

Lessons from National Academies
Report
“Evaluating the Effectiveness of
Offshore Safety and Environmental
Management Systems”

Kenneth E. Arnold, Committee Chair
Sr. Technical Advisor, WorleyParsons
Presented to CSB
July 24, 2012

Problem: Are There Objective KPIs That Indicate
an Elevated Probability of a Major Accident

- Common KPIs seem to correlate to occupational (personal) safety but not to the probability of a major accident
- The Committee could not identify any objective hard data that would have predicted Macondo was imminent. A KPI that could be reduced to a statistic.
- Both BP and Transocean had excellent records on KPIs being collected at the time
- There seems to be agreement that one way to reduce the risk of a major accident is to have an appropriate “culture of safety.”
- If we accept that an adequate level of culture of safety will reduce the potential for a major accident, the problem can be restated:
“How can we develop a performance indication that an appropriate level of “culture of safety” exists?”

Defining a “Culture of Safety”

- A culture is a set of shared values and beliefs that interact with an organization’s structures and control systems to produce behavioral norms
- A “culture of safety” is a culture in which critical decisions are made in such a way as to reduce the risk that competing goals and inadequate knowledge compromise safety.
- From an **organizational perspective** there must be:
 - **Mechanisms** Establishing Structure and Control - to specify what is needed to operate safely and check that it is being done
 - **Actions** Establishing Safety Norms - encourage people to take risks for safety even when no one is looking, when it is not in their immediate best interest, when under stress, or in the face of inadequate, insufficient or uncertain information
- From an **individual perspective** there must be:
 - **Mechanisms** Establishing Competency – technical knowledge of operations as well as of the structure, control and behavioral norms
 - **Actions** – by the individual showing motivation to act in accordance with behavioral norms when under stress and in dynamically evolving conditions

Relationship of SEMS to Safety Culture

- A properly functioning SEMS addresses the “**mechanism**” elements necessary to create a culture of safety
 - Organization – a structure and system of controls
 - Individual – training and competency
- SEMS does not address the “**action**” elements
 - Organization – actions establishing behavioral norms
 - Individual – actions establishing motivation
- SEMS is a “necessary” but not “sufficient” element in creating a culture of safety
- The problem can be restated:
 - “How can we evaluate the effectiveness of a specific SEMS program in such a way as to measure both the mechanisms and the action aspects of a culture of safety?”

Evaluating Compliance

- Evaluating SEMS **Compliance** is possible with a pass-fail assessment
 - Do policies and procedures exist on paper
 - Do they cover all required elements
 - Do they cover the elements in sufficient detail
- Compliance evaluates the **mechanisms** aspects (structure, control, competency) but not how these mechanisms are actually used in practice.
- Reliance on compliance ignores the **action** aspects (norms, motivation, behavior) that determine how the mechanisms are actually used in practice.
- Therefore, compliance alone and a pass-fail assessment can not by itself evaluate the degree with which a specific operation has an adequate “culture of safety”.

Evaluating the Action Aspects

- Evaluating action aspects requires understanding:
 - Is SEMS understood by all
 - Is SEMS utilized as designed
 - Do the norms and motivations of a safety culture actually exist in everyday practice
- Requires time, onsite observations and subjective judgment
- A good evaluation requires a team which is familiar with both the technology and the operating environment
- Implementation of numerous and complex human actions over time is never perfect.
 - An evaluation which does not find something which can be improved concerning action aspects is not a good evaluation
- Thus it cannot be measured by a pass/fail system and requires a grading system

A Holistic Approach to Evaluating the Safety Culture of an Installation

- **Inspect** for compliance to regulations and to mechanisms of SEMs. Focus on intent rather than specific wording
- Require both internal and regulator initiated **Audits** which result in a grading system based on:
 - Interviews with a sampling of workers and first level supervisors
 - Grading each of the elements of SEMs
 - Reviewing and discussing results with leadership
 - Repeating periodically to find trends
 - Publicly reporting results
- Establish **Whistleblower Program**
- **Gather, analyze and disseminate learnings** across operators from inspections, audits and incidents
- Coordinated international search for a suite of **KPIs** where possible

Conclusions

- The Committee did not find or recommend a specific set of performance indicators for major accident prevention
- The Committee recommended a holistic approach to evaluating and improving the level of safety culture which exists in an installation
- Taken as a whole this could be considered a performance indicator for major accident prevention