

IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

SAFETY NEWSLETTER NUMBER 19

By Trevor Kletz

19/1 HOLES IN RELIEF VALVES

In Newsletter 18, Item 1, I pointed out that the drain holes in relief valve tail pipes must be plugged if the relief valve is connected into a blow-down or other closed system.

Several readers have pointed out that these drain holes must not be confused with the vent holes in the bonnets of balanced bellows-sealed relief valves. If these vent holes are plugged in error then the relief valve will not be able to lift fully or, if the bellows leaks, the pressure may build up in the bonnet destroying the balance and altering the lifting pressure.

The vent holes should be fitted with short pieces of pipe bent downwards to prevent rain from entering the bonnets and with bug screens to keep out insects; alternatively they can be piped away to a well ventilated position. But remember the vent has another use — a flow of gas through the hole shows us that there is a hole in the bellows — so make sure the vent outlet is accessible.

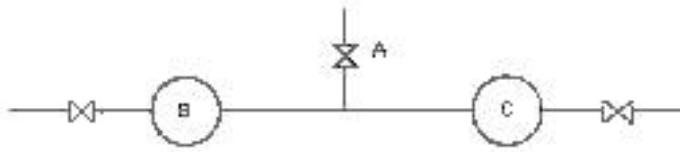
Bellows or piston balanced relief valves are necessary on closed blow-down systems which may develop a substantial variable back pressure — relief valves of other types must never be used on such closed systems.

Going back to drain holes — there have been cases where gas coming out of these has been known to fire. The flame is usually not large but make sure that it cannot impinge on plant equipment.

See item 22/4

19/2 ONE ISOLATION — TWO JOBS

The following happened recently in the Division:



Valve A was locked shut so that the filter B could be cleaned — a Process job.

About the same time a Permit was issued for maintenance work on equipment C. The lock on valve A also isolated C. As the job was a quick one, a slip-pate was not necessary.

When the work on B was complete, the Process worker unlocked valve A and opened it. He did not realise that the lock on valve A was also protecting C.

Oil came out of open ends in C, fortunately without injuring anyone.

What system do you use to prevent this happening on your plant?

19/3 NON-RETURN VALVES

I am often asked if we can rely on a non-return valve stopping the flow into a vessel or if the relief valve on the vessel should be sized on the assumption that the non-return valve does not hold. A

recent study showed that on clean fluids a single non-return valve is not sufficiently reliable but that two non-return valves in series are satisfactory. This will not be true if the fluids are dirty so that the non-return valves are liable to stick open.

If non-return valves are used in this way the type must be carefully specified. The non-return valves must be included in the relief valve register and checked periodically.

An article in Modern Manufacturing, August 1969, p. 104 described a serious fire which killed one man and injured six others and which occurred because L P G leaked into a tank through a faulty non-return valve, and then came out of the tank vent into a building.

It is surprising how many incidents have occurred because non-return valves have been put in upside down or because a non-return valve which ought to go in a vertical line has been put in a horizontal line. Are there any like this on your plant?

19/4 PURGING ELECTRICAL EQUIPMENT — AIR OR NITROGEN?

In Newsletter 17, Item 4, I recommended the use of air rather than nitrogen for purging cabinets containing electrical equipment. A reader points out that air should always be used if the cabinet is big enough for a man to put his head in.

Another reader suggests that the purge air is taken from the impulse line to a motor valve which closes on air failure. If the supply fails the valve will close and shut down the process; this provides a warning that the purge air has failed and prevents operation of the plant until the supply is restored.

19/5 DAMAGE TO CABLES BY HIGH PRESSURE WATER WASH EQUIPMENT

Another Division have reported that the jet from high pressure water wash equipment was accidentally directed against an electric cable. The outer covering of the cable and the inner metal sheath were torn away. Areas where water wash equipment is used should be checked to make sure there are no live cables near enough to be damaged in this way.

19/6 CAST-IRON VALVES

To get better access to the equipment he was working on, a fitter stood on a pipeline; a cast-iron Saunders valve broke under his weight and the supply of nitrogen blanketing to a plant was lost.

We used to use cast-iron Saunders valves for water, air, and nitrogen. Now they are used only for personnel showers and, occasionally, when a special lining is needed. However there are many in use on old plants and it is worth checking that they are well-supported.

19/7 DON'T LET THE FIRE BRIGADE IGNITE YOUR LEAK

In Newsletter 16, Item 1, I pointed out that the Fire Brigade should always be called if there is a big leak of flammable gas or liquid. If the leak fires, the Fire Brigade are then ready, or on the way in.

A reader points out the importance of stopping the Fire Brigade well short of the leak, so that their engines cannot ignite it.

Our Chief Fire Officer, agreeing with this, comments that the Fire Brigade must be given full information and should be met at a fair distance from the leak by plant personnel.

