

TREVOR'S CORNER No. 9

ACCIDENTS OF THE NEXT 15 YEARS?

A shortened version of a paper presented at the UK Hazards XX Conference, April 2008.

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In 1968 I was appointed safety adviser to ICI Heavy Organic Chemicals (later renamed Petrochemicals) Division with responsibility for what we now call process safety. One of the most effective actions I took was the preparation of a monthly *Safety Newsletter*, usually 8 pages long. I added people to the circulation list at their request and over the next fourteen years the circulation grew. By the mid-1970s it was about 2500 and, as well as other ICI Divisions, included many outside companies in the UK and elsewhere, universities and the Health and Safety Executive. The *Newsletters* were not intended primarily for safety experts but for all those involved in design, operations, maintenance and construction, at all levels but especially at the professional level. I made it clear to the outsiders who received the *Newsletters* that they could be copied for circulation within their organisations but not offered for sale. Some companies circulated them widely.

Within ICI the *Newsletters* were seen by division directors, operators and all those in between. The contents consisted mainly of reports on accidents of general and technical interest from ICI and also from other companies, which they supplied in exchange for the *Newsletters*. I did not copy the original reports, but rewrote them to bring out the essential messages. Many of the later *Newsletters* were devoted to specific themes, such as accidents due to plant modifications, preparation for maintenance, static electricity and human error. After I retired from ICI, I edited many items from old *Newsletters* and published them in a book called *What Went Wrong?*, now in its 4th edition and my best-selling book. I have also written a supplementary volume, *Still Going Wrong?*

Many people were surprised that ICI allowed me to distribute reports of our errors all over the world but if we have information which may prevent accidents there is a moral duty to pass it on to other people. In addition, it was to our advantage in several ways:

1. **Economic:** ICI spent a lot of money on safety. By telling our competitors what we did we encouraged them to spend as much.
2. **Pragmatic:** we got useful information from other companies in return.
3. **In the eyes of the public, the chemical industry is one.** The whole industry suffers if one company performs badly. To misquote the well-known words of John Donne:

No plant is an Island, entire of itself; every plant is a piece of the Continent, a part of the main. Any plant's loss diminishes us, because we are involved in the Industry: and therefore never send to know for whom the inquiry sitteth; it sitteth for thee.

Colleagues and other companies were willing to let me describe their accidents and so-called "near misses" (actually near accidents), because I did not say where they occurred (except when the location was stated in the title of a published report). The *Newsletters* were thus an early example of "open access". When I retired from ICI the company gave me permission to reproduce or quote from them as much as I wanted, provided I did not say where they occurred or in which company. If anyone asked me where an accident had occurred, I apologised for my poor memory. Now, as a further step in open access, The UK Institution of Chemical Engineers are making all 171 *Newsletters* available on the Internet. Other companies' reports may be added later.

The information in the Newsletters is given in good faith but without warranty. Much of the advice is decades old and better methods of prevention may be available today. There are many possible solutions to most problems. However, the accidents happened, many are still being repeated today, and readers should therefore ask themselves, "Could this occur where I work and, if so, how do I or should I prevent it?"

In recent years ICI has been very different from the ICI I knew. Except for the paint factories, with which I had little contact, all the plants owned in 1982 when I retired have been closed or sold to one of a large number of different companies. None of the incidents described in the *Newsletters* occurred on plants operated or owned by ICI in recent years.

I wrote almost everything in the *Newsletters* myself. After I retired from ICI in 1982 they continued for 18 months and were then abandoned.

Many readers may wonder if information from 1968-1983 is still relevant. When I retired in 1982 and started working as a consultant as well as a visiting professor I thought that my life as a consultant would be no more than five years as after that I would be out of date. It has not happened. Many of the accidents described in the *Newsletters* are still recurring and many of the problems discussed are still puzzling people, as shown by the examples below. (See also the Afterthoughts on the last page.) Remember that while equipment has changed a more important factor, human nature, remains the same. Are you any more reliable than your parents or grandparents? Perhaps less, as when the *Newsletters* were written there were more people in design and operations and industry had not adopted the extraordinary practice of retiring people when their knowledge and experience were at their highest

US readers should note that some engineering and management terms have different meanings in the two countries. There are glossaries of them in the two books mentioned above but the following can be particularly confusing:

- In the UK a plant manager is usually someone at the lowest level of professional management, equivalent to a supervisor in the US. The UK equivalent of a US plant manager is called a works manager or factory manager. In the UK supervisor is usually another name for a foreman but can be anyone to whom other employees report.
- A chargehand is a rather old-fashioned UK name for a lead operator.
- Lagging is a UK name for insulation; flex is a UK name for a hose..

SOME NEWSLETTER ITEMS THAT ARE STILL RELEVANT

You can search the *Newsletters* for accident reports or information on particular equipment, substances and operations. For example, if you are thinking of fitting a level glass a search for that term will take you to *Newsletter* 34 where you will see that:

Level glasses are always liable to break and it is, therefore, the policy of the Division to install ball check cocks in the lines connecting a level glass to the parent vessel. If the level glass breaks the pressure of the liquid in the vessel pushes a ball against a seat and stops the leak.

