

IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

SAFETY NEWSLETTER NUMBER 17

By Trevor Kletz

17/1 ISOLATION OF EQUIPMENT FOR MAINTENANCE

Another Division has issued a report which shows once again the need for clear and simple rules for the isolation of equipment for maintenance.

A still separates ammonia from a high-boiling safe material. The bottoms line had to be altered. The still was emptied and swept out. The line from the reflux drum to the liquid ammonia storage tanks was isolated by closing a single valve — no lock, no slip-plate.

Perhaps someone opened this valve, perhaps it leaked — we don't know — but ammonia came back from the storage tank through the still and out of an open end on the bottoms line. Fortunately there was no-one on the job at the time or he might have been killed.

This incident shows that we must never rely on closed valves to isolate equipment under maintenance. Valves must be locked and, unless the job is a very quick one, slip-plates must be fitted as well (or the line broken and the ends blanked).

The supervisors concerned may have relied on a closed valve because the line being modified contained a safe material. Any line is liable to be contaminated and the HOC rules, just stated, apply to all lines, including water lines. Water, steam and nitrogen lines have all been on fire at some time.

The report on the incident makes another point: “. . . personnel tend to think that material movement is always in one direction and that reverse flows of materials, pressures etc. never occur. This point requires emphasis though plant training. . .”

17/2 ANOTHER CASE OF REVERSE FLOW

Another Company have described how a man was killed by an unexpected reverse flow.

A scrubbing tower had been depressured and was being drained. The pressure on the blow-down header was higher than in the plant. A poisonous gas passed through a leaking valve from the blow-down header into the tower and out of the drain valve. The operator who was draining the scrubber was killed.

Similar incidents have occurred in HOC Division in the past, fortunately without serious results. When isolating equipment for maintenance, remember that blow-down lines and vent stacks are “operating equipment” and if they are still in use (for example, if they serve other equipment) they must be isolated by some positive means from the equipment under maintenance.

17/3 WELDED PLUGS

Newsletter 16, Item 3, described how a plug blew out of a heat exchanger and suggested that redundant screwed plugs should be welded in.

Several readers have pointed out that we should not seal weld over an ordinary screwed plug, as if the thread becomes eaten away by corrosion, the full pressure is on the seal weld which becomes the weakest part of the vessel.

The right way is to use a specially designed plug with a full strength weld which will take the full pressure in the vessel.

As always, if the equipment has had post welding heat treatment, this may have to be repeated or a more spectacular failure may occur.

17/4 PURGING ELECTRICAL EQUIPMENT — AIR OR NITROGEN? (see also 19/4)

Electrical equipment for use in hazardous areas is sometimes purged with air or nitrogen. Which is best?

The purpose of the purge gas is to keep a slight pressure in the equipment and a slight flow of gas outwards so that any flammable gas or vapour outside cannot diffuse inside where it might meet sparking electrical equipment.

The advantage of nitrogen is that if the flow of purge gas fails, then air has to diffuse into the equipment as well as flammable gas, before an explosion can occur.

On the other hand, the pressure of the compressed air supply is usually much more reliable than that of the nitrogen supply and compressed air is much less likely to get contaminated with flammable materials. For these reasons I prefer air. (The only common flammable contaminant in air is oil mist, and this can be filtered out.) Of course, if an instrument contains flammable materials and electrics in the same compartment nitrogen must be used.

Whether we use air or nitrogen there should always be an alarm to tell us if the supply fails and, if possible, a trip to shut-off the electricity.

If the volume to be purged is large and there is substantial leakage, then a low flow alarm is best. If the volume is small and substantially air-tight, then a low pressure alarm is best.

17/5 A LEAK OF NITROGEN

A man went down into a confined space to try and clear a suspected choke in a nitrogen line. Another man stood at the top of the ladder. The first man started to talk incoherently, but the second man did not realise that this indicated a shortage of oxygen.

The first man then collapsed. Two men risked their lives trying to rescue him without wearing breathing apparatus.

This incident occurred on a ship tied up at one of our jetties. Nevertheless, it shows us that:— A nitrogen leak can cause asphyxiation (I have known this happen in the open air). Rescue from confined spaces should never be attempted without breathing apparatus.

A permit to enter a confined space should never be issued without checking that breathing apparatus is readily available.

17/6 ROLLER CONVEYORS

A lost-time accident occurred as the result of manoeuvring a drum on roller conveyors which were seized. Other roller conveyors have been inspected since and found to be seized.

Have you any on your plant?

