

No. 102

IN THIS ISSUE

CLEARANCE CERTIFICATES

- 102/1 This Newsletter describes some accidents which occurred because the correct procedure was not followed when preparing equipment for maintenance.
- 102/2 If a leak stops, is the pressure so low that the leaking joint can be repaired?
- 102/3 A man fell into an unfenced pit.
- 102/4 A man fell down a lift shaft.
- 102/5 Despite tagging, the wrong joints were broken; the numbers had not been checked.
- 102/6 Can you tell a slip-plate from a slip-ring?
- 102/7 A clearance was signed off before a job was finished. Two relief valves were put back in the wrong positions.
- 102/8 A union official blames managers for 99% of all accidents
- 102/9 Can I be prosecuted if there is an accident on the plant on which I work or which I have designed?
- 102/10 Some new ideas for stopping leaks.
An engineer's casebook.



IMPERIAL CHEMICAL INDUSTRIES LIMITED
PETROCHEMICALS DIVISION

102/1 PREPARATION OF EQUIPMENT FOR MAINTENANCE

This Newsletter describes a number of incidents which occurred in Petrochemicals Division, within the last year, because something went wrong during the preparation of equipment for maintenance.

Errors of this sort are one of the commonest causes of accidents in our industry. Two were described in Newsletter 1 (reprinted in Newsletter 100) and our most serious accident of this type was described in Newsletter 93, page 3.

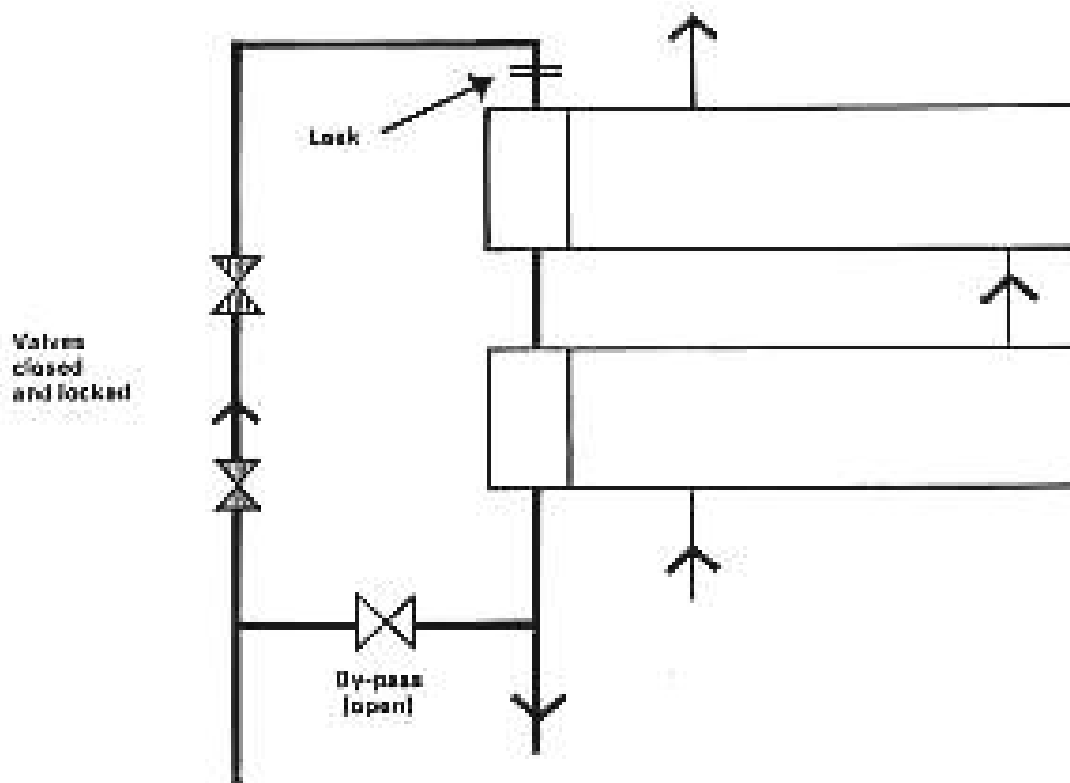
Each Works has rules for the preparation of equipment for maintenance but these alone are not sufficient. In addition, everyone concerned should understand the reasons for the rules and know what happens when they are not followed.