19/8 STATIC ELECTRICITY FROM PUMPED LIQUIDS

You probably know that to prevent the accumulation of dangerous charges of static electricity, pure hydrocarbons should be pumped at a linear velocity below 7 m/sec, or below 1 m/sec. if any water is present.

A recent article in "Fire International" (October 1969, p. 76) shows that the charge developed depends also on the length of time the liquid has been flowing.

"... if experiments were repeated, one after the other, or if the fuel flows continuously through the pipe, the charges will diminish.

This extremely important observation proves that it is the initial quantities of the product pumped that present the greatest danger, since they accumulate charges in a spectacular manner.

The most dangerous moment, therefore, in the operation of any installation is probably when it first goes into service; and putting it back into service after a prolonged interruption is equally dangerous. It is at these times that operators of the equipment must be most scrupulous in observing the safety regulations".

19/9 THE EFFECT OF FLUIDS AT PRESSURE ON THE BODY

Most people know that compressed air will cause injury if it is allowed to come into contact with a cut or one of the openings in the body (I can let you have a RoSPA leaflet which gives details).

Oil under pressure can also cause injury. Another Company report that a man held his finger over the nozzle of a high pressure grease gun. Grease was injected into his finger, stopping circulation and causing an infection that resulted in gangrene — and removal of the finger.

Another Division have described a similar incident. There was a pin-hole leak in the high pressure (1650 psi) hydraulic hose of a fork lift truck. Another man got hold of the hose to turn the leak away from the driver. He inadvertently grasped the hose over the leak and it punctured his finger. Ill effects were not felt until 12 hours later.

19/10 CONFINED SPACES UNDERNEATH DISTILLATION COLUMNS

The skirts underneath distillation columns are often hollow, with an opening for entry. Unless the opening is large, the spaces underneath are confined spaces within the meaning of the Factories Act, Section 30 and an entry permit should be issued before anyone goes in.

If there are valves inside, it should be possible to operate them from outside.

One Works fits grills over the openings to prevent unauthorised entry. They are better than doors as they provide ventilation.

19/11 LAMP-POSTS

A reader suggests that new lamp-posts inside the Works should be sited so that they do not overhang the road-way. They are then less likely to be hit by travelling cranes.

19/12 METRICATION

Will the change to metric units introduce any safety problems?

If you think of any, please let me know and I will pass them on to our metrification co-ordinator, J.R.

19/13 SAFETY, HEALTH AND WELFARE LEGISLATION

Over two years ago the government produced the "First Consultative Document", as it was called, which described their proposals for new safety legislation to replace the Factories Act. Industry has made so many comments that Mrs Barbara Castle has decided not to press ahead with the proposals but instead to set up a small commission to look at all the laws protecting employees and to decide what form they should take in the future. For example, is it best to have a lot of detailed rules or would it be better for the law to be more general? (Note. This was the Robins Committee whose report resulted in the 1974 Health and Safety at Work Act)

19/14 SOME ADVICE FOR ALL WHO HAVE TO SELL SAFETY?

The following advice from a salesman might be intended for all those who have to persuade others to adopt safety measures.

"It's hard enough to sell someone a cemetery lot - it's what we call an intangible, like insurance. . . whatever your approach, you've got to make sure your product is perfect, without a flaw. The minute there's something wrong with your product and your prospect knows it, he grabs onto it and uses it against you."

From "Saturday the Rabbi went Hungry", by Harry Kemelman.

19/15 SAFETY POSTERS

Each month we produce a safety calendar, with a poster attached, for the coming month. Back and future numbers on request. If you can sketch out an idea for use in future, please send it to me. We will pay for any ideas used.

Rules

1. We don't want slogans like "Safety Depends on You". No one deliberately works unsafely.
2. We don't want posters on hard hats, safety shoes, goggles, falling objects, slippery floors etc.
There are many excellent ones already.
3. Each poster must convey a definite technical message: "This tank caught fire because.. ." or "To prevent your tank being sucked in you should. . ."
4. Keep the wording short.

19/16 RECENT NOTES

- (a) "A Review of Explosions in Chemical Plant Furnaces and some Notes on their Design and Operation", Report No. 0.200,655/A, 21/4/70, available from HOC Reports File.
- (b) Safety Note 70/7 reviews a number of "Thermex" leaks that have been reported recently on Teesside and summarises the recommendations made.
- (c) There is an excellent review of the present position on asbestos in "Engineering Notes No. 15", available from Mrs. J. G, Teesside Materials Group, extension B2504.

For copies of (b) or for more information on any other item in this Newsletter, please write to Mrs. J. M. W, Organic House, Billingham or 'phone B3927. If you do not see these Newsletters regularly and would like your own copy, please ask Mrs. W to add your name to the circulation list.

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