

How Accurate is your Safety & Risk Management System?

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Abstract

The chemical industry, a cornerstone of modern society, is inherently fraught with risks due to the hazardous nature of its operations. Traditional Safety Management Systems (SMS) and Risk Management Systems (RMS) often fall short in addressing root causes. This paper introduces the SEPLO Process, a novel approach that integrates four key organizational assets: Basic Technology, Plant Facility, Human Capital, and Organization. By synchronizing these elements, organizations can enhance safety, efficiency, environmental performance, and profitability. The article redefines safety as a strategic asset rather than a cost, showcasing how the SEPLO Process can minimize accidents, boost operational performance, and support long-term sustainability.

Introduction

Chemicals significantly contribute to our lives, day in and day out. Pick any consumable or usable item in our life, and we will find chemicals within it. Since the day starts in the morning, we use hundreds and thousands of chemicals. Even food is composed of basic building blocks of chemical elements.

Hence, human life is inseparable from chemical compounds. This is a contribution and hence a bright side of the Chemical Manufacturing Business. However, there is a dark side attributed to high risk. The high risk is due to the inherent nature of the fluids handled during the production process. Typically, the fluids handled are toxic, inflammable and explosive in nature that may lead to severe accidents.



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To overcome this high risk or likely accidents, effective application of Safety Management Systems (SMS) and Risk Management Systems (RMS) is crucial. The article introduces to the comprehensive strategies for proactive SMS and RMS based on the book, "Earn or Burn Your Profits."

Safety and Risk Management Systems

Chemical manufacturing business is a highly risky business due to unsafe situations that may lead to severe accidents. To overcome unsafe situations and to mitigate the risks, the industry looks at SMS and RMS as powerful tools. The SMS and RMS in a process plant facility is not a new subject to the stakeholders of chemical manufacturing. It has been in practice since the installation of the initial process plants in the history of the process industry; that is way back more than 125 years ago.

The Safety Management System developed initially at a plodding pace and more rapidly in the last three to four decades. In the last few decades knowledge, skills, SMS and RMS have developed quite well to improve control over likely accidents and risks. Despite these advances, the recurrence and severity of accidents have also increased significantly.

What are the Safety and Risk Management Systems?

SMS focuses on preventing accidents. SMS aims to proactively identify hazards and implement controls and minimize risks at their source. SMS deals with safety of plant facilities, people, and environment. It ensures safety protocols, training, emergency response, and compliance with safety standards.

However, residual risks will always exist despite SMS in action. It is due to unforeseen circumstances, human error, or system limitations. The Risk Management System takes care of the residual risks especially post SMS failure. Risk is the combination of the likelihood of an event occurring and the severity of its consequences.

Analogy to Explain Relationship between SMS and RMS

Think of SMS as the first line of defense - installing and maintaining locks on doors to prevent theft. RMS, on the other hand, is like having an insurance policy and an emergency plan in case the locks are bypassed and theft takes place. Both SMS and RMS work together to ensure comprehensive protection

The Limitations of Current SMS and RMS

SMS and RMS uses various techniques for hazard identification, risk assessment and mitigation. However, the systems used and the theory available is not sufficient to have complete control over unsafe situations. Typically the safety and risk management systems developed till date focuses on the consequences that are seen by eyes.

Any accident ultimately ends in physical injuries, ill-health, fire, explosion, and release of hazardous chemicals that damage the environment. These end results can be back traced very easily to either human errors or lacuna in plant facilities and are concluded as the root causes. These concluded route causes are essentially consequences of actual root causes and not the actual root causes.

This can be verified from the past cases of accidents. A deeper study of past accidents will reveal that the root causes identified revolved primarily around technical issues associated with human error or the plant facilities.

A Real Life Example

The Bhopal Gas Tragedy - 1984, is a milestone accident in chemical industry safety. This case is very well known and needs no description. Almost all case studies on the Bhopal Gas Tragedy reported the primary root causes around MIC gas leak, operator

error, lack of maintenance and safety systems non availability. These reported root causes were just a consequence of the actual root cause - the company was not making enough profits or was making loss.

The company had no money to invest into simple operating needs, training of human capital, loss prevention, emergency response and evacuation. This was an organization problem combined with human capital and the plant facilities. Thus, you can identify the root causes of the accident in weaknesses of four business assets, namely basic technology, plant facility, human capital and organization. This is a new concept and a theory has been developed in the book, "Earn or Burn Your Profits".

The Problem

In absence of the above new theory, there are always discrepancies in the understanding and evaluation of the root causes. Root causes identified for an accident in an organization by different safety professionals are different. Similarly, for the same accident in different organizations, the root causes identified are likely to be all different. If a safety manager from a corporation joins a small organization and vice versa, there will be further chaos with the outcome of the root causes and the suggested solutions.