17/7 HOW DO YOU AUTHORISE THE REMOVAL OF SAFETY EQUIPMENT? (see also 18/5)

Newsletter 15, Item 9, described a new sort of flame trap which can be removed by a process worker, held up to the light to see if it is clear and put back. It does not have to be removed by a fitter.

A reader comments "Anything that can be removed, will be removed". Removing the flame trap is rather like disarming a trip system and ought not to be done without written authority".

This prompts me to ask, "How do you authorise the disarming of an alarm or trip?" Severnside Works have a space on their Permit-to-Work form for this purpose. Specimen on request.

17/8 DON'T HEAT PLASTIC PIPES ELECTRICALLY

A small fire occurred on an electrically traced PVC line, as the result of an electrical short. The pipe melted and the solution inside it put out the fire.

Electric tracing of PVC pipes is not recommended.

17/9 COMMON FLUE GAS DUCTS

If several furnaces share a common flue gas duct, the use of an excessive amount of snuffing steam on the furnace can force the flames on the other furnaces to burn outside the firebox. The maximum snuffing steam rate should be set so that this cannot occur. I can let you have a report which gives some guidance on how to calculate the safe rate.

17/10 LABELLING OF DRUMS AND TANKERS

British Drug Houses have had to pay out a large sum in damages to one of their customers because they failed to warn him that a chemical was dangerous. The judge said that if the drums had had a proper label on them, this would have been sufficient.

So if you fill drums or tankers, make sure the labels are correct and are in use. The Distribution Safety Co-ordinator, F.W., can help you.

17/11 BURNT TOAST — AND OILY RAGS

“A man once said he knew it was time to get up when he heard his wife scraping the burnt toast; and quite bitter he sounded when he said it, too. I know how he feels: it’s not the mistakes people make — it’s not even one’s own mistakes — that really get one down; it’s the fact that we go on making the same mistakes over and over again”.

Katherine Whitehorn wrote this in the Observer recently. I know just how the man feels. Most of the accidents described in these Newsletters have happened before.

I have in front of me a report on a fire which occurred because oily rags were left round a steam valve.

Perhaps some people do not know that oily rags or oil-soaked lagging left near a steam pipe will burst into flames. Although the oil may be high-boiling, it slowly decomposes under the action of the heat and forms products that catch fire easily.

Some years ago at Billingham some oily overalls were left in a locker. A steam pipe ran under the row of lockers, to keep the clothing dry. The heat was enough to set the oily overalls on fire and the whole roomful of lockers was destroyed.

17/12 RECENT NOTES

(a) “U.K. Petroleum Regulations: A guide to those in force and to their relevance to HOC Division’s products”, Report No. 0.200,643/A by Miss M.A, available from HOC Reports File.

(b) Report No. 0.21,156/B applies the recommendations of the Polythene report to HOC Division and summarises discussions with over 250 of the Division’s staff. Available from HOC Reports File.

(c) Each month this year we hope to issue a safety calendar. The March sheet shows a stack which blew up and suggests ways of preventing this happening again. If you would like to have a copy, please write to Mrs J M W, Organic House, Billingham, or telephone B.3927.

If you would like more information on any item in this Newsletter, or if you do not see it regularly and would like your own copy in future, please contact Mrs W or your Works Safety Officer.

OIL WORKS
**ALWAYS
SAMPLE
SAFELY**

AND, OF COURSE,
ALWAYS USE A SUITABLE
CARRIER FOR THE
SAMPLE CONTAINER

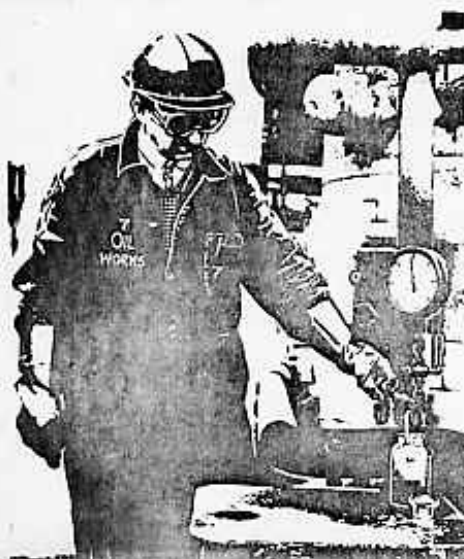
WRONG



BOTTLE HELD IN HAND
—could slip and smash

FACE AND BODY TOO CLOSE
—sure to catch any spray or
spurt of liquid

RIGHT



BOTTLE ON STAND
no chance of slipping
out of hand

AT ARMS LENGTH
face and body much
less likely to be
caught in any spray
or spurt