

## No. 100

### ***IN THIS ISSUE***

- 100/1** Our 100th issue — a good time to look back — and forward.
- 100/2** Many accidents have been caused by plant modifications.  
Now one has been caused by the simplest modification of them all.
- 100/3** Must plant modifications lead to accidents?
- 100/4** Another storage tank fails as the result of corrosion.
- 100/6** The biggest single cause of accidents — in six words.
- 100/7** A short story shows how easily we can be misled by figures into thinking that changes are greater (or less) than they really are.

Newsletter 1 is reproduced — in case you have forgotten what it said.



**IMPERIAL CHEMICAL INDUSTRIES LIMITED**

**PETROCHEMICALS DIVISION**

## 100/1 A REVIEW

With this number the Safety Newsletter achieves its 100th issue.

To show how far we've come since 1968, No. 1 is reproduced. The messages are still relevant. Sixteen copies were sent to colleagues in Heavy Organic Chemicals Division (as we were then called) who I thought might be interested. Other people asked to be added to the list and the circulation gradually grew until it is now 2,500. Many copies are circulated and many photocopies are made. (The item on a new fire-fighting medium in Newsletter 94 was reproduced in the "Sunday Times"). The circulation includes many other companies who let us have similar publications in return; this exchange helps to prevent accidents.

The publication of our 100th issue is a good time to look back at the past nine years and see the changes that have occurred — and then look forward.

It may be hard for me to see the changes clearly because I am too close to them but it seems that:

Despite a few incidents in the early months of this year, fires and explosions and other serious incidents are much less frequent and less serious now than in the 1960's.

Safety is more to the fore than ten years ago, and plays a bigger part in our decision-making.

We are more conscious of the fact that fires and explosions will not be avoided by good intentions. Knowledge of the action required to prevent them is much more widespread.

The status of safety is higher; many more professionally-qualified and experienced people are engaged in safety.

As well as adding more safety hardware onto our plants we pay more attention to operability studies, the control of modifications, isolation for maintenance and the other "software" of safety.

We have come to realise that we cannot do everything possible to stop every conceivable accident, at least not at once, and that therefore we have to find ways of identifying the biggest risks so that we can deal with them first.

We have come to realise that it is not helpful to put the blame for an accident on someone's "human error". We have either got to accept the occasional error or design our plants and methods of working so as to eliminate the effects of human error. (See Newsletters 98/6, 97/3, 96/7 & 8, 89/8 and 86).

The influence of the Factory Inspectorate has grown. New designs are discussed with them and they take more interest in dangerous occurrences.

Looking forward to the next ten years what changes would we like to see?

As discussed in Newsletter 95/1, we would like to see more thought given to ways of avoiding hazards rather than controlling them. If plants used safer materials, or not so much of the dangerous ones, we would not need so much protective hardware.

We would like to see simple rather than complex solutions to our problems (See Newsletter 61/4).

We would like to find ways of improving the corporate memory (See Newsletters 93 and 88/6).

Looking back at past Newsletters, several recent issues have been devoted to a single topic, and you might like to be reminded of these:

Plant Modifications	(No. 83)
Human Error	(No. 86)
Pictures from our Safety Calendars	(No. 90)
Accidents that have been repeated after ten years or more	(No. 93)

I would like to thank all the people who have supplied reports for the Newsletter — unfortunately there has been no shortage of material and I have been unable to use all the information supplied. I would be happy to discontinue the Newsletter because there were no accidents to report.

I would like to thank all those who have allowed their mistakes and omissions to be published in the Newsletter — I cannot recall a single objection. Ten years ago we were much more willing to keep quiet, (“The man who reports an accident is a double fool — once for having it and once for reporting it” — a supervisor quoted in Newsletter 29/10). Now many more people realise that we will stop accidents only if we learn from each other’s mistakes.

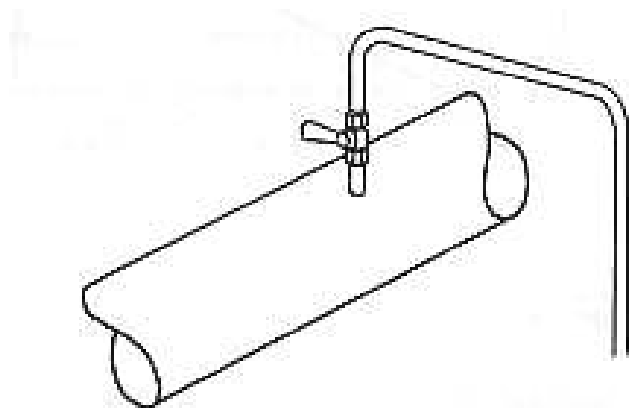
Readers outside the Division may get the impression that we spend our time sucking in tanks, opening up equipment full of oil and so on. To keep things in perspective, it is, therefore, worth mentioning that many plants go for months without a dangerous occurrence or even a minor injury and that every week thousands of permits-to-work are filled in correctly and thousands of jobs are correctly isolated for maintenance.

