The Human Factor: Process Safety and Culture

By
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Society of Petroleum Engineers
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Outline

• Why Focus on the Human Factor?
• What is a Society of Petroleum Engineers Technical Report?
• SPE Technical Section: “Human Factors”
Cause of Major Accidents

• Most not caused by failure of “Safety Critical” equipment
  – Unocal, Santa Barbara
  – Shell, Bay Marchand
  – Oxy, Piper Alpha
  – PTT, Montara Blowout
  – BP, Macondo Blowout
  – Black Elk, WD 32

• Only at Macondo could Safety Critical equipment have mitigated the result

• All cases involve human actions or omissions contrary to policy, procedures and training
If not an emphasis on safety critical equipment, than what?

• National Commission on Deepwater Horizon  
  – “..sweeping reforms that accomplish no less than a fundamental transformation of its safety culture”

• NAE-NRC Macondo Well Blowout  
  – “Safe operations cannot be achieved solely through regulations, inspections or mandates. They will only be realized when there is a full commitment to system safety”

• TRB 309 on Evaluating the Effectiveness of SEMS  
  – BSEE needs “to evolve an evaluation system for SEMS that emphasizes the evaluation of attitudes and actions rather than documentation and paper work.”

• We need to impact Human Behavior
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• What is a Society of Petroleum Engineers Technical Report?


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Society of Petroleum Engineers

• Mission: To collect, disseminate, and exchange technical knowledge concerning the exploration, development and production of oil and gas resources, and related technologies for the public benefit; and to provide opportunities for professionals to enhance their technical and professional competence.

• Individual member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry.

• 110,000 members in 141 countries; 191 sections and 264 university chapters

• 15 Regions and 6 Technical Specialties
What is a Technical Report?

• Present technical information on a topic where publication would be of benefit to the public and the SPE membership
  – Evaluation of the state of technology
  – Technical guidance on issues of importance to the industry
  – Not a recommended practice or standard
• Free download from SPE.org and OnePetro.
• Dissemination through press releases, SPE magazines, communications to SPE members, etc
• Technical Directors ensure periodic review
<table>
<thead>
<tr>
<th><strong>Proposal</strong></th>
<th>Submitted by any SPE member or member of the Board</th>
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<tr>
<td><strong>Board Approval</strong></td>
<td>Goes to F&amp;S Committee and then to full Board; TD assigned</td>
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<tr>
<td><strong>SME Input</strong></td>
<td>SME committee formed; may hold Summit to obtain broader input</td>
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<tr>
<td><strong>Draft</strong></td>
<td>Discussion draft developed and posted on SPE.org for member comments</td>
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<tr>
<td><strong>Stakeholder Comment</strong></td>
<td>Comment period of at least 30 days</td>
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<tr>
<td><strong>Revision</strong></td>
<td>SME committee reviews comments and revises document</td>
</tr>
<tr>
<td><strong>TD Approval</strong></td>
<td>Technical Director approves final document</td>
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<tr>
<td><strong>Board Approval</strong></td>
<td>F&amp;S Committee and then full Board approves final document</td>
</tr>
<tr>
<td><strong>Publication</strong></td>
<td>Published on SPE.org with announcement and awareness campaign</td>
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Human Factors Technical Report

• Steering Committee developed discussion papers and invited participants
• Two day meeting of 70 SMEs from major and independent operators, national oil companies, contractors, regulators, universities and consulting organizations
• Final Report reviewed by all participants:
  – HR Risks
  – Leadership and Safety Culture
  – Perception of Risk and Decision-Making
  – Individual and Team Capacity
  – Integrating HF into IT Development
  – Conclusions and Recommendations for SPE
HF Risks

• Factors that can lead to loss of standards of consistently reliable human performance
  – Leadership and Culture
  – Perception of Risk and Decision-Making
  – Communication of Risk
  – HF in Design
  – Individual and Team Capacity
  – Collaborative and Distributed Team Working
  – Commercial and Contractual Environment
  – Workload Transition
  – Assurance of Safety-Critical Human Activities
  – Investigation and Learning from Incidents
Leadership and Culture

• “Challenge is creating and maintaining an organizational culture that no longer allows things to happen when, in hindsight, it is clear that something should have been done and everyone knew it.”

• Definition of Process Safety Culture
• Measurement of Safety Culture
• Experience in Other High-Hazard Industries
• Assurance of Safety Culture Improvement
• The Role of Regulations
Perception of Risk and Decision-Making

• “Decisions are often required under stress of time pressure, with competing goals and with inadequate, insufficient or uncertain information and unknown consequences.”
• “Most of the time people get it right.” Sometimes it is wrong due to, “...cognitive limits and biases, physiological factors, and organizational conditions”
• Decision-Making Processes
• Cognitive Bias
• Perception of Risk
• Group Decision-Making Factors
• Situations and Decision-Making
• Challenges for the Industry
• Possible Solutions
• Assurance of Decision-Making
Individual and Team Capacity

• “The reality is that training and competency alone will not assure operational integrity.”
• The Role of Training, Certification and Licensing
• Open Questions Relating to Training and Competency
• Operational Control of Work
• NASA and Integrated Operations
• Management of Change
• Assurance of Capability
Integrating Human Factors into IT Development

• “Information overload in the operational environment is a serious and growing issue.”

• Aligning Technology with Human Nature
  – Improve how IT systems are developed
  – Use a “mental models” approach
  – Expand cognitive capacities under critical conditions
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What is a Technical Section?

• Communities of SPE members which share ideas, promote competence, and develop projects related to a specific technical interest
• Meet virtually for the most part, but are encouraged to hold a face-to-face meeting at least once a year
• Programming includes:
  – On-line discussion boards
  – Articles in SPE publications
  – Webinars
  – Conferences
  – Technical Reports
Human Factors Technical Section

• Purpose: Promote the exchange of information, technology, and development of competence in Human Factors for application to the petroleum industry.

• Objectives: Exchange Human Factors information and raise awareness of the role Human Factors plays in the industry.

• Officers:
  – Andrew Dingee, BP, Chair
  – Ford Bret, Petroskills
  – Graham Reeves, BP
  – John Thorogood, Drilling GC
  – Kathryn Breitsprecher, Baker Hughes, Secretary
  – Larry Perkinson, Saudi Aramco
  – Margaret Crichton, People Factor
  – Ron Mcleod, Shell
Join the HF Technical Section

- [www.spe.org](http://www.spe.org)
- Click on “Member” tab
- Under “Connect” click on “Join a Technical Section”
- Under “Current Technical Sections” click on “Human Factors”. You will have to login as a member.
- Under “About Us” tab click on “Join/Leave This Community”
- Under Technical Sections check “Human Factors” and Save