Perhaps with the passage of time and changes in staff — at all levels — some of this knowledge has been lost. (Newsletter 93 described some serious accidents that have happened again after ten or more years because knowledge was lost). This Newsletter may help to remind you of this knowledge. It may also remind you of the need to check regularly that the rules are being followed — so that we can spot the lapses before accidents occur.

102/2 IF THE PRESSURE FALLS AND A LEAK STOPS, IT MAY NOT BE SAFE TO OPEN UP THE EQUIPMENT

Many accidents occur because equipment given to maintenance has not been isolated — see Newsletter 91/2. Even in plants with good systems and good records, occasional lapses can occur as shown by the following incident.

An operator who was training as a deputy supervisor found a leak on the inlet flange to a bank of heat exchangers.



He closed the inlet valves and locked them shut. The leak stopped. There were no valves on the exit line but he assumed that, as the leak had stopped, the pressure was now so low that the leaking joint could be remade. He issued a clearance. The regular supervisor counter-signed it but did not check the job.

When the joint was opened a stream of oil 5 feet long sprayed out. Fortunately the fitter had slackened the bolts away from him, there was no injury and the joint was remade. The plant was then shut-down.

The Works concerned have now decided that in future clearance certificates will not be countersigned. The regular supervisor will sign them until the trainee is judged to be sufficiently well-trained and then the trainee will sign them. In order to judge whether or not the trainee is well-trained, the regular supervisor should allow the trainee to prepare the job and then inspect it.

102/3 A MAN FALLS INTO AN UNFENCED PIT

A sludge wagon arrived on a plant to empty a pit — a regular weekly job. The day supervisor who normally supervises the job was not at work so the shift men asked the driver, who was familiar with the job, to carry on. They did not give him a clearance.

The driver took the cover off the pit, sucked out the sludge and then went to look for a hosepipe.

While he was away one of the shiftmen started to do another job in the area. He slipped and fell into the pit. Result: Eleven days in hospital.

Had a clearance been issued the man issuing it might have made sure that the pit was not left open with no-one present.

102/4 A MAN FALLS DOWN A LIFT SHAFT

Two men employed by a lift contractor were on a plant when they noticed a lift was not working. They decided to be helpful and repair it there and then. They did not ask for permission or for a clearance, they did not immobilise the lift and they did not put warning notices on the doors. One man went to the motor room. The other stayed on the second floor and used a by-pass mechanism to open the lift door. Someone called the lift to the third floor. The man on the second floor, thinking the lift was still there, tried to enter it and fell 25 feet down the shaft. Result: Several broken bones.

102/5 IDENTIFICATION OF EQUIPMENT FOR MAINTENANCE

Previous Newsletters (see 91/1) have recommended that equipment which is given to maintenance should be identified by a numbered tag unless there is a permanent number of label on the equipment. The number of the tag should be put on the clearance certificate and given to the man who is going to do the job.

On two occasions recently, despite tagging, the wrong equipment was opened up.

In both incidents a fitter broke a joint on a piece of equipment which was up to pressure instead of breaking a joint on the equipment which had been prepared for maintenance. Both items of equipment were tagged. The tag on the live equipment had been put on for a previous job and then left there, in one case because the joint had to be broken again later and in the other case because no-one had bothered to remove it. In both cases the tag number had been given to the fitter but he saw a tag, assumed it was the correct one, and did not check the number.

Don't leave old tags on the plant. Check tag numbers before breaking joints

102/6 CAN YOU TELL A SLIP-RING FROM A SLIP-PLATE?

On one of the older plants in the Division, thin slip-plates have often had to be used as there is not

enough spring in the pipelines to insert slip-plates of the same rating as the pipeline (see Newsletter 13/1). Recently some lines were modified so that full-thickness slip-plates can be used. When the slip-plates are not in position a slip-ring is used to take up the gap in the pipeline.

The operators are not familiar with slip-rings, which have not been used in the past. One operator mistook a slip-ring for a slip-plate and allowed a repair job to be done without slip-plate isolation.

Remember:

Slip-plates have one hole in the tag; slip-rings have two (see Newsletter 90, page 4).

Spectacle plates are better than slip-plates and slip-rings as their position is obvious. They cost more to start with but they do not get lost like slip-plates (see Newsletters 42/5 and 2 0/7).

Operators should be told about changes made (see Newsletter 94/2).

102/7 A LOOK BACK AT NEWSLETTER 2

Our second Newsletter, issued in June 1968, described two incidents concerned with maintenance.

