

Contents lists available at [ScienceDirect](#)

Process Safety and Environmental Protection

journal homepage: www.elsevier.com/locate/psep

IChemE

Learning lessons from incidents: A paradigm shift is overdue

M. Sam Mannan^a, Simon P. Waldram^{a,b,*}

^a Mary Kay O'Connor Process Safety Center, Texas A&M University, College Station, TX, United States

^b Waldram Consultants Ltd., United Kingdom

ABSTRACT

Drawing on historical data we show that the international community of process engineers has not been good at learning lessons from their past accidents. We call for a paradigm change in the way we approach this and the creation of a single new, multi-national, multilingual accident database that is free at the point of use and that includes immediate and underlying causes as well as “lessons learned”. It must be user-friendly and provide links to key source documents. The purpose of this paper is to challenge those in authority, and with the power to do so, to make this happen. We give some preliminary views on what may be required. In countries that so choose this could include an element of compulsion to consult the database in specific circumstances and a sign-off procedure to verify that this has been done.

© 2014 The Institution of Chemical Engineers. Published by Elsevier B.V. All rights reserved.

Keywords: Accidents; Causes; Incidents; Lessons learned; Database; Multi-lingual; Free access

1. Introduction

At the start of this paper we need to define two words because of the slightly different meanings that they convey in Europe and North America – and perhaps elsewhere. In this paper, we use the word “accident” in the conventional sense that an event was not intentional, or planned, and also that it was accompanied by harm to individuals, the environment or to fixed facilities. The philosophy of the process safety community must be that all accidents are preventable and use of the word “accident” therefore does not mean that the event was unavoidable, could not have been anticipated or was “an act of god”. Note that without the concept of total avoidability, saying that everyone has the right to return unharmed at the end of their day’s work really makes little sense. In contrast, we use the word “incident” to describe a similar event but which by good fortune did not cause harm. As an example, a heavy steel item dropped from height on a process plant might land close to a group of workers at ground level but not result in any injury. It should be immediately obvious that in order to prevent a re-occurrence (with possibly far more serious consequences) this incident must be properly investigated. The

root causes that lie behind it have to be identified and necessary changes in training, work practices, etc., specified and enforced. Some practitioners advocate use of the word “incident” to describe all unintended events whether accompanied by harm or not. Our view is that to describe a process plant event that results in injuries, or fatalities, as an “incident” will be offensive to many and may imply that what actually happened is in some sense being trivialised.

Whenever there is a catastrophe we are usually told that “lessons will be learned”: this phrase has become so ubiquitous in everyday life that the public just seems to accept that it will happen. It is used by spokespeople following “natural” disasters such as an earthquake, extensive flooding or tsunami, or man-made incidents derived, for instance, from financial, political, military or engineering activities. But unfortunately, for example, lessons from the actions of the banker Nick Leeson (whose loss of £827 million in 1995 led to the collapse of Barings Bank) didn’t prevent subsequent similar, and even larger, losses at the Sumitomo Corporation, Société Générale or UBS. In an analogous manner, and as a process engineering community, we too have failed to learn lessons sufficiently well from past experiences. By looking at some very different

* Corresponding author at: Waldram Consultants Ltd., 2 Cascade Avenue, Muswell Hill, London N10 3PU, United Kingdom. Tel.: +44 02088831395.

E-mail addresses: waldram@blueyonder.co.uk, scwaldram@yahoo.com (S.P. Waldram).

Received 23 May 2013; Received in revised form 20 January 2014; Accepted 4 February 2014

0957-5820/\$ – see front matter © 2014 The Institution of Chemical Engineers. Published by Elsevier B.V. All rights reserved. <http://dx.doi.org/10.1016/j.psep.2014.02.001>

types of events within the process industries we demonstrate that as an international group of professional engineers we are nowhere near as good as we should be at “learning lessons” from the incidents that result from our activities. The choice is ours: we can continue to carry on as we are doing or we can recognise these failures and try to address them with a different, concerted plan of action.

Because modern communications can be so fast and widespread geographically it should now be easier than before to disseminate lessons learned within a company (even if it has sites on different continents), amongst professional groups or within the process industries as a whole. But this is not happening as well as it should do, not least because we are all busy and may also be inundated with information; or alternatively perhaps we don't even know that the information exists, where it resides and how to access it. Many years of describing incidents, accidents and their investigations at conferences, in journals, in government reports, in books or encyclopaedias have been shown, as best, to be only partially effective – even if well meaning. We will argue that a paradigm shift in the way we try to ensure that lessons are learned is now required. We propose that this needs to include the creation of a new free at the point of use, single, comprehensive, international, accident and incident database: obviously this must be user friendly, include root causes and ‘lessons learned’, be available in a variety of languages, be searchable using a flexible Boolean methodology and have hyperlinks to pdfs or websites for key source documents. There are no current databases that meet all of these specifications.

