

## INTRODUCTION



In the process and energy industries it is a common practice to start formal meetings with a “Safety Moment” or “Time Out for Safety”. Generally, the chair of the meeting calls upon one of the participants to share information or a personal experience that will help everyone better understand safety issues and how to improve safety practices, particularly those that are relevant to that particular location. In addition to providing specific information and guidance, these Safety Moments have the overall effect of raising up safety as a value — something that takes precedence over all other activities.

Although the idea behind the Safety Moment program is a good one, the people who are charged with delivering the message are often at a loss for what to say. I recall once visiting an oil refinery in California. The reason I was on site was that a new safety regulation had just been introduced and I was helping the refinery get up to speed on meeting its requirements. The refinery held a weekly operations meeting to which I was invited. The Operations Manager, who was leading the meeting, was clearly wondering what to say for the required Safety Moment. But then he saw me and, with an air of relief, and asked me to spend a minute or two explaining the new regulation.

What sometimes happens is that the person providing the Safety Moment talks about a topic that is simple and obvious such as holding on to the hand rail when climbing or descending stairs, watching for pedestrians when driving, or checking for slipping hazards in freezing weather. There is, of course, nothing inherently wrong with such Safety Moments, but they lack punch — they can give the impression that the speaker is just going through the motions.

One reason for this lack of punch is that the process and energy industries face the potential for large — even catastrophic events — resulting from failures of the process safety systems. But most Safety Moments discuss *occupational* safety rather than *process* safety issues. It is a missed opportunity.

In order to address this opportunity for improving the quality and relevance of Safety Moments, and in order to provide a focus on process safety issues, in the year 2018 we started publishing a weekly Safety Moment at our Sutton Technical Books web site, [www.iansutton.com](http://www.iansutton.com). The response to this initiative has been encouraging, so we decided to pull the first fifty-two Safety Moments (one for each week) together in a single publication — the book/ebook that you are currently reading. For the Safety Moments that we have published since then please visit <https://iansutton.com/safety-moments>.

## GOALS

Although there are many different types of Safety Moment, they generally aim to meet one of the following goals:

- They can provide information or training materials. For example, at the refinery just mentioned, at a later meeting the speaker talked about the effects that hydrogen fluoride (a material that they used in bulk) can have on the human body.
- Safety Moments can be used to share practical knowledge and experience. Someone may have been involved in an incident or near miss, and they want others to know about what happened and how they can avoid repeating the event. Or the speaker may discuss an incident that took place at another location. Reports from organizations such as the Chemical Safety Board and BSEE (the Bureau of Safety and Environmental Enforcement), or publications such as the Process Safety Beacon from the CCPS (Center for Chemical Process Safety) are useful in this regard.
- Safety Moments can help people understand the root causes of incidents — including near misses and minor events.
- They also help everyone understand the *management* issues to do with safety and process safety.

Whatever its topic, a Safety Moment should always be used to encourage people to think about how they can improve the safety of their own work and operations. In general, these Safety Moments do not provide the “right answer” — instead they are used to prompt discussion as to how safety can be improved at your own facility or design office. The person presenting the Safety Moment should always aim to create discussion on the lines of, “What does this mean to us, here at *this* place of work?”

Some of the Safety Moments in this book/ebook are quite lengthy and cover more issues that would normally be covered in a typical meeting. In these cases, it makes sense to pick on one aspect of that Safety Moment and to discuss just it.

## THEMES

There are various themes that run through many of the Safety Moments. The themes that are currently being used are shown at the [Topics](#) web page. With regard to these Safety Moments, the following topics are the most relevant and important.

- [Common Process Hazards](#)
- [Communication](#)
- [Dangers of Safety](#)
- [Equipment](#)
- [Hazards Analysis](#)
- [Incidents](#)
- [Industries](#)
- [Piping and Valves](#)

Discussion to do with each is provided below.

### **Common Process Hazards**

One of the philosophies behind Process Safety Management (PSM) is that each facility is unique. Therefore, it is not possible to have a prescriptive standard that tells operating companies what to do. Instead, companies have to identify the unique hazards associated with their own operations and then implement corrective actions based on a risk-ranking methodology. For this reason, facilities covered by PSM standards have to conduct a series of Process Hazards Analyses (PHAs), often using the Hazard and Operability (HAZOP) methodology.

Yet many hazards, particularly to do with utilities, piping, valves and hoses, are really not all that different from one facility to another. Therefore, in order to save time during the PHA and also to improve the quality of the analysis, it is useful to list and evaluate some of these common hazards.

