

**EFFECTIVE ENVIRONMENTAL,
HEALTH, SAFETY AND
RELIABILITY SYSTEMS – RECIPE
TO BE INDUSTRY LEADER**

LEADERSHIP

Leadership creates an avenue for people to contribute to making something extraordinary happen.

A process of

social influence where one person enlists support from others to accomplish a common task.

FOCUS

In this talk I will be looking at the relationship
between Reliability and EHS

DURING A 3-MONTH PERIOD IN 2010

58 WORKERS WERE KILLED

AT US REFINERIES, COAL MINES, OIL DRILLING RIGS, AND POWER PLANT CONSTRUCTION SITES



4 dead, 3 injured in Anacortes refinery explosion

10 workers were performing maintenance work at the 130,000 bpd **refinery**. "We are responding quickly to ensure the safety for our employees, contractors and the neighboring community," said Bruce Smith, Tesoro's chairman, president and CEO, in a statement.*

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UNUSUALLY

EXPENSIVE

* The most expensive safety equipment you will ever buy
is equipment you install
after a catastrophic incident.

AT THE NATIONAL PETROCHEMICAL AND REFINERS ASSOCIATION'S NATIONAL SAFETY CONFERENCE IN 2010, JORDAN BARAB,

DEPUTY ASSISTANT SECRETARY FOR OSHA, SAID:



UNLIKE THE REST OF US INDUSTRY, THE PETROCHEMICAL AND POWER UTILITY CULTURES ARE WELL ALONG THEIR
PROCESS SAFETY PATHS.

Total	
Cases involving days away from work:	965,000
Cases involving sprains, strains, tears:	379,340
Cases involving injuries to the back:	195,150
Cases involving falls:	212,760

IMAGINE FOR A MINUTE

When we fix the root causes of workers will go home to their families whole and intact.

any fatalities or injuries, more

Our organization will earn a better reputation, employees will enjoy a better quality of contribute to the promise that organizations will treat people and the environment with respect.

life, and in the end greater profitability. We will

BAD RELIABILITY CAN CAUSE EHSS DISASTERS

We at _____ process or
procedures.

We will discuss defects in mechanical integrity and neglect of process safety

July 25, 2001 **Motiva acid tank failure fire** - Contract employees were reportedly welding metal catwalks above the tanks.

This incident was an EHS disaster:

Eight people were injured

2.4 M L acid into the Delaware River

The U.S. Chemical Safety & Hazard Investigation Board questioned:

- Condition of the tank
- Hazard evaluation process
- Adequacy of maintenance procedures

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IN MAINTENANCE WORK, ACCIDENTS ARE NOT ALWAYS PREDICTABLE BUT THERE ARE PROCEDURES TO REDUCE
PROBABILITY

We
sup

- the maintenance procedure would have been worked through before it became a problem.
- Hazard would have been detected and would have been mitigated or eliminated.



Water turbine pressurized casing explodes in turbine generator hall

ACCIDENTS ARE GROUPED INTO 5

CATEGORIES

<u>Category</u>	<u>% accidents</u>	<u>Specification</u>
44% Changes after commissioning		20% Operations and maintenance
15% Design and implementation	15%	
Installation and commissioning	6%	

Problems in any of these categories can cause break downs. A failure to manage mechanical integrity is the leading cause of break downs and the resultant EHS

incidents.
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CORE ELEMENT:
RECOGNIZE THE
RELATIONSHIP

Reliability and
Mechanical
Integrity

EHS
incidents

Mechanical Integrity Programs

protect our machinery (provide

reliability)

but also our workers and the environment

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PATTERN 1

There are patterns to many maintenance accidents:

1. Something breaks down and has to be repaired.
2. The breakdown causes a worker to be in harm's way.
3. Reliable equipment does not require maintenance workers to be put into harm's way.
4. The way to deal with potential harm is to eliminate its possibility by eliminating the breakdown.

PATTERN 2

Size and scope of

**repair is smaller (due to PM)
making for safer repairs**

- 1. PM activity catches deterioration early in the process before failure (and reliability is impacted).**
- 2. At that point the repair is smaller, safer and more manageable. Fewer EHSS incidents**
- 3. It also gives managers more time to plan and deal with hazards.**

PATTERN 3

Hazards are eliminated or mitigated in the planning process

- 1. The planner plans the job to minimize downtime**
- 2. The planner is specifically trained to look for hazards to safety, health and environment.**
- 3. Planners will mitigate or eliminate the hazard in the plan before the crew even leaves the shop.**
- 4. Result is fewer EHS incidents with more reliable equipment**

PATTERN 4

Planned jobs allow fewer opportunities for the maintenance worker to improvise.

- 1. Improvisation is great in comedy.**
- 2. It can be deadly in maintenance.**
- 3. Adequate time for job planning means having the right tools, spares, equipment, skills, and drawings when the job starts.**
- 4. Results in fewer EHS incidents and better reliability**

ACTION ITEMS

- Plan most jobs: Planned and scheduled maintenance work should be maintained above 80%.
- PM integrity: Over 95% of PM jobs completed as scheduled.
- Do what you say: Schedule compliance above 85%.
- Improve reliability: MTBF for major assets should keep improving.

CHANGING A CULTURE

- Create a powerful culture for great practices in EHSS and Reliability

Keep it up through:

- Follow-through to keep people's eyes on the goal
- Resilience to get the plant back on track when the program goes off track
- Positive attitude. Don't punish honest mistakes; make sure your people learn from them.

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THANK YOU FOR YOUR
ATTENTION

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