

**Culture-Based Risk Assessment-
Disasters Having Lesson
Learning Potential**

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ASSE Arizona Chapter

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REFERENCES

ABSTRACT

The primary reason for “Risk Assessment” is to ensure we do not have any accidents resulting in to painful human injuries. Disasters worldwide have taught us an improved loss control through a professional safety management system. Employers therefore must commit to preventing accidents to minimize injury to its employees and damage to its physical assets. The responsibility for loss prevention begins with the highest level of management and continues down through every level of supervision and eventually to each and every employee. Identifying and rectifying all associated potential hazards could minimize the risks to personnel and property. There are certain remedies that can help prevent accidents from happening. Regular feedback, Employee Involvement, Recognition and Appreciation change the employee behavior! Proactive approach gives an environment with a higher awareness of safety and reducing injuries.

1 INTRODUCTION

The primary reason for “Risk Assessment” is to ensure we do not have any accident resulting in to any painful human injuries.

Lessons learned repeatedly suggest the necessity for a strong safety commitment from senior management. We have to put serious thoughts on our traditional way of

thinking and behaving. We may have to make some sacrifice for the safety of our people and facility. Our upbringing and our beliefs must not come in the way of running our business that could result in to unsafe situation leading to accidents. Managers must set good Leadership examples giving safety a prime importance! The success could be achieved through a sound safety culture which is Employee Owned, Management Driven, Operationally Consistent which Maximize Creativity and Innovation. Adopt the cultural belief that all incidents are preventable. An employer that institutes a cultural change toward the zero incident concept is bound to see safety improvement that the entire workforce can be proud of!

2 SAFETY MANAGEMENT PROGRAM

Disasters worldwide have taught us an improved loss control through a professional safety management system

2.1 CORPORATE POLICY

The Company therefore must commit to preventing accidents to minimize bodily injury to its employees, and damage to its physical assets. The Company takes every reasonable measure to provide and maintain a safe and healthy work environment to its employees and protect the public against foreseeable hazards resulting from operations. Policy Declaration is the first and most important element of the Program. It is important that the highest authority and the management of the Corporation consider no phase of Operation as being of greater importance than that of Accident Prevention.

2.2 RESPONSIBILITIES

It is the responsibility of the Corporate Management to ensure that Operating and Business Plans reflect and are in line with Company Loss Prevention Policy. Executive Management directs Managers and superintendents to develop and administer an effective Loss Prevention Program. All employees learn and follow safe work practices for their willing participation in the program.

They report all accidents and near misses, which have lesson learning potential. The responsibility for loss prevention begins with the highest level of management and continues down through every level of supervision and eventually to each and **EVERY** employee.

3 HUMAN/FINANCIAL LOSSES

Here are some examples of major incidents that have occurred worldwide causing devastation with multiple fatality and massive financial losses from which we learn lessons to avoid similar things happening at our work place.

3.1 RISK ASSESSMENT PROGRAM

Identifying and rectifying all associated potential hazards could minimize the risks to personnel and property. This is a very important program element and is the mother of all other programs. I understand that most of you have Instructions dealing with Safety Task Action Report, which is a tool to identify unsafe acts. Instruction on Job Safety Analysis is to identify hazards when employees are exposed to hazards. Both these instructions recommend actions to protect people and plant for reducing injuries and property damage.

3.2 SOURCES OF LOSSES & FIVE STEP RISK ASSESSMENT

People are the first source of losses. These could be managers, engineers or workers. Secondly, equipment - whether fixed plant, machines, tools, or vehicles. Thirdly, process materials, supplies and products that have physical & chemical hazards. Fourth is surroundings that include buildings, surfaces, lighting, noise, radiation, and weather, social or economic conditions, which can affect safe performance of people, equipment and materials. My hats off to those who initiate the theme having five steps constituting the concept of Risk Assessment to identify hazards, evaluate the risk of each exposure, plan how to handle each risk, and, manage according to plan.

