

Confined Space - Steam Vaults: It's Time to Change the Statistics

by

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When working in confined spaces, there is an increased risk of exposure for serious physical injury or possible death from hazards.

The next slide shows actual footage of a manhole steam explosion with a worker inside during the process for starting the steam system.



Confined spaces remain the leading cause of multiple fatalities in the workplace. These statistics will not change without equipping, protecting and training employees.

We changed our confined space procedures for our steam vaults after we had an incident where an employee was injured. These changes in safety, equipment and training resulted in heightened employee safety and productivity.

Confined Space - Steam Vaults

Three Learning Outcomes

Advance employee safety and productivity through:

- ▶ Increased Safety
- ▶ Improved Equipment
- ▶ Enhanced Training

INCREASED SAFETY

OLD PROCEDURES	NEW PROCEDURES
One 4-Gas Meter in vault after pre-entry inspection	Every entrant continuously wears a 4-Gas Meter in a steam vault after pre-entry inspection
No Fall Protection worn	Fall Protection harness without side D rings is worn by all Entrants
Permit was time consuming, had incomplete information and illegible handwriting	Permit is one form for multiple entries, designed for quick completion and provides pertinent information without redundancy
Outer rings were rusted in place. We were unable to remove them quickly in the event that a rescue is required	Created a Preventative Maintenance Program in order to provide quick removal of outer rings

INCREASED SAFETY

OLD PROCEDURES	NEW PROCEDURES
Did not do on-site training with local fire department	Annual training with the fire department's Technical Rescue Team. Now familiar with our challenges, campus and points of contact
Entry was permitted at any temperature. No established Work/Rest and Water Consumption Program	Entry temperature limited to 115 degrees. Instituted a Work/Rest and Water Consumption Program according to temperature
Heat Illness not covered in training	Heat Illness symptoms covered in training and stated on Permit
University Police unaware of work being done and/or the location of steam vaults	Vault maps distributed to AFD and University Police (plus training for UP). Technical Rescue Team was identified as the first responder team for rescue entry
For rescue, call 911. The call went to Metro Denver. No prior arrangements discussed with AFD.	3 way call with UP and AFD. UP escorts AFD to site. Our rescue actions verified by local fire department. Rescue script and actions are stated on Permit and in our Policy

IMPROVED EQUIPMENT

OLD PROCEDURES	NEW PROCEDURES
Lower 4-Gas Meters on a rope	Use meter pumps to reach low levels, provide real time readings and accurately sample the confined space
Two old, large and heavy meters	Eight compact light-weight meters and pumps (all same make and model)
No ladder extensions	Ladder extension in every steam vault
Two fans, each at 150 cfm	Two new fans, each at 12,000 cfm
One very heavy dewatering pump at 20 gpm	Two light-weight dewatering pumps each at 30 gpm
No cooling trailer	Cooling trailer for extreme situations - anytime the steam vault is above 115 degrees. It can reduce the temperature to 85 degrees in about an hour

ENHANCED TRAINING

OLD PROCEDURES	NEW PROCEDURES
8 hour class, one time. 2 hour refresher, annually.	2 hour initial training video, 2 hour rescue and a 4-Gas Meter training video, 2 hour refresher training video - all specific to our workplace
No 4-Gas Meter training (was only conducted by Safety personnel)	All employees must annually demonstrate the operation of the 4-Gas Meter before entering, working or attending a steam vault
Make-up training not readily available	All training is on video available as needed for new hires, transfers and as a refresher
Permits and Policy were not readily accessible	Permits and Policy are on a common electronic drive
No written duties of Entrant, Attendant and Entry Coordinator	Duties of Entrant, Attendant and Entry Coordinator are covered in training and stated in our Policy

CONCLUSION

- ▶ A workplace incident resulted in employees taking the lead to problem solve in order to improve our confined space steam vault procedures.
- ▶ Those leaders accomplished this by tapping into their strengths as well as utilizing existing and emerging resources.
- ▶ The result has been increased employee safety and productivity through increased safety, improved equipment and enhanced training.