

# IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

## SAFETY NEWSLETTER NUMBER 16

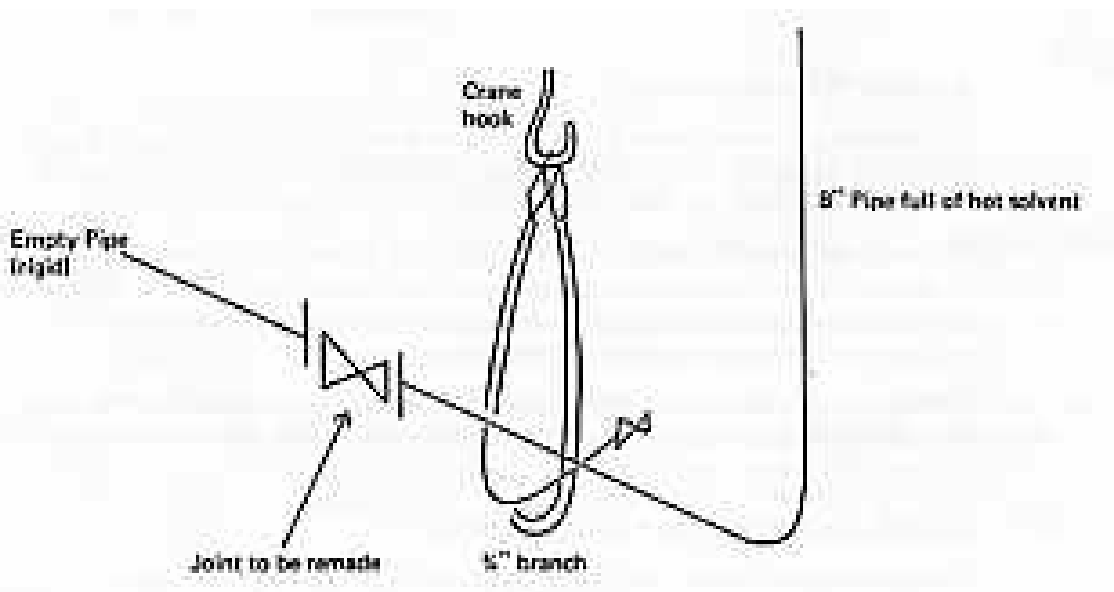
By Trevor Kletz

Since the last Newsletter, there have been three bad leaks of hot liquids, above their boiling points, in the Division. Fortunately none of them fired but all show some points of general interest.

### 16/1 A LEAK OF LIQUEFIED FLAMMABLE GAS (see also 19/7)

There was a bad leak when a 3/4 inch branch broke off and allowed a heavy solvent, saturated with C4 hydrocarbons, to escape.

A joint on an 8 inch line had to be remade. The two sides were 3/4 inch out of line and as there was a crane on the job, it was used to lift one of the lines. The strap pulled on the branch and broke it off.



It is not a good idea to use a crane for a job like this on a live line.

The C4 hydrocarbon formed a visible cloud of vapour about 10 yards across. Fortunately it did not ignite. Two men went into this cloud to close valves and stop the leak.

If anything like this happens again — and one day it will — remember that the cloud might catch fire and therefore:

*Call the Fire Brigade — so they are ready if it does.*

*If you have to enter the cloud, do so protected by water sprays from the Fire Brigade. I can lend you some American slides showing how this should be done.*

Near the leak, some excavations were being pumped out. We used to use diesel pumps but fortunately they were banned on this plant a few months beforehand. Safety Note 69/9A describes how diesel engines can ignite gases and makes recommendations.

### 16/2 TREAT HOT LIQUIDS LIKE LPG

Liquefied flammable gases, such as propylene and butylene, are particularly dangerous because they are normally stored above their boiling points and, if they are spilt, they evaporate very quickly forming a heavy vapour that spreads along the ground.

Any flammable liquid above its boiling point behaves in much the same way. This was illustrated recently when a Klinger cock on a hot "Thermex" line came open — either it had worked loose or someone knocked it. "Thermex" at 320° C — 40°C above its boiling point — came out of an open end and formed a cloud of droplets and vapour which drifted slowly downwind. Fortunately it did not ignite.

We would never use Klinger cocks as the sole isolation on a line carrying liquid propylene or butylene — so we should not use them on a line carrying any flammable liquid above its boiling point.

On the plant concerned the open ends after the Klinger cocks have been plugged until the Klingers can be replaced by a more suitable valve. (If you do the same, take care if you remove the plug — the cock may be leaking.)

### **16/3 A LOOSE PLUG BLOWS OUT (see also 17/3)**

The third leak occurred when a 1/2 inch plug blew out of a heat exchanger. A spray of hot oil, well above its boiling point, came out and formed a jet of liquid 30 feet long. The heat exchanger had just been installed and had been pressure tested beforehand.

The plug was fitted in a bellows and was put there so that after pressure testing, in a horizontal position in the manufacturer's workshop, water could be completely drained out of the bellows. As the exchanger is installed in the plant in a vertical position there is no need for a drain and the plugs should be welded in position.

Are there any redundant screwed plugs on your equipment which would be better welded in? - particularly on equipment handling flammable liquids above their boiling point.

