

## The E.Vironment Benchmark

E.Vironment is proud to provide *The E.Vironment Benchmark*, a periodical focused on leading-edge thinking in the advancement of Environmental, Health and Safety Management practices.

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## Breaking the Failure to Learn Cycle

By Paul Pizzi, Managing Partner, E.Vironment

*The definition of insanity is doing the same thing over and over and expecting different results.*

Several recent deadly industrial accidents and two insightful books have turned many of my long-held safety paradigms upside down. Andrew Hopkins' book, *Failure to Learn*, is based on the 2005 BP Texas City incident. Hopkins' subsequent book, *Disastrous Decisions*, examined the 2010 Macondo incident in the Gulf of Mexico. In both instances, Hopkins looks beyond how these accidents happened to WHY they happened. Although the author examined these two specific disasters, his conclusions apply – in my opinion – universally across the process industries.

This issue of the *E.Vironment Benchmark* introduces a few key concepts. The next two Benchmark issues will expand on those concepts.

### **PERSONAL VS. PROCESS SAFETY**

Industry was slow to recognize and act on the differences between personal (occupational) safety and process safety. Personal safety is concerned with people getting hurt – chemical burns, cuts, slips, trips, falls, etc. Personal safety incidents can be severe, sometimes resulting in disability and even death. For this reason, the goal must always be “zero” for personal safety incidents – but as this paper shows, we cannot stop there.



“Just a jump to the left and I’ll be safely on those loose scaffold boards.”

### Why would the worker pictured above make this jump?

Possibilities include:

- ▶ He had done it many times before
- ▶ The crane operator is waiting for a signal
- ▶ Co-workers expect him to do this

As this photo illustrates, our view of what is acceptable from a personal safety perspective has evolved substantially in the past decades, and industry’s continued vigilance in this area will likely lead us closer to the goal of no personal safety incidents as we continue the personal safety journey.

Process safety, on the other hand, is concerned with things that can have a much broader and more catastrophic impact – fires, explosions and major releases of toxic chemicals, such as the incident that occurred at Bhopal. Such incidents occur far less frequently than do personal safety incidents; therefore few workers have direct experience with them. Also, industry has managed process safety risks differently than personal safety risks, which may have led to the appearance of greater emphasis on personal safety.

Preventing deadly industrial accidents depends on recognizing the distinction between personal and process safety and measuring/managing each with this distinction in mind.

### MEASURING SAFETY

Injury statistics – lost time accidents and recordable injuries – have dominated safety metrics for many years. Companies that were concerned with continuous improvement in safety performance often set challenging statistical goals based on these metrics as a means of motivating performance improvement. Many tied their

management – and even worker – bonuses to attainment of these goals. In so doing, they believed that they were creating an environment that would naturally drive safety performance improvement. And indeed, in many instances it did, resulting in significant and important reductions in personal safety incidents.

At the same time, however, these metrics and compensation systems failed to recognize the importance of process safety and its potential to be the cause of major industrial accidents. Thankfully, both the conversation and positive actions regarding process safety are becoming a reality.

Following the BP Texas City incident, the US Chemical Safety Board recommended that the American Petroleum Institute develop a set of process safety metrics. In 2010, the Institute published guidance for leading and lagging process safety indicators, analogous to the metrics mentioned above that have been in use for decades to measure personal safety.

“...the focus was on **personal safety hazards**, not process safety hazards. This was not necessarily a conscious choice.”

— Andrew Hopkins, *Failure to Learn*

### FAILURE TO LEARN

Given the combination of limited first-hand experience with process safety failures and, until recently, little or no process safety performance data, one might expect companies to pay strong attention to the experiences of those less-fortunate companies who have experienced a catastrophic process safety failure. Such failures have been studied extensively and the lessons learned widely distributed.

But process safety incidents continue to happen, sometimes even at the same facility. The following quote from *Failure to Learn* aptly states the nagging question: Why don’t we learn the lessons identified from previous incidents?

“There is a **depressing sameness** about major **accidents**...the causes are remarkably similar...it is apparent that companies haven’t learnt lessons of earlier **disasters**.”