In the first incident a plumber assistant foreman had been given a clearance to modify a pipeline. At 4.30 pm the plumbers went home, intending to complete the job on the following day. During the evening the process supervisor wanted to use the line that the plumbers were working on. He checked that the line was safe to use and he asked the shift fitter to sign off the clearance. The next morning the plumbers, not knowing that the shift fitter had signed off their clearance, started working on the line while it was in use.

We should make it clear in our instructions that clearances can be signed off only by the supervisor to whom they are issued (or by someone who is doing this supervisor's job).

If maintenance supervisors remove the top copies of clearances from the books, then it is difficult for an unauthorised person to get hold of them and sign them off. (If all clearances are left in the books, why have two copies?).

In the second incident two relief valves, identical in appearance, were removed from a plant during a shutdown and sent to the workshops for overhaul. One relief valve was set to operate at 15 psig and the other at 30 psig. The pressures were stamped on the flanges. The tie-on labels on the two valves became interchanged and the valves were installed wrongly. A similar incident was described in Newsletter 54/2.

When re-installing relief valves do you check the stampings on the valve bodies or just the labels? Is there another check after the valves have been replaced?

Other items in Newsletter 2 described how sparks from a pneumatic cutter-grinder ignited some oil soaked ground, and how a hose secured by a Jubilee clip came undone, injuring a man. Another man used a hose to wash some dirt off his boots; unfortunately it was connected to a caustic soda line and not a water line.

102/8 OTHER MEN'S VIEWS—1

A series of quotations from writers with whom we may not entirely agree but whose point of view should be considered.

I place the blame for 99 per cent of all accidents fairly and squarely on the shoulders of management, directors, managers, foremen and chargehands, both in the past and right up to the present time.

Unsafe to dangerous practices are carried out which anybody with an observant eye could see if

they wished, and if they do see, do they do anything about it? Not until a serious accident happens and then the excuse is "It has never happened before. The job has always been done like this". The workman takes his cue from management. If the management doesn't care the workman doesn't care either until something happens.

Sole responsibility for any accident should be placed fairly and squarely on the shoulders of the Departmental Manager. He should go about with his eyes open instead of sitting in his office, to be able to note unsafe and dangerous practices or work places, and get something done about them as soon as possible. If he gives instructions on these matters he should enforce them.

Frank Hynes, Union Official in "Safety"~ the accident prevention magazine of The British Steel Corporation, August 1971.

102/9 SOME QUESTIONS I AM OFTEN ASKED—32

CAN I BE PROSECUTED IF THERE IS AN ACCIDENT ON THE PLANT ON WHICH I WORK OR WHICH I HAVE DESIGNED?

Under the Health and Safety at Work Act it is possible for employees to be prosecuted as well as, or instead of, their companies if there is a failure to comply with the Act. This was also possible under the old Factories Act, and so the Health and Safety at Work Act has not really made any change in this respect. However, the range of offences for which individuals and companies can be prosecuted is now much wider. Under the Factories Act a company or an employee could be prosecuted only if they had broken a specific regulation. Under the Health and Safety at Work Act a company or an employee can be prosecuted for failing to provide a safe plant or system of work or adequate instruction, training or supervision.

In practice, the company is usually prosecuted and prosecutions of employees are quite rare. Individual employees have been prosecuted only when the breaches of the Act were due to wilful and deliberate actions (such as damaging safety equipment) or to gross negligence (such as failing to carry out duties which were clearly laid down as part of the job).

As long as one does one's best in the sense of exercising reasonable care, I do not think there is any danger of prosecution. I do not know of any case in which a person has been prosecuted for an error of professional judgement alone. The company might be prosecuted for failing to employ a more competent manager, designer or supervisor, but that is another matter.

(There is one other situation in which an individual might be prosecuted. If a company is a fly-by-night organisation and has ceased to exist before a prosecution can take place, then the Factory Inspectorate might prosecute a responsible official as the only person they can get at).

102/10 WAYS OF STOPPING LEAKS

A report from the US Department of Commerce describes a number of ways that have been suggested for stopping leaks from ships. Many of them could be used to stop leaks from road tank wagons or low pressure storage tanks and some of them might be used to stop leaks from pipelines.

Here are some of the ideas.