### **16/4 WRONG VALVES PUT INTO COMPRESSOR**

Another Division reports that a familiar accident has happened once again — a compressor was assembled with the suction and delivery valves interchanged. When it was started up the gaskets were blown out of the cylinder joints.

Can this happen on any of your machines and if so, what system do you use to prevent it? A mechanical system that makes it impossible to fit the wrong valves is best, but if this is not possible a system of numbering or labelling is necessary.

### **16/5 SAMPLING**

Sampling accidents are common in the chemical industry. We have been free of serious accidents for some time but several accidents have occurred recently and it may be worthwhile restating the rules that should be followed when sampling corrosive liquids.

1. Wear goggles and gloves.
2. Do not hold the sample bottle in the hand. A stand must be provided.
3. Do not stand close to the sample point when opening the sample valve. The sample valve should be provided with remote operation or there should be a protective covering round the sample point. If this is not provided stand as far away from the sample point as possible with your arm outstretched.
4. Do not carry the sample bottle in the hand. Use a container fitted with a lid.

In one recent incident in which the operator was splashed his injuries were worse than they might have been because his shirt and overalls were undone at the neck.

### **16/6 HEAT RADIATION FROM FLARESTACKS**

There has been a lot of discussion during the last few years about the amount of heat a man can stand for a short period. This often determines the height of a flarestack. The subject has now been discussed with a doctor working for the Medical Research Council. As a result of these discussions,

we feel that the present HOC limit of 5 kw/M<sup>2</sup> (1500 BTU/ sq. ft./hour) at the boundary of the flarestack reservation is reasonable. We consider that we could put equipment in flarestack reservations so long as people do not have to go in so often that access becomes uncontrolled. If buildings are put near flarestacks, the entrances should be outside the reservations.

### **16/7 COMBUSTIBLE GAS DETECTORS**

As pointed out in Newsletter 7, Item 5, combustible gas detectors do not fail safe and should therefore be tested immediately before use, every time they are used.

J. & S. Sieger Ltd., the manufacturers of Sieger gas detectors can now supply a simple test unit for £20.

Another test apparatus is described in Agricultural Division Research Dept. Minute No. RD/A. 1294.

Newsletter 3, Item 9, and Safety Note 69/6A both draw attention to the fact that some of the sample tubes used with MSA explosimeters can absorb the combustible vapour and give a false, low reading. Agricultural Division Research Dept. Minute No. RD/A. 1293 reports tests on many types of tube and concludes that only "Hycar" OR 25 or metal tubes should be used.

### **16/8 A NEW SORT OF LTA RATE?**

Everyone criticises the Lost-time Accident Frequency Rate — a man slips on the kerb, hurts his ankle and has a day off and this counts the same as a fire or explosion in which someone is seriously injured.

The Chief Inspector of Factories makes an interesting suggestion in his report for 1968. Let us try, he suggests, dividing our LTA'S into three groups:

Those which might have caused death

Those which might have caused serious injury

Others

The slips on the kerb would come into the last group but most attention would be concentrated on the first two groups.

Does any Safety Officer feel like presenting his 1970 results in this form — and including dangerous occurrences as well?

### **16/9 UNSTABLE DESK CHAIRS**

The chances are that as you read this you are sitting comfortably in your office chair, leaning back and with your feet up. If so, read on!

Another Division has reported a lost-time accident, caused by the failure of one leg of a "Tan Sad" chair. These chairs, used by many senior personnel have four legs on castors arranged in pyramid fashion, the seat being attached by a swivel, and an adjustable seat and back. Investigation of the incident has shown several disconcerting features.

The chair that failed was fairly old, and the load required to break a leg is only about 400 lb. This load can be reached by a moderately overweight executive sitting down suddenly on the front of the seat with one of the chair legs in the forward position. You will be glad to know that later chairs are stronger.

More disconcerting is the instability which can occur. With the old design in its least stable position — seat fully forward, legs under the corners of the seat, castors aligned on polished surface — a load of 56 lb. on the front of the seat will cause the chair to shoot backwards and overturn. Newer chairs are better, and of course a carpet helps, but unless the castors are removed and replaced by rubber feet the load for instability is still well within the normal weight range of executives.

Remember this next time you lean forward to reach the telephone, lean back in comfort, put your feet up or otherwise misuse your chair. And remember too that the worst instability is when the load is applied to an arm rest; unless you are much heavier than your secretary, get her to sit on your knee, not the arm of the chair!

## **16/10 FREE OFFER to all readers of this Newsletter — £100,000 OF INFORMATION**

No joke — this is the sum that had to be paid in damaged plant and lost production to buy the information given in this Newsletter.

You can buy this knowledge yourself at the same price — by waiting until the accidents happen on your plant — or you can join the club now on our subscription.

Welcome in!

Some readers have suggested that I should change the name of this Newsletter to something such as “Safety Recommendations”, “Safety Advice Notes” or “Safety Guide” in order to make it clear that the contents are not just interesting news but are intended to spur the reader into action.

Any ideas? \_\_\_\_\_

For more information on any item or for additional copies please write to Mrs. J. M. W, Organic House, Billingham, or 'phone B. 3927.

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