Finally, I would like to thank E.T. and her predecessors for their patience in re-typing numerous drafts, E.D. of our Publicity Section for her help and advice, and our printers, Typeset of Newcastle, for their help.

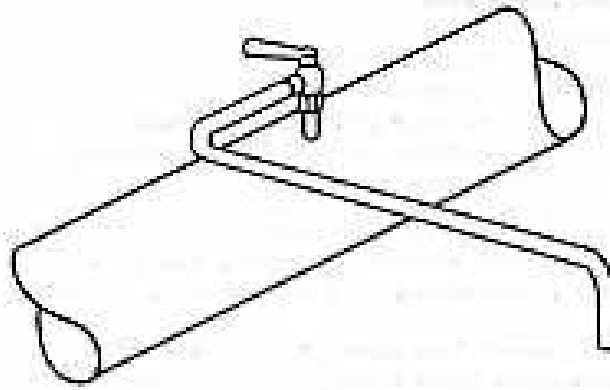
## **100/2 THE SIMPLEST MODIFICATION OF THEM ALL — BUT IT STILL CAUSED AN ACCIDENT**

Earlier Newsletters (97/6, 83, 7 1/7, 67/7d and 63/7) have described many accidents caused by plant modifications, some of them very simple. The following incident, which occurred on the Wilton Site, was caused by a change so slight that many people might not think it necessary to put it through a modification procedure.

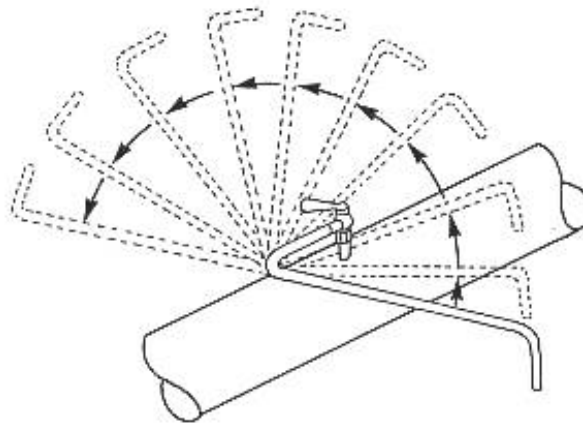
A vent line was arranged as shown below.



When repairs were made a straight-through cock was not available so a right-angle type was used



When the vent was used the reaction force caused it to whip round, as shown below. Fortunately, no-one was hurt, but some years ago a similar movement of a vent pipe caused a fatal accident (see Newsletter 93, page 5)



### **100/3 MUST PLANT MODIFICATIONS LEAD TO ACCIDENTS?**

This was the title of Safety Newsletter No 83. One reader keeps a copy handy for ready reference. When he picks it up the title seems to read

“MOST PLANT MODIFICATIONS LEAD TO ACCIDENTS”

Perhaps there is a moral somewhere.

### **100/4 30,000 m<sup>3</sup> OF FUEL OIL ARE SPILT IN TWO HOURS**

Failures of storage tanks as the result of corrosion are unfortunately not rare. As they are not pressure vessels, many companies do not inspect them regularly. Even in ICI where we have a system of inspection, some tank failures occur; there were several leakages in Petrochemicals Division in 1976, due to corrosion — internal and external. Fortunately none were serious.

A failure in another Company was described in Newsletter 76/2. Now a different Company has reported the failure of a 12-year old fixed roof tank containing fuel oil.

It is believed that on one side of the tank the sand foundation subsided. Water collected in the void and caused corrosion of the tank floor and the base of the tank wall. This was not spotted as the insulation came right down to the foundations.

The walls were originally 6 mm thick at the base but had corroded down to 2 mm.

When failure occurred part of the floor collapsed into the void, forming a tear 2.5 m long. 30,000 m<sup>3</sup> of fuel oil at 95°C came out within 2 hours. The spilt oil was collected in the tank bund except that some leaked into adjacent bunds through rabbit holes and pipe sleeves.