3.3 UNSAFE ACTS & CONDITIONS

Unsafe Acts & Unsafe Conditions cause Incidents. These could be due to operating equipment without authority, failure to warn, failure to secure, operating at an improper speed, removing safety device, which happened in the Bhopal Gas Tragedy in India. Some common Unsafe Conditions are; inadequate guards, inadequate or improper PPEs, defective tools, equipment or materials, restricted movement, inadequate warning system, fire hazards, poor housekeeping, hazardous gases, vapors, dusts, fumes or oxygen deficient environment, noise, vibration, radiation, extreme temperatures, or inadequate ventilation.

4 ACCIDENT CAUSES

Root Causes of Accidents in Process Industry are design failure, operational error, equipment failure, and maintenance & inspection deficiencies as was found in the case of 6"- gasoline line failure that resulted in to severe business disruption for over five weeks in Arizona, inadequate supervision & training, and natural phenomena & external influences such as caused by Katrina in the USA.

4.1 WHAT IS A NEAR MISS?

It is an event that "could have been an accident". One or more "unsafe conditions" or "unsafe acts" can turn it into an "accident". An "accident" results in harm, whereas a "near-miss" does not.

4.2 MANY NEAR MISSES ARE NOT REPORTED!

Although we are aware of the pyramid that so many Unsafe Acts and Unsafe Conditions lead to some minor to major injury and/or property damage, and, yet, industry experience suggests that the number of accidents that are reported is much higher than the near misses reported.

4.3 WHY BE CONCERNED?

This is matter of major concern because, not investigated Near-Miss is a lost opportunity to prevent an accident. As we know, Unsafe Situations cause more "near-misses" and Uncorrected Unsafe situations, cause accidents.

4.4 PROMOTE NEAR MISS REPORTING

Question then is, why people do not report and investigate them? The answer is, because the Employee has a Negative Mindset. He thinks that nothing has happened, so why bother! It is not worth reporting. It is too much of a hassle and if I report it my boss might not like it. This Negative Mind Set needs to change to promote reporting the Near Misses. This could be achieved by ensuring that the Observation Cards that you have do not identify individuals and are Not Penalized. Furthermore, the report does not adversely affect their safety record. This demonstrates employee and management commitment to safety.

4.5 NEAR MISS INVESTIGATION - BENEFITS

Near Miss reporting and investigating heightens the awareness of the individual. The major benefit of this is that it uncovers the underlying unsafe conditions and unsafe acts and allows facilities to eliminate unsafe situations.

4.6 REPORTING NEAR MISSES

You must have Observation Checklist, which provides guidelines for investigation of near misses as part of the program. However, from the industry experience, I ask, is the use of this checklist really active? Is it implemented

with honesty? If not, it could give us a false sense of security!

4.7 NEAR MISS REPORTING TIPS

In order to increase the integrity of the Company Observation Card and the strength of the Near-Miss Reporting, it is recommended that the Company issues a “no-blame” policy statement which would help gain employee confidence and would support the program fairly. Also, initiate an employee awareness campaign to encourage and increase active participation. Reward those who report near misses to motivate them. It is good idea to share experiences by displaying the findings on a “Near-miss” bulletin board and the departmental Web Page. Continued training for Near-miss understanding, reporting and investigation should be an on-going process.

4.8 WHY ACCIDENT INVESTIGATION?

Where humans are involved, accidents do occur. To prevent their recurrence, we need to evaluate potential risks and take remedial actions before it is too late by communicating and implementing the improved work methods.

4.9 CAUSES OF ACCIDENTS

Investigation should consider determining employee Lack of Knowledge or Skill, Mental or Physical Defects, his Attitude, Lack of or extent of his motivation. Additionally, the investigating team would include Inadequate engineering, Inadequate specifications, Inadequate maintenance and inspection, Inadequate tools, Unsafe Conditions, Unsafe acts and also for any Poor Work Standards.