— Andrew Hopkins, *Failure to Learn*



# “Safety culture lives in employee discussions.”

— Paul Pizzi

A number of years ago, I was the Environmental Manager at a large refinery. A tanker that was unloading 350,000 barrels of crude oil at our dock exploded, killing 28 people. Living through that traumatic event changed forever how I view personal and process safety. Direct experience with such a deadly incident heightened my awareness of process safety in ways that no other experience could.

As our aging industrial workforce retires, the younger workers remaining will probably never have witnessed a catastrophic explosion, fire or chemical release (which is a good thing!). The challenge is how to prepare these less-experienced workers to recognize and address the warning signs of high-potential process safety incidents without them witnessing such incidents first-hand.

In this context, the only way to reduce such incidents is through proper training and by incorporating the lessons from every relevant incident – those within a facility, the company and those of other companies – to drive positive change in the way an organization manages process safety. Just as in the personal safety arena, companies also need to expend as much effort to learn from process safety near-misses as they do from personal safety near-misses. Hopkins notes, “If we want to reduce the risk of accidents, we must identify the precursor events that are specific to these accidents and set about reducing them in number.”

By incorporating learnings from past incidents and near-misses, employees will develop an awareness of the importance of process safety and draw on that awareness in their day-to-day activities. Like learnings from personal safety incidents, process safety learnings need to be internalized not only by safety specialists, but by the workforce as a whole.

## RISK ASSESSMENT OR RULES

Risk assessment is widely used in industry to evaluate commercial, compliance and other risks, including safety risks. It can be effective in many areas of design, construction and operations. However, the broad focus of the risk assessment process can mean that a risk assessor may focus too heavily on one risk area – such as commercial risk – and sometimes inadvertently overlook critical safety considerations.

In those situations where a specific safety risk is just too critical to be overlooked in the normal risk assessment process, companies should consider implementing rules that ensure the proper functioning of critical process safety controls, rather than relying on risk assessors to recognize and properly mitigate a critical safety risk.

We’ve certainly learned that, in most process industry settings, critical safety decisions are better handled by strict adherence to rules rather than by the people-dependent guidelines provided in risk assessments. As Hopkins notes, “reducing risk to ‘acceptable’ levels still denotes a level of risk.”

One example is the siting of temporary buildings or trailers during turnarounds. There can be a lot of pressure to locate these buildings or trailers close to the work site to allow workers easy access. If a risk assessment is performed to determine where to locate these temporary structures, it might be tempting to make assumptions that favor closer proximity to the job site for the sake of convenience. It would be better to require temporary buildings or trailers to be situated outside the explosion limits for the specific hazardous scenario (*for example, a minimum of 1,000 feet from process units*).

“If we want to **reduce the risk of accidents**, we must identify the precursor events that are specific to these accidents and set about **reducing them in number**.”

— Andrew Hopkins, *Failure to Learn*

## DEFENSE-IN-DEPTH


The Defense-in-Depth concept works on the assumption that various defenses, or barriers, designed to prevent incidents are independent of each other. A common example of home security demonstrates this concept. In the following example, several defenses are used to protect a home from intruders. Since these defenses function independently, if the dog happens to be at the kennel, the other defenses are not affected and will still protect the homeowner.

In an operating facility, defenses are sometimes inadvertently designed to be interdependent, potentially resulting in disastrous incidents. Hopkins asserts that certain defenses believed to be independent on the Macondo well, were in fact, interdependent.



## BUSINESS IMPACT

Has your company truly learned the lessons of earlier process safety incidents, and successfully applied that knowledge to the processes and procedures that govern process safety? Have you identified the precursor events that could lead to a process safety failure in your operations? Have you set up process safety rules to govern actions that are simply too important for safety to be bypassed? Are you alert to failures happening at similar operations and incorporating the lessons learned

from those incidents into your own process safety program? Addressing these questions will help ensure your company successfully learns the lessons of past process safety failures. 

**For more information** on breaking the failure to learn cycle, please contact Paul Pizzi (paul@evironmentgroup.com).

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**ABOUT THE AUTHOR**

Paul Pizzi



Paul Pizzi is Managing Partner of E.Vironment and heads the firm's global Strategic Advisory practice. He works with senior management and EHS leadership of leading chemical and energy companies in shaping their short-term and long-term EHS direction and strategy. E.Vironment's Strategic Advisory practice includes Senior Management Alignment, EHS Function Optimization, Business Risk Management, Process Safety Management, EHS Management Systems and EHS Auditing and Compliance Assurance.