

Case study: Re-thinking rescues in confined spaces

The problem

When planning for a station outage at the Waipori 2A station, the team at Trustpower identified confined space entry and rescue as a critical risk. In particular, the maintenance activities inside the hydro generator scroll case presenting uniquely high-risk elements, due to the restricted working area and access point.

The Waipori 2A1 scroll case is effectively like a snail's shell, with a larger opening at one end (of 1.3m in diameter) which gradually reduces as it curves around in a circle back onto itself (reducing to a work area to less than 60 centimetres wide). To further add to the risk, the access into the scroll case is through a 68-centimetre diameter top-entry manway.

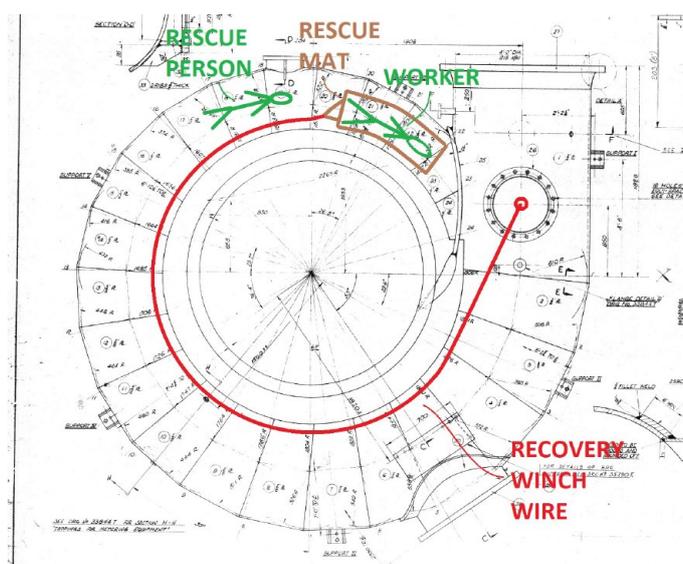
Any emergency evacuation from a hydro generator scroll case can be challenging, particularly with an unresponsive or injured worker. While the need for a rescue has a low probability due to other preventative controls in place, a rescue plan is needed.

During a workshop to design the confined space entry plan, one of the contractors joked that *"if he was to get stuck in the small end of the scroll case the only way to get him out would be to pull him out by his ankles..."*

The solution

While it was an off-hand comment, this led to a discussion to explore the idea of a 'rescue mat' for those working in the confined space. The theory was that workers could be lying on this mat, complete with retrieval loops, while working, which would enable a faster and easier rescue if required.

Further input included the idea to manufacture the mat from a welding blanket-type material to reduce the likelihood of it being damaged during the work, and also provide a more comfortable environment to help insulate the workers from the cold steel of the scroll case.



RESCUE USING RESCUE MAT – SCROLL CASE



Rescue Mat & Sling

The concept of a 'rescue mat' was developed and refined, and within a week a prototype was manufactured by a local seamstress.

What we learned

A trial rescue was organised prior to the actual work starting in the scroll case, with all those involved in the work, and an opportunity to refine the rescue mat and plan accordingly.

The trial rescue demonstrated the 'rescue mat' was a practical piece of equipment to assist in rescuing an injured person from a horizontal scroll case.

A number of operational lessons were learned and improvements identified, including adding:

- extra sections to the mat to wrap an injured person's arms to reduce the likelihood they would get snagged during an extraction
- extra reinforcing stitching along the line of pull-through of the mat.

RESCUE USING RESCUE MAT – SCROLL CASE



CSE RESCUE DRILL WORKER BEING WINCHED CLEAR – SCROLL CASE



CSE RESCUE DRILL USING RESCUE MAT – SCROLL CASE

The rescue mat was refined, and then ready for use in time for the outage in early 2019.

The key to success for this initiative was making space for innovation and ideas, listening to everyone involved, and not being prepared to accept the status quo. It's also a great example of taking rescue drills seriously, not just paying lip service to a critical control.