5 BASIC REMEDIES!

There are certain remedies that can help prevent us from accidents happening. We should train and motivate employees, conduct special Engineering revision, Job Safety Analysis, Identify Personal and Job Factors, Identify Deviations and take Corrective Actions as needed.

5.1 RECOGNITION PROGRAM

The Recognition program include Group Recognition, Individual Recognition, Safety Awareness, Safety Bulletin Boards, Special Loss Prevention Displays, Bulletins & Publications, and the Use of Program Statistics & Facts in Safety Education & Awareness Activities, Critical Safety Campaigns, and, Employee Safety Suggestions programs.

5.2 WHAT CHANGED EMPLOYEE BEHAVIOR? A study to survey the effects of different lighting levels on worker productivity was conducted by Harvard Professors. A group of employees from the plant who knew they were part of a study were placed in a special room to perform

their normal jobs. Output was measured each day as lights were dimmed and brightened. As the lighting was changed, productivity went up, ultimately increasing by nearly 30%. This was concluded that there was no correlation between productivity levels and a particular light setting. However, the sense of recognition and achievement the workers experienced by “being a part of the study” translated into better job performance. This Hawthorne Effect explains why new initiatives that solicit input from employees often improve performance. So, what changed employee behavior to do what you want him to do! It is the Regular feedback, Employee Involvement, Recognition and Appreciation.

5.3 WHAT MOTIVATES EMPLOYEES?

Work by Dr Hertzberg suggested that the #1 satisfier for workers was a sense of accomplishment. I achieved something on my job. #2 was recognition for doing a good job. My boss saw and commented on something I had done. One engineer said, occasionally I’ll take my grandson to school crossing a bridge I had designed. Every time, he asks me, Grandpa, is this your bridge? And I tell him, you bet, this is my bridge. Another words, PAY rank was way down at #6. Those are the most powerful motivators for people, a sense of accomplishment. And that’s why we ought to recognize and celebrate trailing indicators. Dr. Hertzberg is telling us that if you don’t, you are missing a major way to motivate people to permanently change their behavior.

What about the dissatisfiers? I am sure you have heard this many times before. I do twice the amount of work he does, he makes more money than I do. But, when I screw up one time, I get nailed. When I make a mistake, that is recognized 100% of the time, but when I excel, nothing is mentioned 99% of the time. Abuse and favoritism can also be a deadly problem.

5.3.1 SMARTCARDS

Many industries use Smartcards to motivate employees & supervisors. Every month, managers give a customized Smartcard to employees. Track and Reward employees & managers who participate with chances to win trips at a monthly or weekly training meeting, each supervisor reads the poster of the month and discusses it with his employees and then hands them a Smart card, with 2 true/false questions. The Smart card will match the poster that is displayed that month and it will pinpoint the correct behaviors we want our employees to show. All employees are helped to answer the true/false questions correctly and the supervisor encourages them to call their answers into a custom telephone number created for them. Every call is tracked to reward supervisors with trips and prizes based on their employees showing good participation rates in the program. Can you see how the middle managers are involved?

5.4 HOW TO ACHIEVE BEHAVIOR CHANGE

So, how do we change employee behavior? We do it much the way that any mother does. At age 3, most of us hated green beans and refused all efforts to get you to eat them. Finally, one day, mom got smart and put a bowl of ice cream on the table... "Son, if you eat your green beans, you can have some Ice Cream." You bet, it worked! So what did the mom do? She first communicated the behavior she wanted (eat green beans) and then positive reinforced you immediately for the behavior change. You got ice cream on the spot, not a million kid hours later...100 years of research in the field of behavioral analysis says that we use a 2 step process to change behavior...First, we teach and train employees what we need them to do and second, we positively reinforce them the INSTANT they demonstrate the behavior we want.