The report recommends:-

- 1 On insulated tanks the insulation should end 200 mm above the base so that checks can be made for corrosion.
- 2 Drainage should ensure that water cannot accumulate at the base of storage tanks.
- 3 All tanks should be inspected regularly. In ICI this is required by our Pressure Vessel Code. (Available outside ICI from the Royal Society for the Prevention of Accidents, Queensway, Birmingham B4 6BS.)

### 100/5 UNUSUAL ACCIDENTS No 67

*The following accident was reported to the Factory Inspectorate.*

A foreman struck a counter with his right hand to drive home his instructions to employees and broke his wrist.

### 100/6 SOME QUESTIONS I AM OFTEN ASKED—

#### 31 - “WHAT, IN SIX WORDS OF ONE SYLLABLE, IS THE BIGGEST SINGLE CAUSE OF ACCIDENTS”?

*“..... the horrible thing about all legal officials, even the best, about all judges, magistrates, barristers, detectives, and policemen, is not that they are wicked (some of them are good), not that they are stupid (several of them are quite intelligent), it is simply that they have got used to it. Strictly they do not see the prisoner in the dock; all they see is the usual man in the usual place. They do not see the awful court of judgment; they only see their own workshop”* Sir Geoffrey Hoare, a former Solicitor-General.

With a little alteration this applies to ICI employees.

Accidents do not occur because we are wicked (most of us are good) or because we are stupid (most of us are quite intelligent) but because we have got used to everything we see. We see familiar scenes, not tripping hazards and obstructions. We see our old friend Joe, not a man wearing the wrong protective clothing about to work on a pipeline which may not be properly isolated or identified. We see a place we know well, not leaking equipment in a badly ventilated building.

If we want to say a few words why accidents happen, it is because *we have got used to it.*

An effective way of making people wake up to the hazards around them is to go around with a camera and then show them colour slides of the scenes they pass every day.

### 100/7 THE MANAGER’S DREAM

*The following story is intended to show how easily we can be misled by accident statistics — when the numbers involved are small.*

It was an evening at the end of January 1977 and the Works Manager could put it off no longer. He had to get out his safety report for the previous year. This would show that his Works had had six lost-time accidents — the same as in the year before. Every other Works in the Group had shown an improvement — between 10% and 40% — but his Works had remained the same. It was bottom of the league and the Board had said that in 1976 the lost-time-accident record was one of the things on

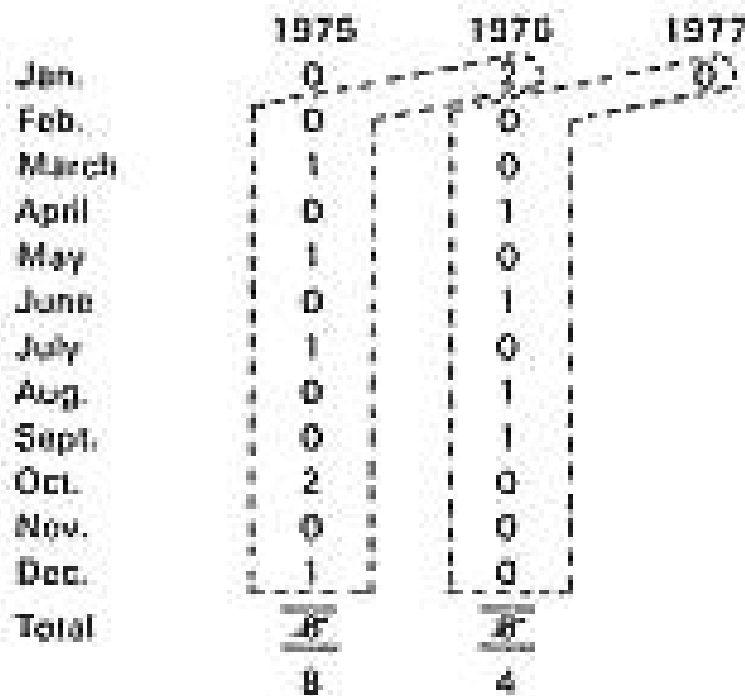
which Works Managers would be assessed. It was rumoured that the Works Manager showing the biggest improvement would be promoted, the one showing the worst...

He gazed at the figures showing accidents month by month, hoping that somehow one of them would disappear

	1975	1976	1977
Jan	0	2	0
Feb	0	0	
March	1	0	
April	0	1	
May	1	0	
June	0	1	
July	1	0	
Aug.	0	1	
Sept.	0	1	
Oct.	2	0	
Nov.	0	0	
Dec.	1	0	
<b>Total</b>	<b>6</b>	<b>6</b>	

While the Works Manager was working his wife was watching television. He looked up to see the Prime Minister announce that in future the year would start on February 1 instead of January 1.

