

## Ladders into Confined Spaces 101

Risk assessment and compliance with Australian Standards will always be an important step in managing water quality and safety issues within water storage tanks. However, applying appropriate Standards can be ambiguous unless an experienced risk analysis is undertaken – designers, regulatory authorities and clients need to consider **all of the hazards involved** (to both water quality and operations personnel) if sensible outcomes are to be achieved.

Access systems into most tanks have been poorly designed to date – they haven't considered the confined space implications to the personnel involved, let alone how they affect water quality within the tank. Water storage tanks have one main purpose in life - to store water in a secure, high quality environment for the consumers. This has often been overlooked by the asset owners and OH&S regulators, in an attempt to satisfy workplace compliance issues and safety to the various personnel operating the asset. By applying an experienced, commonsense approach to all of the relevant issues water quality can also be improved.

Hatch and platform areas must be protected against natural and deliberate contaminants that can enter the tank – this can be as simple as designing the hatch frames and covers to fully seal the tank, rather than trying to address several low importance issues such as 'trip hazards' and 'hand contact' requirements on access ladders.

Designers and clients have neglected the fact that personnel qualified to enter a confined space should be quite capable of stepping over a raised hatch frame without the assistance of a continuous protruding ladder stile to guide them – perceptions of a 'trip hazard' that may be encountered once or twice a year have overtaken the fact that contamination to the tank **WILL occur continuously** 365 days of the year if the hatch area is defective.

Water security has been compromised by not accurately assessing the 'risk and likelihood' guidelines designed to ensure safe, holistic outcomes - there are plenty of better options to assist personnel into the hatch area and onto the ladder safely, including the ergonomics of ladder placement and positioning to favour safety when climbing **down**, rather than **up**.

Consider an example of climbing up a ladder and onto the platform area – it is relatively easy to climb **upwards** as the body is comfortable and all the hazards can be viewed. However the experience of 'feeling' for the first rung with your foot as you move **down** the ladder, is quite different – this is a critical point that has been overlooked and it serves to illustrate that ladder safety is not equally balanced when travelling both up and down.

Ladders **must** be positioned into a tank to favour the descent rather than the ascent – this is achieved by placing the ladder parallel to the wall where it can be stepped onto while facing straight ahead, rather than having to turn 180 degrees and step backwards onto the rungs, as in a '90 degrees' to the wall' type installation.

Ladders fitted into confined spaces have different functional requirements than those addressed in the Australian Standard 1657-1992 (Fixed platforms, walkways, stairways and ladders). The traditional ladder system of sloping stiles, enclosed cages and fixed platforms is not suitable for safe entry and exit using a harness and fall arrest system. AS/NZS 2865:2001 (Safe working in a confined space) 6.4 states: **Any modification to a confined space shall not detrimentally affect the safe means of entry to, exit from, or work in a confined space.**

Confined Space access ladders should be designed as a **vertical structure system** to allow for clear entry and exit when personnel are being lifted or lowered in a harness **(cages and platforms will not assist in this situation – they actually increase the risk of an accident occurring)**

A vertical ladder system will prevent 'Harness Trauma', by allowing personnel to climb under control and not be fully suspended throughout the confined space access operation - vertical ladders allow the climber to maintain balance and to avoid any 'swing and rotation' throughout the access operation.

Some designers are incorporating twin access systems – a traditional 'caged, angled and platformed' ladder system under one hatch, and a separate rescue hatch **without** a ladder system - this concept should be avoided in favour of a single access area with all the **combined resources placed into the one location**.

An FRP vertical ladder and a Titan Arm combination provides the ideal system for safe access and rescue capability – it places the safety component (the ladder) inside the confined space environment and the rescue system (the Titan Arm) outside the hazard area where it can be operated effectively by the confined space support team.

**It is possible to achieve all outcomes** simply and cost effectively, by assessing all of the risks involved, and not just making assumptions of the probabilities that may occur – there needs to be a strong practical input into all projects at the designer level, to make sure that past mistakes are not continued and that proven ideas, good practices and new materials are given the recognition and credit that they deserve.