5.4.1 REDUCE INJURIES WITHOUT HIDING

There are many companies on the market today offering Behavior Change solutions. Broadly, these split into two camps. The first is a consultancy led approach; this often has sound theory, but not equipped with the tools to implement the effective Positive Reinforcement which is the Oxygen of behavior change. The other camp centers on an incentive led approach. Whilst this approach has some merit, many solutions are 'off the shelf' and can lead to haphazard application to reward the 'right' behavior; or even worse, they can lead to rewards being issued for trailing results based measures. Recognition Concept overcomes all these trip hazards, by combining an experienced Consulting service with a proven methodology for recognizing and rewarding employees and managers. This is delivered using Smartcard – you did it right, which is customized to the industry situation, preferences and budget. This improves the ability of supervisors and managers to deliver Positive Reinforcement effectively, thereby guaranteeing a better chance of improvement.

5.4.2 USE THE PROACTIVE APPROACH

Proactive approach gives you an environment with a higher awareness of safety and fewer or no injuries. Before injury nearly 300 "near misses" occur escaping injury. These near misses reinforce that it is "ok" to take chances. BUT, one more time, lightning strikes and an injury occurs. The proactive approach rewards employees to do it right and alerts to wrongdoing. With the old school approach, count the safe work hours and hand out T-Shirts, what happens then, employee hides injuries or somehow escape them. With the new approach, managers decide what behaviors to reward, and do so on a daily basis, and that is done without abuse or favoritism. Employees have to display a particular behavior. Remember, you want lasting behavior change.

5.4.3 WHY MIDDLE MANAGERS SHOULD BE REWARDED

Once you switch from an "entitlement" program to the one that requires action, expect grumbling. Middle managers will complain they have too much to do to reward

employees for safe behavior. Overcome these by rewarding middle managers and safety for driving the behavior-based process. Employees who are willing to put extra effort into safety pick up a greater % of the rewards available. That's what behavior based safety is about: being rewarded for doing something.

5.4.4 WHY RECOGNITION PROGRAMS WORK?

A study by the world's largest safety organization ASSE tracked 300 construction firms. One half of the companies refused to implement a safety reward recognition program. The other 150 companies felt that they needed a safety recognition strategy. At the end of the study, the firms who chose to implement safety recognition programs had injury rates that were 50 percent lower than the firms who refused to try safety recognition programs. There are numerous case studies that support the same findings with success stories.

6 LOSSES AT PETROCHEMICAL PLANTS

In the recent past, many refineries and petrochemical plants have suffered major catastrophes resulting in to multiple fatalities and many hundreds of millions of property damage and operations upsets of long duration impacting significantly on business. The disasters reported in this slide are only those having suffered 20million dollars and above property damage.

Where humans are involved, there's accident potential. Accidents result in losses. Company procedures and practices lower accidents if implemented fully and correctly. Consider launching Positive Reinforcement with tangible and instant recognition program to achieve an employee Behavior Change that is an excellent tool to motivate for adding values in reducing injuries. This system is applicable to construction or hotel industry, or hospitals, or any Contracting companies who should be encouraged to adopt the same philosophy and implementation policy.

If you have a good workable loss prevention coupled with recognition program in place, please consider this talk as a refresher. However, for those, who have bits & pieces of the program in place, may consider including the other applicable elements to avoid devastating losses that occurred recently at an Oklahoma Refinery and BP Refinery in Texas City. The news that Motiva Refinery employees at Delaware had complained about the corroded Acid Tank with six reports of Acid leaks during the last eight years. Eventually, the tank spewed out sulfuric acid under pressure. The explosion was fatal with multiple injuries. Motiva was fined \$10m for endangering workers negligently and discharging pollutants in the air & water. Similarly, a 6-inch gasoline line rupture that disrupted the business of the Arizona State for over five weeks was another example of management not focusing on safety but only pumped gas for profitability ending with massive

financial burden that we could learn lessons from! The company did not have Preventive Maintenance Inspection program in place for a 50-year old underground gasoline supply line. We have many such incidents occurred in-Kingdom compelling us to consider making a change in behavior that could lead us to lower the injuries and safe guard our assets.

