

IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

SAFETY NEWSLETTER NUMBER 4

By Trevor Kletz

4/1 PERMITS-TO-WORK

In earlier Newsletters I have mentioned several accidents that could have been prevented by the H O C policy of locking shut valves which isolate equipment under maintenance and in addition, whenever possible, isolating the equipment by slip-plates, unless the job is so quick that fitting slip-plates would take as long as the main job and be as hazardous.

A fatal accident which occurred recently in another Division brings out the same point. A liquid ammonia pump had been disconnected by maintenance and partly dismantled. The operator was about to start up a movement using the spare pump. He was found lying beside the pumps with ammonia leaking through the suction valve of the dismantled pump and out of an open end.

We do not, of course, know with certainty what happened but it is believed that the operator was trying to check that the valve on the pump was tightly closed by easing it off its seat and then tightly closing it again. The operators often do this when both pumps are connected up. It may have become an ingrained habit with the operator concerned and he may have done it on this occasion failing to realise that if there had been any leakage the ammonia would be seen escaping from the open end. It is also possible that the operator did not appreciate the rate at which ammonia can escape from a valve that is just cracked open and the overpowering effect a small amount of liquid ammonia can have on a person.

The accident would not have occurred if the pump had been isolated by fitting slip-plates or blanks and if the valve had been locked shut while the slip-plates or blanks were being fitted.

The report on the accident, in fact, recommends that in future blank flanges should be fitted and that the man fitting them must wear breathing apparatus and must not be left alone.

4/2 ENTRY TO VESSELS – ANALYSIS OF THE ATMOSPHERE

Two incidents which could have had serious results occurred recently. In both cases a permit to enter a vessel was needed and in the usual way an analysis on the atmosphere in the vessels was requested. The laboratory staff sampled and analysed the atmosphere and reported that it contained 20.4% oxygen. Fortunately the man in charge suspected that something was wrong, and had repeat analyses taken; these showed only a few percent oxygen.

What went wrong?

In the first incident the analysis was carried out with a Servomex oxygen analyser. In this piece of apparatus, which is widely used, a sample of the atmosphere to be tested is aspirated through the apparatus but there is no positive way of telling whether or not a sample is actually passing through. It appears that on this occasion there was a blockage in the apparatus, no sample passed through it and the reading obtained was from the air already in the apparatus A bubbler or some other means of telling when a sample is passing through should be fitted to the apparatus.

On the second occasion the sample was taken near a man-hole instead of in the middle of the vessel. Samples for atmospheric tests should be taken from well inside the vessels and the laboratory staff should be supplied with long sample lines so that they can do so. In large vessels and, in particular, in long or tortuous places like flue gas ducts, several samples should be taken at several different points.

In both these incidents, vigilance by plant staff who suspected something “fishy” prevented a serious accident.

While on the subject of entry permits, do all the men who are authorised to sign them realise that before they do so they must, by law, personally examine the tank, vessel or other confined space themselves (Chemical Works Regulation 7)? It is not sufficient for another person to examine it on their behalf.

4/3 A FIRE

“Experience to date suggests that I.C.I. plants are unlikely to be faulted in areas of highly complex technology but may be vulnerable to major consequential losses in more mundane areas.”

This quotation is taken from a talk by the man responsible for placing I.C.I.’s fire insurance business. It was illustrated by a recent fire in the Division. After a plant had been shut-down for maintenance some timber was left wedged under a pipeline. The pipeline operates at 300 °C and the wood caught fire. Although the plant was cleaned up after the shut-down, the piece of wood was hard to remove, nobody realised it was a hazard and it was left in position.

4/4..SPILLAGES FROM OVERHEAD LINES

A recent incident draws attention to the precautions necessary when dismantling overhead lines.

If an overhead line has to be broken and it may contain some liquid which for some reason cannot all be removed beforehand, are tundishes and flexes available so that the liquid can be drained away to a safe place when the joint is broken or does the liquid have to splash down on to the ground?

4/5 FIRE-RESISTANT INSULATION BOARD

A recent fire in another Division drew attention to the following.

If a flame is played on the face of these boards and then removed, the board does not continue to burn. On the other hand, if a flame is applied to the frayed edge of a board faced with asbestos paper, e.g. Celotex, the board will continue to burn when the flame is taken away. Boards which are impregnated with a salt inhibitor (such as Finn boards) do not have this disadvantage. Celotex boards are O.K. for roofs where the edges can be sealed and where the faces are unlikely to be damaged but they are not suitable for walls. Finn boards are better for walls but even these lose some of their fire resistance with age.

4/6 COIR MATTING

Accidents often occur because men slip on oily patches around compressors and other machinery. One solution which has been used successfully in the Division is to spread coir matting around the machines. It is true that there is a slight increase in fire risk but the risk of someone slipping and injuring themselves is much greater and it is worth a slight increase in fire risk in order to reduce the slipping risk. The coir matting should be fire-proofed with salt solution.

4/7 FOAM LINES

In a joint note with Agricultural Division dated 26th June we proposed that fixed foam lines are no longer fitted on new fixed roof storage tanks and that instead we rely on foam monitors for putting out tank fires.

The Teesside Fire Service have now agreed that fixed foam lines need not be fitted on the new storage tanks being installed on No.5 p-Xylene Plant at Wilton and No.2 Aromatics Plant at North Tees. The saving amounts to five figures, though some of it will be spent on buying extra monitors.

4/8 REVIEW OF TANK FIRES AND EXPLOSIONS

I have issued a review of the tank fires and explosions on which I have seen reports; copies are available to anyone interested.

4/9 “FIGHTING TANK FIRES”

The National Fire Protection Association of America has published a series of 36 colour slides on this subject. We have a set which may be borrowed together with accompanying text. The slides show the use of water sprays in forcing back flames so that isolation valves can be approached. They do not show the uses of foam.

4/10 FLOATING ROOF TANK

The vapour leaking through the seals on floating roof tanks can very easily be set alight by lightning. According to one report, in a group of 1,000 tanks, on average one tank per year will be set alight in this way.

These fires can be prevented by fitting shunts on the tanks, strips of stainless steel 2 inches wide which are fitted every 4 feet or so and which earth the floating roof to the walls. Earth wires and the ladder do not provide sufficient contact.

I would like to know if you find these Newsletters useful. Sometimes I feel like a man writing messages in bottles, throwing them into the sea and wondering if they ever reach land.

19th September 1968