

IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

SAFETY NEWSLETTER NUMBER 3

By Trevor Kletz

This newsletter describes a number of recent incidents of general interest.

3/1 DOUBLE ISOLATION

Double isolations with a blow-off in between are widely accepted as a satisfactory method of operation when isolating equipment for maintenance - provided the main valves are locked shut and the blow-off valve is locked open.

A recent incident in which a man was nearly gassed has shown that this system is not foolproof. The size of the blow-off must be large - say one-quarter of the area of the main pipe - and it must go to a clear and obvious opening. A long thin line leading away to a stack from a small blow-off valve is not satisfactory as a back pressure may be developed in the inter-space and this may cause leakage through the second isolation valve.

3/2 WHY WE LOCK VALVES?

The value of the H.O.C. policy of locking shut valves used for isolating equipment for maintenance work is shown by a lost-time accident which occurred recently in another Division. A fitter was working on a section of line which was isolated from plant at operating pressure by a single isolation valve which was out of his sight. Somebody, it is believed, opened the isolation valve and the fitter was injured by the spurt of liquid.

3/3 TESTING THE ATMOSPHERES IN STACKS

During the last few years a number of explosions have occurred in flare and vent stacks. They could have been prevented by regularly analysing the atmosphere in the base of the stack to see if any air was getting in. Regular analysis of the atmospheres in all stacks is strongly recommended.

It might be argued that there is no point in analysing the atmosphere in a flare stack, as distinct from a vent stack, as whenever an explosive mixture is formed in a flare stack it will be ignited by the flare, which will flash back down the stack. On the other hand regular analysis of the stack atmosphere may enable a small leak of air to be detected before the leak gets worse and the oxygen concentration builds up to a dangerous level.

3/4 PROTECTION OF LIVE ELECTRIC EQUIPMENT

In a recent incident some live electric equipment was protected by a metal cage on one side and by the walls and windows of the building on the other side. When the windows were broken nobody realised the danger and the man who was sent to repair them got a shock from the live equipment and was nearly electrocuted.

Windows are not a satisfactory method of fencing off live electric equipment. The metal protection should go all round or, at the very least, a warning notice should be placed on the outside of the window.

3/5 LEAKS OF CORROSIVE LIQUIDS

When we tighten up on some aspects of our permit-to-work procedure, as we have done recently, there is always a danger that it will split at the seams some where else.

It may be coincidence or it may be an indication that we are getting slack in one respect but there have been six occasions so far this year when corrosive chemicals have dripped on to metallurgists who have been working on the plant.

3/6 INERT GAS

It is not generally realised how quickly men will lose consciousness if they enter an atmosphere which is deficient in oxygen. A recent investigation suggests that a man, after moderate exertion such as running up a flight of stairs, would lose consciousness about 20 seconds after entering an inert gas atmosphere and without any warning symptoms or any sort of respiratory distress. Death would be expected to follow in three or four minutes.

3/7 VALVE AND FLANGE SHIELDS

The Ramco Manufacturing Company of New Jersey produce a range of safety shields for pipe flanges and valve bonnets which prevent joint leaks and gland leaks from spraying all over the place. Engineering Department (Piping Section) have details. They may be worth a trial on joints or valves which, because of their location or the materials handled, present a particular hazard.

3/8 HIGH PRESSURE WATER JET CLEANING EQUIPMENT

In a note dated 12th June I described an accident which had occurred with this equipment in another company, some experiments which had been carried out to demonstrate the force of these water jets and the precautions which ought to be taken in operating the equipment.

Since then I have come across reports of 4 more accidents involving this type of equipment. I have also accidentally stumbled across one case when the Works instructions were not being carried out. This equipment is valuable and useful but it is also lethal and unless we exercise constant vigilance and take great care in the training of our operators we will have an accident ourselves.

3/9 SAMPLE LINES TO EXPLOSIMETERS

These should be made of metal, polythene or some other inert material. If rubber is used (natural or synthetic) it may absorb hydrocarbon vapour and result in a false negative reading. (see also 16/7)

3/10 SLOP-OVER

In a note dated 19th June I described the various ways in which an accident can occur as a result of mixing water and hot oil. For example, if a tank containing a water layer gets too hot the water will vaporise rapidly causing the tank to froth over. If hot oil is added to a tank containing a layer of water, the water will vaporise rapidly and may blow the roof off the tank. Precautions for preventing 'slop-over', as it is called, are described in the note.

A small-scale demonstration of the phenomenon occurred recently at home - some fishcakes were wetter than usual and when they were put into a hot frying pan the oil frothed over on to the kitchen floor.

3/11 A QUOTATION

The following, except for the words underlined, is taken from the report on an accident:

"In dealing with the question, Need the disaster have happened? it is, of course, necessary to consider the events which preceded it and the extent of the information (recorded in writing or forming part of the fund. of common knowledge) avoidable to all who were concerned...."

"The stark truth is that the tragedy ..., flowed from the fact that, notwithstanding the lessons of the recent past, not for one fleeting moment did many otherwise conscientious and able men turn their minds to the problem These men were not thinking or working in a vacuum. All that was required of them was a sober and. intelligent consideration of the established facts."

"The incidents preceding the disaster should have served to bring home vividly to all having any interest in the subject that air and fuel mixed together will explode ; that it was accordingly necessary to formulate and maintain a system aimed at preventing such a happening; and for that purpose to issue instructions, disseminate information, train personnel, inspect frequently and report regularly. These events were so spread out over the years that there was ample time for their significance to be reflected upon and realised and so to lead to

effective action. But the bitter truth is that they were allowed to pass unheeded into the limbo of forgotten things.”

“Why was there this general neglect? Human nature being what it is, we think the answer to this question lies in the fact that there is no previous case of loss of life due to incidents of this nature.”

These quotations are taken from the report on the disaster at Aberfan, in which a colliery tip collapsed and killed 144 people.

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