Looking at his figures, the Works Manager saw that his accident record showed a remarkable improvement — from 8 in 1975 to 4 in 1976— he had halved it.



He always knew he could improve the safety record if he set his mind to it.

“Wake up dear”, said his wife. “You’ve fallen asleep again”.

All that the Works Manager had to do was find a convincing reason for starting the safety year in

February rather than January. That should not be too difficult — the Safety Committee took office on February 1; the safety competitions started on February 1. They had not done so in the past, but that could soon be changed. As for next year — he looked forward to promotion and his successor could worry.

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.

June 1977

## HEAVY ORGANIC CHEMICALS DIVISION

### SAFETY NEWSLETTER NO. 1

The object of these Newsletters, which will be issued from time-to-time, is to inform HOC Division Safety Officers of accidents and dangerous occurrences and other items of general interest. Safety Officers may circulate the newsletters or any items from them within their Works as they consider appropriate. Extra copies can be obtained from Mrs. BF. (extn. 3927).

#### 1. TRAINING

Those of us who have children at school know that methods of teaching have changed since we were at school ourselves. The following quotation from an article on education illustrates the change that is taking place.

“(There is a) growing concern that children should play a more active part in learning... Class teaching is no longer the appropriate model. ... By contrast many of the new curricula assume that it is as important for children to find out for themselves as from a teacher, to discuss among themselves as to answer a teacher’s questions, Nuffield science and maths, for example, put the emphasis on learning by discovery, working in ones and twos; while recent developments in English teaching stress the value of discussion, of the kind of interchange and inquiry that suits small groups of five to fifteen.”

Can we learn from this how to improve our safety training?

We cannot let each manager, supervisor and operator blow up his own plant and then discuss the result with him.

But we can get groups of managers, supervisors and operators (mixed or separate) to discuss the causes of accidents that have happened and decide what they would do to prevent a recurrence. They will learn far more in this way than they will learn by listening to someone talking or by reading reports.

I have written up about 50 accident case-histories for discussion in this way. All are illustrated by 35 mm. colour slides. Many of the case histories deal with fire and explosion hazards but others are of interest to any Works, whatever their processes. Copies of the case-histories and slides are available to those interested and I am willing to take initial discussions myself.

#### 2. PERMITS-TO-WORK

As you know, it is an instruction now in all works that

- (a) Before any item of equipment is given to maintenance it must be isolated 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.
- (b) Before any line is broken, even to insert a slip-plate the valves isolating the line must be locked shut. (Blow-off valves between double isolation valves must, of course, be locked open.)

Despite these clear rules several dangerous incidents have occurred recently.

In one Incident a branch had been covered in insulation and was overlooked. While a fitter was dismantling the main line, process liquid came along the branch and was spilt.



In another incident a line was isolated correctly with slip-plates but a plumber broke into the wrong line. This would not have happened if a numbered label had been fixed to the line at the point at which it was to be broken and the number of the label put on the Permit-to-Work.

These incidents show that the price of safety, like the price of freedom, is eternal vigilance.

3. Stopping leaks by squashing pipe-lines is an attractive idea. It is done already on Power and Ammonia Works in a rather special situation. Oil Works have agreed to sponsor some trials of the P. & A. equipment to see if it is suitable for wider use.
4. A hose, fastened by a Jubilee clip, came apart and sprayed a man with a corrosive liquid. This emphasises that, as has been said before, Jubilee clips are not suitable for industrial use with hazardous materials.
5. The blades on an air -cooler fan sheared off recently during normal running, This incident was the result of bearing failure, caused by incorrect installation by the manufacturers and by inadequate lubrication. Have you got any air coolers on your Works?
6. Oil Works stick little posters, like the one attached, to the outsides of Permit-to-Work books. Details and copies of others from Les, Hard or Jack Crosby.
7. If you use plastic lines, make sure that plugs or other fittings screwed into the lines are not harder than the lines themselves or the thread in the plastic may wear. Recently a metal plug blew out of a polypropylene line and a man was sprayed with a chemical,
8. A good review of asbestos and its risks has been published by the Factory Inspectorate "Problems arising from the use of Asbestos", HMSO. 1967, price 3/9d.

I have been asked if fire-resistant suits made from asbestos should be used. I am sure it is safe to do so as the asbestos is totally enclosed by aluminium on one side and by cloth on the other, but inspect them regularly to make sure the protection is not broken.