Different Root Causes for an Identical Accident

To explain the point lets cite a simple identical incident example in four different companies. Let us imagine four companies of different sizes: say small, medium, large, and very large.

Naturally they will have huge differences in their company turnover, manpower quality (knowledge, skill, and attitude), plant facilities, and organization culture. Now imagine a fictitious scenario of a plant emergency situation in all the four companies. You will observe the team members busy shutting the plant safely. Suddenly in a hurry, one particular operator tumbled down on a valve spanner, causing a physical impact followed by injury.

Let us find out how the individual safety manager from each company reacts to this accident situation. All four safety managers will agree that the operator tumbling on a valve spanner is the apparent reason for physical impact and injury and that is the accident. Physical injury to the operator is the harm or damage. It would be interesting to see what these safety managers say about the root causes.

- **The first safety manager:** The operator was not

attentive. It is sheer operator's mistake.

- **The second:** The operator is a sincere worker. The operator knows the plant very well. But during the plant emergency situation, the cumbersome piping layout confused the operator and he tumbled down.
- **The third:** In a chemical plant the piping will always be cumbersome. The operator has all necessary basic knowledge. However, specific training to the operator was missing. The HR department did not perform their job properly ensuring each operator is trained adequately.
- **The fourth:** Everything was just fine. There was no problem with the operator's knowledge and skills, his understanding about the piping system and layout, and necessary specialised training to operate the plant. Emergency shutdown is a once in a blue moon activity and is a dynamic situation. For such a dynamic and once in a blue moon situation, practicing regular drills is essential. The organization completely missed this drill. It is purely an organization's failure.

Based on the above scenarios, you will find that the four safety managers from four different companies conclude four different root causes and solutions to identical accidents.

The real question is why so different root causes? Why the disagreements?

If for a simple case of an operator tumbling on a valve spanner, the outcome is so different, what will happen with complex accident scenarios? I am not saying whether the arrived root causes above are right or wrong. They may be right or may be a consequence of the actual root causes. How do you know the exact root cause for an accurate solution that will allow you not to repeat the accident again?

The New Solution

As stated while citing the Bhopal Gas Tragedy example above, the root causes are with weaknesses in the four assets of an organization and their synchronization. For the purpose of safety and risk management, an organization's assets can be clubbed into four categories: Basic Technology, Plant Facility, Human Capital, and Organization. These assets need to be integrated constantly with each other to deliver safety. I refer to this integration as asset synchronization. The integration or synchronization of the four assets is for complementing each other and not in isolation.

Not the Highest Safety Standard

Each organization differs from others in their characteristics as to their size, financial conditions, weaknesses, strengths, business growth stage and culture. Their needs for every business function are different and so are the safety needs. Hence, applying a standard safety system to all organizations will not work. In other words the above new concept debunks the myth that organizations need to employ the highest safety standard and must strive for it.

The SEPLO Process

The book "Earn or Burn Your Profits" provides a complete solution - a new safety management system named "The SEPLO Process" that will help organizations to integrate the four assets delivering safety. The SEPLO Process is based on the fourth era of the safety management system, which has not shown its presence in the chemical process industry.

Safety - Not a High Cost but Enabling a Sustainable Business

The book has given a new direction on how safety and plant efficiency are related. By employing the SEPLO process, the chemical manufacturing businesses can avoid accidents and have a safe operation; the SEPLO in action will enhance efficiency. The enhanced efficiency will alleviate the environment driving profitability. Thus, the SEPLO process debunks the myth that safety is a cost burden. In fact the SEPLO process enables strengthening of all four pillars of organization: safety, efficiency, the environment and profits. At first glance, the four words: safety, efficiency, the environment and profits, appear to conflict with each other when considered individually in action. However, when the four business assets are integrated, these four pillars become harmonious in achieving sustainable success.

Conclusion

The chemical industry, while essential to modern life, is inherently risky due to the hazardous materials it handles. Traditional Safety Management Systems (SMS) and Risk Management Systems (RMS) have been employed to mitigate these risks, but they often fall short in addressing the root causes of accidents. The article highlights the limitations of current SMS and RMS, which primarily focus on addressing the consequences of the root causes rather than the underlying causes.

A novel approach, the SEPLO Process, is proposed to overcome these limitations. This process emphasizes

the integration of four key organizational assets: Basic Technology, Plant Facility, Human Capital, and Organization. By synchronizing these assets, organizations can achieve a more holistic approach to safety and risk management. This integrated approach not only enhances safety but also improves efficiency, environmental performance, and profitability. The

SEPLO Process challenges the conventional notion of safety as a cost burden and positions it as a strategic imperative for sustainable business success.

Reference

1. Rajendra Utturkar, "Earn or Burn Your Profits" published 2024.

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