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Embedding the Lessons of Hard Knocks

Trying Not to Repeat Our Mistakes Time and Time Again

Dr Ken Patterson & Gillian Wigham



Dr Ken Patterson

Originally an Industrial Chemist, Ken joined HSE in 1986 as a specialist inspector, dealing with process safety. He worked both in the field and spent periods in HSE HQ, in Major Hazards and Operational Research. He moved to Hickson & Welch in 1994, after the company's major accident, as their Health and Safety manager. He retired in 2015 after 10 years with Synthomer firstly as their European and then as the Global SHE manager.

Ken was a member of the working group which wrote IChemE's "Fundamentals of Process Safety course, which he has taught many times since. He chaired the working group which produced the third edition on CIA's Occupied Buildings guidance and was a member of the UK's Chemical Weapons Convention Advisory Committee. In 2011 he was awarded the Franklin Medal by IChemE for his work in process safety.



Gillian Wigham

Also an Industrial Chemist, Gillian has over 30 years experience in the chemical industry having worked as a Research Chemist, Plant Support Chemist, Development Chemist, Occupational Health Manager, SHE auditor, Training Manager and Quality Manager.

Gillian joined Synthomer in 2005 from Hickson & Welch initially to support the European SHE Manager, specifically with Occupational Health and SHE procedures. Gillian now works for the corporate team, across the Group's global sites, as Group SHE auditor and Occupational Health advisor.





 A leading global supplier of water-based and differentiated polymers with 2020 revenues of £1.65bn; Headquartered in London (UK)



An international footprint across 18 countries, with 37 manufacturing sites and 4 Innovation Centres located in Europe, North America and Asia



 A strong track record of organic growth and M&A



ca. 4750 employees around the world



Listed on London Stock Exchange since 1971;
 Market Capitalisation ~£2bn











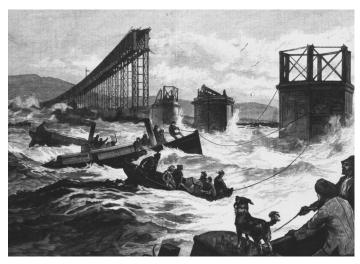
What do we know?

- The duty of old people is not to tell young people what to do
 - when did that ever work?
- Old people should tell young people what we have got wrong, so young people at least have the chance to make their own mistakes.
- We do, collectively, know a lot about how to do things safely, much of it learned from our (and other's) mistakes.
 - The history of engineering, at least since the birth of the railways, is a history of learning from what worked, or - possibly more often - from what went horribly wrong!





We all make mistakes (and have always done so)







- Both the rail and airline industries have strong cultures of accident & near miss reporting and investigation, coupled with a strong "rule book" and constant learning from their mistakes.
- Both provide astonishingly safe modes of travel.
- However, both are very "self-similar", they do the same thing time and again, with a relatively small set of material (aircraft types, locomotive types, airports, fixed track layout, etc).





What does that mean in the Process Industries?

- The process industries are always innovating with little control on what type of process is allowed:
 - Reactors get bigger, storages get bigger, new processes are introduced ...
 - T2 industries accident: they used an "Innovative" temperature control system boiling off the cooling water and replenishing it from time to time
- We also change what we have: we try to improve, streamline, remove manual operation and we change the people doing it.
- We have developed Process Safety Management Systems (PSMS) to control these changes but they depend on fallible people making the right decisions,
 - How do we help our staff learn the things we think we know, and how do we keep that knowledge fresh as they take their decisions?

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Why do we repeat accidents - memories

- Human memory isn't consistent "Chinese whispers"
- Hard to remember accidents in a neutral, unbiased way
 - Feel the emotion to make the memory, but remember the facts
- False details can reproduce
- How different people focus their attention on an event will affect what they remember
- Three aspects of memory that can fail
 - Encoding how we get information into the brain
 - Storage how we retain information over time
 - Retrieval how we get information out of the brain

Only people have memories, not organisations







Our best defence against repeat accidents?

"A systematic framework for managing the integrity of hazardous processes" - our PROCESS SAFETY management system

- Analyse the hazards inherent, transient and potential in every process and plant
- Think about the possible accidents before they occur
- Put appropriate barriers against them in place
- Manage the systems which keep the barriers effective to ensure they are working
- Embed the system in all your operations to make the process systematic and rigorous
 But these systems still <u>always</u> rely on humans

- so how do we keep them informed?