- 1 Put a piece of foam or a plastic balloon in the hole and fill with foam or compressed gas.
- 2 Fix a patch over the hole with self-tapping screws, explosively driven studs, magnets or suction caps.
- 3 Use a semi-spherical patch and fill the space between the patch and the wall of the tank with a quick-setting putty.
- 4 Put an 'umbrella' through the patch and then open it.

- 5 Pinch a leaking pipeline with an explosively-operated nipper.
- 6 Surround a leaking pipe with a device like the one used by doctors to measure blood pressure.
- 7 Push a self-expanding plug into a leaking pipe on the end of a long pole.

Some of the devices are available commercially; others are being developed.

The report is entitled "Survey Study of Techniques to Prevent or Reduce Discharges of Hazardous Chemicals", Ref No AD/A-02O 173 and can be obtained from Microinfo, Hamlet House, High Street, Alton, Hampshire GU34 1EF, price £3.00 or from the US National Technical Information Service, Springfield, Virginia 22151

102/11 UNUSUAL ACCIDENTS No 69

At a food manufacturing firm somebody raised the pressure setting on an autoclave. All he had to do was turn a knob. There was nothing to prevent him altering it and there was no high pressure or high temperature trip or alarm.

As a result, the tins of food that were put through the autoclave were over-cooked. A director of the company, who was on holiday in Italy, was telephoned to ask what they should do with one million pounds of solid rice pudding in tins!

When instrument settings are important they should be controlled by an alarm or trip and the set points should be altered only after authorisation in writing by a responsible person.

102/12 RECENT PUBLICATION

The Wilton Site Guide to High Pressure Water Washing (Newsletter 32/10g) has been revised. (Newsletters 34/7 and 19/5 and Safety Note 70/4 described accidents which have occurred with this equipment).

For a copy of the Guide or for more information on any item in this Newsletter please 'phone E.T. (Ext. P.2845) or write to her at Wilton. If you do not see this Newsletter regularly and would like your own copy, please ask Mrs T. to add your name to the circulation list.

August 1977

AN ENGINEERS CASEBOOK

No 2—RUNNING POLICY FOR SPARE AND MULTIPLE UNITS

Most equipment is subject to wear and tear whilst it is in service and if it is left running long enough it will eventually fail. Where more than one item of equipment is in service, if all have an approximately equal exposure to the service conditions, then they may be expected to fail after roughly the same number of running hours.

You might say that this is stating the obvious; quite so, and quality control over manufacture, precise design and reproduceability tend to ensure that there is a minimum scatter in the time to failure.

We have the following recent examples. Four axial flow compressor rotors (3 working, 1 spare) are regularly rotated round the three working machines. As a result they have similar running hours, in this case about 6 years. Blade cracking in one was rapidly followed by failure in another and examination of the remaining two also revealed cracked blades. In another case a fleet of four dozen rail tank cars, of identical design and construction, all had, nominally, the same number of running hours. They all developed cracks in the barrels at about the same time as a result of which there was a major repair requirement and a shortage of cars whilst the repairs were carried out.

Situations like this can be avoided by ensuring that one of the operating units is deliberately ahead of the others in terms of running hours, thereby giving it an opportunity to reveal any built-in weakness. In the case of multiple units phased inspection can also help. Instead of inspecting the whole population every say, 5 years a number should be done each year, thereby providing an opportunity of early warning of time-dependent failure by corrosion, fatigue, wear, etc.

E H Frank

WHO'S WHO IN SAFETY



No 16 - R Hellon

Ray Hellon, North Tees Works' Fire Officer, first became involved in the fire service in 1940, serving as a part-time messenger and fireman in the Auxiliary and National Fire Services. He returned to the AFS after some time with the Royal Marines and began full-time service with Middlesbrough Fire Brigade in 1953.

He joined ICI as a fireman at Wilton in 1957 and was promoted to Shift Fire Officer in 1966 and to Second Fire Officer in 1969. He was given the job of Shift Security Officer after a re-organisation in 1971 but soon returned to the fire service, moving to North Tees in April 1973.

As North Tees Fire Officer he is responsible for fire prevention, the training of auxiliary firemen, maintenance of fire-fighting equipment, liaison with the Cleveland Fire Service and also fighting fires — fortunately not very often. He has a team of eleven full-time firemen, two fire pumps and a foam tender.

Ray enjoys reading, listening to light music, driving and holidays abroad. He is a widower with a married daughter and two young grandchildren. His son-in-law is a fitter in Wilton Transport Department.