### **Communication**

Many of the articles, safety moments and other publications at this site discuss the all-important topics of communication and story-telling.

One of the best ways of improving safety is to learn from personnel who have a wealth of experience and who have, to some extent, been trained in the 'School of Hard Knocks'. Therefore, some of our publications are to do with transferring knowledge and experience to people who are new to the organization.

## Dangers of Safety

One of the factors that often contributes to a major event is that someone was either upgrading a safety system or an injured person was being rescued. During this effort to improve safety or to address a relatively minor safety situation, a safeguard was removed or a risky action was taken, resulting in catastrophic consequences.

## Equipment

Process safety programs require that all equipment be designed, operated and maintained to the highest standards. In practical terms this requirement means that if the equipment and piping always retains its integrity, *i.e.*, if it does not leak, then then highly hazardous materials will not be released. (The term used by OSHA — Mechanical Integrity — is too limiting; integrity programs should incorporate instrumentation and other non-mechanical items. The phrase ‘Asset Integrity’ is a better choice.)

Piping and valves have their own [topic page](#).

The following is a list of the typical equipment covered by a process safety asset integrity program.

- Pressure Vessels and Columns
- Storage Tanks
- Pumps
- Compressors
- Turbines
- Heat Exchangers
- Air-Cooled Exchangers
- Cooling Towers
- Fired Heaters
- Flares / Blowdown
- Boilers
- Internal Combustion Engines
- Electrical Equipment
- Buildings

There are many regulations, codes and standards to do with the mechanical integrity element of process safety management programs. Some of the key standards-setting bodies are:

- American Chemistry Council / Responsible Care®
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- American Society of Mechanical Engineers (ASME)
- International Organization for Standardization (ISO)
- National Fire Protection Association (NFPA)

In the United States important process safety management regulations are published by:

- The Environmental Protection Agency (EPA)
- The Occupational Safety & Health Administration (OSHA)
- The Bureau of Safety and Environmental Enforcement (BSEE)

## **Hazards Analysis**

The ability to identify and risk rank hazards is fundamental to all process safety programs. If hazards are not identified, the risk to do with them cannot be eliminated or reduced. The articles and safety moments in this topic area describe various hazard identification techniques, including,

- Hazard and Operability Studies (HAZOP),
- Failure Modes and Effects Analysis (FMEA),
- Layers of Protection Analysis (LOPA),
- Checklists, and
- Fault Tree Analysis (FTA).

The sequence in which they can be carried out — moving from overview or concept level to detailed analysis — is discussed in the ebook Hazard Analysis.

## **Incidents**

Many Safety Moments describe an event that took place (or a near miss that could have had serious consequences). The intent is for the people in the audience to derive lessons learned so that similar events do not occur at the facilities for which they are responsible.

But, if such learnings are to be truly effective it is necessary to derive basic causes that are common to such events. (We tend to avoid the term “root cause” because it implies that there is a final solution to the causes of incidents. In fact, each event has a cause, which is in turn, an event, which has its own causes, and so on.)

## Industries

One of our themes is that, although there are differences between industries, with regard to process safety they have much in common. The risk management techniques that can be used in, say, oil refineries, can be used by other industries. And this is a two-way street — many of the techniques used in the process and energy industries originally came from the nuclear power and aerospace businesses.

## Piping and Valves

This topic covers the design of piping and valves, and their role within a process safety management program.

The following is a list of the typical piping and valves that are covered by an asset integrity program.

- Pipe (specifications and sizing)
- Materials
- Equipment
- Piping
- Fittings
- Flanges
- Gaskets
- Blinds
- Flame Arrestors
- Vortex Breakers
- Hoses
- Block Valves
- Globe / Control Valves
- Rotary Valves
- Check (Non-Return) Valves
- Flangeless Valves
- Valve Seat Materials
- Valve Position
- Steam Traps
- Pressure Safety Relief Valves
- Thermal Relief Valves

## FURTHER INFORMATION

Most of the Safety Moments include links to further information at this site. Those links, in turn, often provide links to other sources, most of which are listed at our [Citations](#) page.

## CONCLUSION

We hope that you find these Safety Moments to be useful and interesting. If you have any feedback on or if you have an event or story of your own that you would like to share, please drop us a line at [www.iansutton.com/contacts](http://www.iansutton.com/contacts).

*Ian Sutton*

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