9. The Oil Works Safety Compendium has been revised. It includes all the safety instructions and explains the reasons for them. There are copies on each Works but if you have difficulty in getting hold of a copy, 'phone Les, Hard.

T A. Kletz

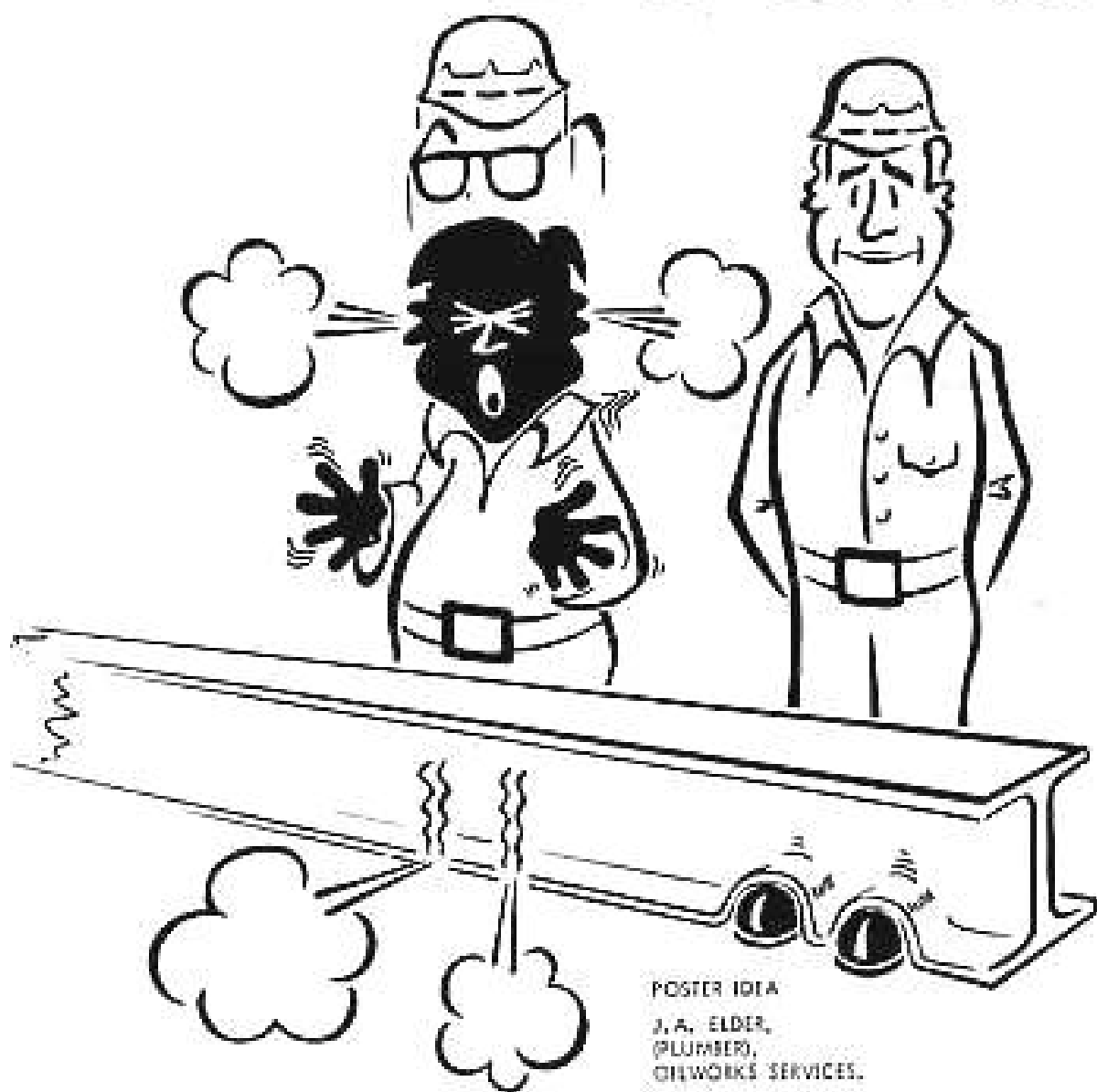
Division Safety Adviser

P. S. Please let me know if you have any suggestions for inclusion in the next issue, or would like more details of any item.

7th May, 1968

In the original poster on the next page the man on the left is coloured red, from the effect of the girder on his feet.

# WHO'S NOT WEARING SAFETY BOOTS



**NEVER NEGLECT TO  
WEAR PERSONAL PROTECTION**