Making Safety Second Nature

Dr. Trevor A. Kletz
Process Safety Consultant and Visiting Fellow, Loughborough University of Technology
64 Twining Brook Road
Cheadle, Cheshire SK8 5RJ
United Kingdom

ABSTRACT

By the end of the 1960s a new generation of plants had been built, operating at higher temperatures and pressures and containing larger inventories of hazardous chemicals than before; the result was a series of fires and explosions followed by a new emphasis on process safety. A feature of these new developments, listed below, and realized only in retrospect, was that they were more than mere problem-solving techniques. They made people look at problems in a different way; they became second nature.

- We could not do everything at once. We needed a rational and defensible method of deciding on priorities and used quantitative risk assessment (QRA): comparing the risk to life from the various hazards to which employees and the public were exposed. As a result, people no longer said, “There is a risk; we must prevent it.” Instead they asked how likely it was and what the consequences would be.

- We soon realized that the biggest source of error in QRA was failing to foresee all the hazards or all the ways in which they could occur. We developed and used Hazop to identify risks. Those who took part learned to look more critically at designs and proposals and to see some of the things that might go wrong. The need for hazard identification was reinforced by the explosion at Flixborough in 1974, which drew attention to the unforeseen results of plant modifications.

- Flixborough also drew attention to the need to reduce inventories of hazardous materials, if possible by using so little that leaks hardly mattered or by using safer materials instead.

- Safety audits proved an effective way of drawing attention to hazards and made people more aware of these they passed every day.

- Many accident investigation reports were superficial, dealing only with the immediate technical causes and paying no attention to ways of avoiding the hazard or weaknesses in the management system, particularly when human error was involved. Gradually people came to realize that instead of telling others to be more careful we should try to remove opportunities for error.

- Whether accident reports are thorough or superficial, in most companies they are soon forgotten. Ways of keeping the memories alive include adding a note to codes and instructions on the reasons for them, reminding people of the lessons of the past, making sure recommendations continue to be carried out, never abandoning procedures or equipment unless we know why they were adopted and developing better methods of information storage and retrieval. These actions have still to become second nature.