Building and rebuilding memories - IChemE

IChemE invests in assisting in learning from accidents:

- Loss Prevention Bulletin
 - Approaching 50 years of publication, now free on-line to members
 - Searchable database of accident reports & summaries, plus good/best practice reviews
- SLPSIG keeps available out-of-print HSE major accident reports
 - Newsletter has a round up of incidents with links to more information
 - Other SIGS & Area Groups regularly discuss accidents and the learning from incidents
- TCE publishes reports and long-term reviews of major accidents on their anniversary (for example Fukushima, this year)



Building and rebuilding memories - IChemE

IChemE is heavily involved in learning from accidents:

- The SIESO Prize for students asks "How do we present what we have learnt from accidents in new, innovative ways, likely to catch the imagination of today's undergraduates & young engineers"
 - And offers £750 for the best entry!
- The "Fundamentals Of Process Safety Course" discusses significant major accidents as a way of introducing PSM and topics like PtW & MoC.
- However, typing "accidents" into a search of IChemE's "Accreditation of chemical engineering programmes" produces 0 matches.
 - Not of itself a good or bad thing but perhaps an area to consider at some point?
 - The authors have lectured to students at Leeds & Bradford universities on Major Accidents.





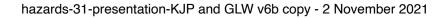
Keeping the knowledge in manufacturing: Process Safety Leadership

- Clear and positive process safety leadership is at the core of managing a major hazard business
- Leadership is vital to ensure risks are effectively managed
- Leaders must understand <u>and show they understand</u> the Company's Major Accident Hazards and PSMS
- Good process safety management does not happen by chance, it requires constant active engagement
- Sharing good practice and learning and implementing lessons from incidents are important aspects of process safety









Keeping the knowledge in manufacturing: Management and Operations at every level

- Remember events
- Spread the knowledge
- Learn from our mistakes

Learning from our mistakes . . . The Synthomer Way . . .





'Reporting incidents / near misses, solving root causes, sharing and implementing lessons learned'

Reporting

- Reporting and recording all injuries, incidents and near misses
- Investigating injuries, incidents and near misses so root causes can be determined
- Implementing actions to prevent reoccurrence
- Sharing lessons learnt and implementing lessons from others as 'If it was my site'





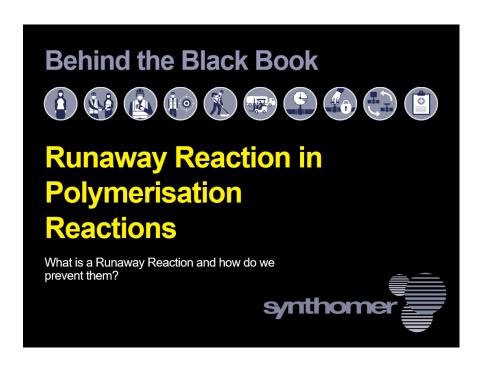
The Black Book

- A historical journey through the most significant Process Safety events in Synthomer history
 - Analysis of Company Accident and Incident data over the last 15 years
 - Site Challenge What was your worst ever event?
 - Compiled 'top 20' events
- Format
 - Photo
 - Summary Site, Incident, Material, Quantity, Consequences
 - · What Happened
 - Why did it Happen
 - Lessons Learnt
 - Colour coded Bow-Tie and accident time-line
- On average Synthomer had 5 chances to stop the 20 'worst' events the Company has had!



Behind The Black Book

- What else can the Company do with the rich data-set held in the accident and near-miss data Synthomer has collected over the last 15 years?
- 10 Presentations explaining the technical details underlying a number of the Black Book incidents, "Behind the Black Book"
- Presentations developed by technical experts for technical staff.



The Yellow Book

- A historical journey through the most significant Occupational Health & Safety events in Synthomer history
- Many similar events led to same consequence
- Decided to compile in 16 generic groups of injuries
- Similar format to The Black Book but includes good practice photos/sketched/ images



Major Industry Events

- A historical journey through a "Top 10" set of significant accidents from the Chemical Industry history which particularly relate to Synthomer's processes
- Cross section of events involving processes
 Synthomer carry out
- The root causes of these events would clearly lead to major accident events on Synthomer sites
- Similar format to The Black Book



Learning from our mistakes . . . The Synthomer Way

- Site Leaders "own" a physical copy of The Black Book
 - They must be able to demonstrate knowledge and understanding of its contents and how the conclusions apply to their site and its processes
 - "Handing on" this understanding is a duty when a new manager is appointed (covered in the Management of Personnel Change for the handover)
- Site Leaders expected to know about major industry events
 - part of their competence assurance assessment
- Regular site routines to review the Black Book and the Yellow Book
- Anniversary articles on the Synthomer "Intranet" written by employees
- Anniversary webinars about major industry events from external speakers



The Synthomer Way

- Synthomer's core values embed SHE at their heart
- The books demonstrate this in a way visible to employees and other stakeholders
- The Safety Vision is zero accidents or incidents
- The expectation is that all parts of the company's operations perform at least as well as the Industry's top quartile
- The Journey to the vision continues ...







Conclusions

- Process Safety Management Systems are the key
- Don't forget . . . but remember the facts
- Embed the lessons from the past
- Treat every piece of information as "if it happened on my site"

And a Question:

"If Synthomer represents good practice what can IChemE (and this Hazards Conference) do to make this good practice more widely followed/available?"



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