



1. Incident Description:

On February 6th, 2012 and in one of CCC Projects one of CCC welders entered a 30" pipe to check the quality of the welds he had just completed.

The welder (deceased) asphyxiated and lost his conscious due to the high level of Argon gas which had created an oxygen deficient environment inside the pipe.

Then another welder, upon noticing no improvement from the collapsed welder, requested the welding helper to enter the pipe and drag him out. The helper went in and had breathing difficulties and he was pulled out. Then the second welder shouted for help and another site worker went inside and he had also breathing difficulties and came out. Then again he used his H2S Cartridge mask and went in. He managed to tie a rope around the feet of the unconscious welder and came out of the pipe. Then Crew members pulled the unconscious welder out of the pipe. *He was lucky! This does nothing to protect from an oxygen deficient atmosphere.*

The unconscious welder remained unconscious and non-responsive to resuscitation and later he was pronounced dead the clinic by the medical doctor.



2. Immediate Actions & Mitigation Measures:

Immediately upon notifying the incident and in order to prevent reoccurrence, CCC Managing Office-Safety & Controls Department requested all Projects Directors/Managers in CCC to instruct their construction teams where applicable to implement the following measures as per CCC HSE Management System:

1. Post warning signs of **NO ENTRY** on the open end of the pipe spools larger than Diameter 12" (See sample sign below)



2. Strict implementation of the **PERMIT TO WORK** System, and availability of the required **JSA's & Risk Assessments**.
3. Fabricate **Confined Entry Models** and use them in safety huddles to educate the workers about the hazards associated with confined spaces. (See 2 photos below).





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4. Place several models at critical locations for reminding the workers of the hazards in confined spaces. (*See photo below*)



5. Perform an HSE Stand-down this week to ALL Project personnel and deliver special Tool Box Talk (TBT) about confined spaces, inert gases, and flammables.
6. Ensure to have adequate supervision (construction supervision & HSE supervision) on all activities.

3. Fatality Root Causes:

The fatality was investigated and the following root causes were identified:

1. **Lack of Supervision:** Conflictive roles & responsibilities of Job Performer (JP) and Foremen created an environment where no one felt accountable / responsible.
2. **Violation by the individual:** The deceased welder entered a confined space without work permit.
3. **Lack of Hazard Awareness:** the Welder went inside the pipe without considering the potential hazards (i.e. asphyxiation)
4. **Inadequate Safety Barriers:** Pipe entrance was not secured allowing entry into pipe, warning signs were not provided.
5. **Inadequate Equipment:** Instead of inflatable Argon dams, foams pads were used and these pads were not adequately prepared / fixed.
6. **Behavior:**
 1. The Supervisor enforced incorrect behavior by sending welder into pipe one day before.
 2. Site Engineer pressed Foreman to avoid further delay and to fix it quickly.
 3. Colleague welder was terminated due to high repair rate (& for being trouble maker) putting other welders under pressure.
7. **Inadequate Audit/Inspection/Monitoring:**
 1. Inspection Test plan for Pipe Erection does not differentiate between the different sizes of line pipes.
 2. The Tool Box Talk (TBT) for the Welding Crew prior the activity was inadequate and not specific.
 3. There was no monitoring system to assess quality of the Task Risk Assessment prepared.

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8. Inadequate HSE Training:

1. Job Performer and Foreman were not trained on how to properly conduct and deliver Tool Box Talks (TBTs)
 2. Welders were subjected to intensive HSE training without effective feed-back to assess their knowledge.
 3. Inadequate online Task Risk Assessment training material, Confined space training was inadequate to all members of the welding crew.
9. **Work Exposure to hazardous Chemicals:** Oxygen deficient environment due to purging with Argon Gas and inadequate Argon dam.
10. **Inadequate Assessment of Needs and Risks:** Home-Made type Argon Gas Dam foam pads were used resulting in leakage instead of inflatable or other type of dam pads.

4. Corrective Actions to prevent reoccurrence:

Following the investigation, the below corrective actions are recommended in order to prevent reoccurrence:

1. Review welding procedures and Perform Technical analysis for risks associated with foams pads vs. inflatable pads.
2. Revalidate Task Risk Assessments related to welding activities ensuring all hazards and controls are in place.
3. Refresher HSE Training of all Task Risk Assessment for Teams leaders and HSE Personnel.
4. Conduct refresher training session for welding Job Performers and Foremen on how to conduct & deliver Tool Box Talks (TBTs).
5. Establish criteria for "Welder Performance Assessment" and link it with an incentive scheme.
6. Review effectiveness of HSE Training for workers to include job/trade specific risks based on the HSE Incidents Trend Analysis.
7. Ensure warning signs and/or barriers are placed at large pipe/vessel entry points.
8. Issue a circular to reinforce prohibition of unauthorized entry into pipes & vessels.
9. Implement 2-way communication strategy (Feedback from the recipients)
10. Site Engineers to undergo "Permit to Work "Training.
11. Review Area permit application to limit it to non high risk activities (high risk activities such as lifting would require dedicated Job Performer)

No ~~disc~~ Actions That relate to the Emergency Response/Rescue attempt that could have killed several others

5. Disciplinary Actions by Client:

Subsequent to the investigation, the Client decided to discipline the CCC involved personnel (Management) as follows:

Sr. No.	CCC Personnel	Disciplinary Action
1	Project Manager	Warning letter.
2	HSE Manager	To be removed from Project and not to be employed in any current or future project of the same Client.
3	Project Engineer	Final Warning letter.
4	Mechanical Site Engineer	To be removed from Project and not to be employed in any current or future project of the same Client.
5	Welding Foreman	To be removed from Project and not to be employed in any current or future project of the same Client.
6	Welding Supervisor	Final Warning letter.
7	Job Performer	Warning Letter.
8	Job Performer	Warning Letter.