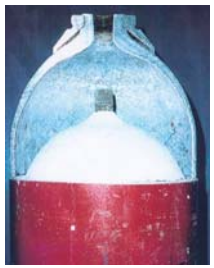
ACETYLENE GAS SAFETY SEMINAR 2009



Asia Industrial Gases Association

Council of Labor Affairs Executive Yuan

Taiwan High Pressure Gas Industrial Association

Safety & Health Technology Center

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ACETYLENE PRODUCTION
Auditing

Daniel Tregear

IMPORTANT NOTE

This presentation is intended to discuss internal company auditing.

It is not meant as an “either / or” vs. local regulatory review of your sites.

Information Sources

- European Industrial Gases Association
  - Code of practice Acetylene – IGC Doc 123/04/E [AIGA 022/05]
  - Major hazards (appendix 3 Acetylene Plants) IGC Doc 142/08
  - Guide to lime applications IGC Doc 143/08
- US-National Fire Protection Association (NFPA)
  - NFPA-51A : Standard for Acetylene Cylinder Charging Plants.
  - NFPA-55 : Standard for the Storage, Use & handling of Compressed Gases.
  - NFPA-5000 : Building Construction & safety Code.
- Acetylene Industry best practices.

Types of internal technical audit on an acetylene plant

OPS
- Confirming that A&B do the same thing
- Making sure the site is maintained

MAN
- Confirming that A&B are working to procedures
- Making sure the site is as it was designed

ENG
- Confirming that site is operating to CoP and Stds
- Making sure the site is as is meant to be today

Engineering audits

Why ?

How Often ?

Is acetylene special?

Is acetylene special

On the good side

- Not complex technology
- Very established technology

On the downside

- It is an explosive material
- It is a cylinder filling operation
- Lack of expertise

Engineering audit
Source documents

The HAZOP [Hazard and Operability study]

Industry Codes of Practice, Legal Standards, Company Standards, Books

Industry Gas Association subject working group

The audit

The team

The time

The tasks

- Preparing and validating the sites documentation
- Reviewing the most significant work processes
  - Work permit
  - Management of Change
- Validating the hazard review
- Undertake a checklist audit

Checklist auditing

Why?

What lists

- Health & Environment
- Offsite surroundings
- Acetylene process

What is on the acetylene list?

The acetylene checklist sections

- Storage of carbide
- Generator area
- Water seals
- Flash back arrestors
- Gas holder
- Cooler condenser
- Ammonia scrubber
- Low pressure driers
- Low pressure purifiers (dry and wet)
- Sulphuric tank
- Caustic tank
- Compressors
- High pressure oil coalescer
- High pressure driers (silica, PSA, $CaCl_2$)
- Filling manifolds – single cylinder
- Filling manifolds bundles
- Weighscales
- Acetone tank
- Filling – acetone
- Filling – acetylene
- Cylinder pre-fill inspection
- Cylinder inspection shop
- Electrical equipment
- etc. etc. ….

Example – the carbide store (1 of 2)

Are the unloading of carbide containers facilities adequate

For what are the carbide containers inspected after receipt on site

Are operators trained how to deal with damaged or hot drum/containers

Is it prohibited to store other flammable materials or acids in this area

Is there a large / clear warning notice posted not to extinguish any fire with water

Are the emergency exits properly indicated

Example – the carbide store (2 of 2)

- Is the storage area separated from the rest of the plant (at least a fire wall)
- Is the storage area above grade or otherwise prevented from flooding
- Is the storage area constructed of non flammable materials
- Is the storage area roof checked for leaks
- Is there separation (distance or fire door) between carbide store and generator
- Are non sparking tools in use
- Is there a inventory rotation policy – first in, first out.

Example 2 – the filling manifold

- Is each manifold provided with a main inlet valve, blow down valve, pressure gauge and flash back arrestor
- Is each fill point provided with a shutoff valve, check-valve and flash back arrestor / filter
- Are hoses regularly checked and changed
- Are hoses suitable for the service
- Is there emergency deluge. Is it tested and is the activation suitable.
- Have all dead ends section of pipe been eliminated
- Is there suitable earthing; when was it last tested.
- How are the cylinders cooled during the fill process

Auditing

Thank you for your attention

Whatever you do – audit it !