2. Our professional responsibilities

Most of the professional bodies to which we belong make very robust statements about the responsibilities and duties of their members in relation to health and safety. For instance the first canon of the Code of Ethics of the AIChE states unambiguously that members will “Hold paramount the safety, health and welfare of the public and protect the environment in performance of their professional duties”, [AIChE \(2013\)](#). The word “paramount”, of course, means supreme, most important, or above all others. Process Safety is also one of the “Essential Issues” that figure prominently in the recent IChemE publication, “Chemical Engineering Matters”, [IChemE \(2013\)](#).

Most, or many, of us would always subscribe, at least in formal public statements, to the principle of holding the safety, health and welfare of the public paramount. If this is so then it seems logical that every assistance should be given so that all process engineers can follow the AIChE canon: for this reason alone we propose that the accident and incident database for which we argue must be freely available to all end users.

To write that only “most, or many, of us would always subscribe, at least in formal public statements, to the principle of holding the safety, health and welfare of the public paramount” may disturb, or be offensive, to some readers. But as recently as February 2012, in an article on “UK offshore safety” published in *The Chemical Engineer*, Geoffrey Maitland, Professor of Energy Engineering at Imperial College London was quoted as saying “that operators on the UK continental shelf have a ‘patchy process’ of sharing best practice and ‘lessons learned’ from incidents as they are concerned about admitting liability and releasing intellectual property,” [IChemE \(2012\)](#). From our own professional experience and

with this type of comment as corroboration it seems as if, at least in the minds of some, financial, intellectual property or legal considerations are arguably contenders for being held paramount. As process safety engineers we must resist this attitude.

3. Historical background to “Learning Lessons”

[Barton and Rogers \(1997\)](#) remind us that as early as the 14th century, industrial accidents were described, with comments such as “Don't be alarmed, help to sweep up the floor, Just as we always do, and try once more!”, [Chaucer \(1386\)](#). But, as described in the next section, by 1785 we have the details from Italy of a well-documented accident investigation: much later the famous sentiment “Those who cannot remember the past are condemned to repeat it” appeared in “The life of reason”, [Santayana \(1905\)](#), and then pioneers like Ducommun in the USA and Kletz in the UK helped publicise this concept and to develop methodologies and management systems to improve the safety performance of the process industries in a systematic way. Current best practice includes carrying out incident and accident investigations with root cause analysis, defining necessary actions with structured follow-up to ensure that these are completed in a timely manner and, in many cases, compulsory regimes of national reporting. As mentioned before, for significant events, and to publicise “lessons learned” that may be of use and applicability to others, we write reports, arrange seminars, make presentations at conferences, write up case studies in journal articles or books, prepare entries in encyclopaedias and assemble databases. Company newsletters (hard copy or electronic) and intranets are used to disseminate information. Despite all these actions, over 200 years of experience have not and do not eliminate repeat accidents – though they may prevent some from re-occurring. We need to accept this failure, use it as valuable feedback and then as a matter of urgency refine what we are doing, make it much more effective, easier and cheaper to be able to access and “learn lessons” and, perhaps, also to introduce some legal framework for compliance.

4. Three examples of classes of repeated accidents

4.1. Dust explosions

One of the first recorded accident investigations followed an explosion at about 6.00 p.m. on 14th December 1785 in Giacomelli's flour warehouse in Turin, [Morozzo \(1795\)](#). [Eckhoff \(2003\)](#) recounts in full aspects of this well-known investigation. Count Morozzo correctly identified some unusual features of the flour, i.e., that it was exceptionally dry, and recounted a similar “near-miss” incident at Joseph Lambert's Bakery, also in Turin. He wrote:

“Ignorance of the fore-mentioned circumstances and a culpable negligence of those precautions which ought to be taken, have often caused more misfortune and loss than the most contriving malice; it is therefore of great importance that these facts should be universally known, that the public utility may reap from them every possible benefit.”

Over a 30 year period between 1958 and 1988, 984 incidents of fires and explosions involving dusts and powders were reported to the UK HSE: there is also good evidence from

Download English Version:

<https://daneshyari.com/en/article/10373920>

Download Persian Version:

<https://daneshyari.com/article/10373920>

[Daneshyari.com](https://daneshyari.com)