasks.

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