The ball check cocks form part of an isolation valve. *They will operate correctly only if the isolation valve is fully open or almost fully open.* They will not work correctly if the isolation valve is half-shut.

When a level glass connection broke recently there was a large escape of gas which caught fire and injured a man. The ball check cock did not operate because the isolation valve was nearly closed.

Please make sure that your operators know that these valves must be fully opened and then left just cracked off the back seat position.

On some plants the balls have been found to be missing. You may like to check that on your plant they are all present.

The original leak came from a hose which had been repaired with tape. There are many references to hoses in the *Newsletters*, for example, *Newsletter 44* reports that:

Before removing a hose a man tried to drain it by loosening the coupling nut. Hot water came out of the coupling and scalded him. In the past, men have been burnt by corrosive chemicals in this way.

Whenever hoses are used at pressure, a valve should be provided for blowing off the pressure-

The best place for the blow-off point is at the process end as then it can be used to prove that the hose is clear, by opening the service and blow-off valves before the process valve is opened.

A search for "flex" may find "flexible", eg, in *Newsletter 47*:

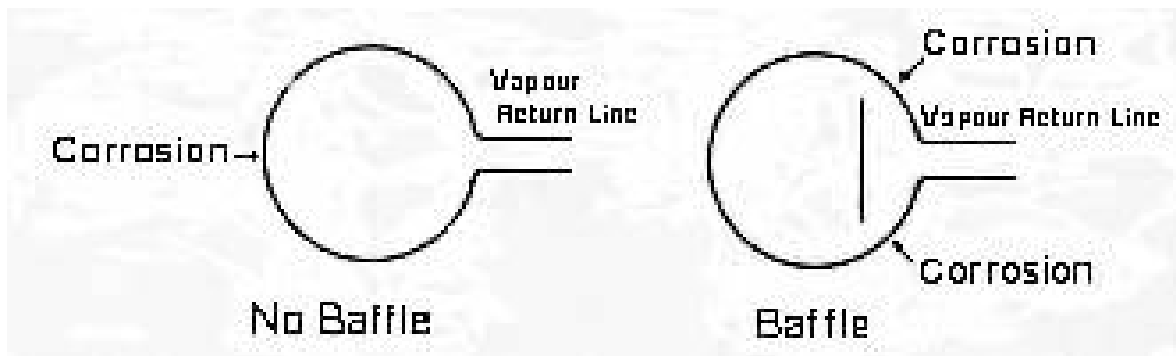
Corrosion was suspected on a distillation column. Ultrasonic thickness measurements were therefore made on the outside of the shell. These showed that although some corrosion had occurred, the thickness was still well above the design minimum.

Some months later, when it was possible to take the column out of use, the lagging (insulation) was removed and it was discovered that part of the column was so thin that it could be flexed by hand.

The thin spot was immediately opposite the vapour return line from the reboiler. The thickness measurements had been made on the other side of the column where the staging and ladders made access more convenient.

The lessons to be learned are:

1. Thickness measurements in distillation columns should be made at the points at which corrosion is most likely to occur. In the case described above, this was opposite the vapour return line. Often there is a baffle near the return line and corrosion is then most likely near the edges of the baffle. The geometry of the column must be studied.



2. During design, access ladders should be positioned to facilitate thickness measurements at the points where corrosion is likely to be heaviest.

This report shows how a search for one term can lead to a voyage of discovery where interesting and valuable information are brought to light. I hope I have convinced you that the information in the *Newsletters* is still relevant.

HOW TO GET THE BEST OUT OF THE NEWSLETTERS

I do not expect anyone to read right through the *Newsletters* as if they were a book but you may like to browse them, as I have done above, to see their scope.

At a safety meeting you can describe or distribute an accident report from the *Newsletters* and then ask those present why the incident occurred and if it could occur on the plant they operate or are designing. If it could, what have they done or should they do to prevent it happening. Remember that the advice given in the *Newsletters* may not be the best available today or the best for your company. The motto, 'If it ain't broke ...', is true but if it is broke, you don't need to mend it the same way as everyone else. Also remember that discussions are a more effective method of learning than listening to a lecture or reading.

Alternatively, you can give a different accident report to everyone present and ask them to answer the same questions at the next meeting.

Whichever way you use the *Newsletters* they could help you prevent the accidents described in them, most of which occurred between 1968 and 1983, happening again during the coming 15 years.

Afterthoughts

Only that shall happen
Which has happened,
Only that shall occur
Which has occurred;
There is nothing new
Beneath the sun. – *Ecclesiastes 1:9*

"The reality is that mission statements have done little to change the corporate world for the better... People do not change by dint of a statement, no matter how carefully drawn up it might be" (L. Kellaway). Telling them what has happened and will happen again unless they learn from it is more effective. Better, let them tell you what they think is the best method of prevention.

Newsletters 1-100 are now on the Internet. Go to www.icheme.org. click "Safety", scroll down to "Safety Newsletters", click "more details" and numbers 1-100 will be listed. To read or download them you have to go through the motion of buying them though there is no charge and you cannot search them as a group. I am looking for ways to make the system more user friendly.

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