7 LESSONS LEARNED (Process Safety Management Issues)

From the incidents mentioned, the lessons learned repeatedly suggest the necessity for a strong safety commitment from senior and plant management, the need to employ the best available technology to mitigate risk.

7.1 CULTURE BASED APPROACH

We have to put serious thoughts on our traditional way of thinking and behaving that we may have been doing it due to our customs based on our culture in order to ensure that they are not hinder in our work safety. If needs be, we have to make some sacrifice by compromising them for the safety of our people and facility. Our upbringing and our beliefs must not come in the way of running our business that could result in to unsafe situation leading to accidents. Generally, operation is given a priority focusing on profitability. However, paying attention to safety as #1 pays dividend in all respect! The Company must consider having a world-class safety program with excellent safety management system that is implemented with full dedication and commitment.

7.2 MANAGERS IN THE NEW SAFETY CULTURE

Managers must be active in planning for the safe operations of the hazardous tasks. They must ensure the safe execution of the tasks as planned. The management ensures that the workforce is well trained to perform the hazardous jobs and that they are well supervised to ensure full compliance of the required procedures. The managers are good communicators with clear instructions provided, and, more importantly, set a good Leadership example giving safety a prime importance! Although safety is everyone's business, safety is the management responsibility!

7.3 CONTRACTORS IN A SAFETY CULTURE

Based on the same token, safety of the contractors is also the responsibility of the proponent organization. It is therefore, the contractors be screened and selected and viewed as partners. Their performance is measured to establish their accountabilities. The contractors must accept the safety culture requirements.

7.4 SIGNS OF CULTURE CHANGE

Management commitment to safety to reduce injury rates must be of highest importance. They would spare time and money to change employee attitude to safety. Do whatever

necessary to heighten employee participation in near miss reporting freely, seriously and honestly which could be attained employing positive reinforcement instantly with a tangible recognition reward.

8 SUMMARY

In summary key to the success is through a sound safety culture, which is Employee Owned, Management Driven, Operationally Consistent, which Maximize Creativity and Innovation. Its most essential components are Management Commitment, Employee Recognition, Employee Training, and Hazard Analysis with follow-ups for Corrections. Adopt the cultural belief that all incidents are preventable. Any management system will work if top management and the employees pull together toward the common vision of zero incidents. We must always strive for the best and always look for proven methods and avoid reinventing the wheel. The management system must always be adaptable to enable continuous improvement. Any company that institutes a cultural change toward the zero incident concept is bound to see safety improvements that the entire workforce can be proud of.

9. ABOUT THE AUTHOR

[Mr. Jitu C. Patel, CPEA, serves the ASSE Arizona Chapter as a Senior Board Advisor. He is an international safety consultant who has a bachelor's degree in Chemistry and a master's in Fuel Science. For 21 years, Mr. Patel has provided health and safety professional services to Aramco, the oil and gas producing and processing corporation in Saudi Arabia. He also has provided technical training and conducted research for 15 years on the topics of fire and explosion, health and environment issues at heavy chemicals manufacturing companies owned by U.K. oil companies. Mr. Patel has developed and conducted fire and safety seminars for Fire and Safety engineers and the line management staff of many industrial organizations. He has presented many technical and safety presentations published in several international publications. His work has taken him throughout the world serving on such boards and committees as the Safe Operations and Laboratory Safety Committees at Associated Octel and Aramco; the Toxic & Flammable Gas Detector Sensor Development Committee of Users and Manufacturers in UK; the Conference Organizing Committees for successive PDC's organized by the ASSE Middle East Chapter in Bahrain; and the International Advisory Committee of the Bhopal Gas Tragedy 20th Anniversary Process Safety Conference organized by the Indian Institute of Technology. He is a member of the BEAC's Training and Education Board; Member of the ASSE's IPS Board and was honored with a Howard Heideman's Award of the Safety Professional of the Year in 2006 by the ASSE Arizona Chapter. Mr. Patel is a Fellow and ASSE.Diversity Award winner, who is also an ASSE Ambassador.]