

## **COURSE: HUMAN FACTORS AND SAFETY MANAGEMENT**

### **SCOPE AND APPLICABILITY:**

This course provides participants with an understanding of aspects of human factors and errors that can compromise operational safety so that improvements can be recommended. Participants will learn how to conduct a methodological review of human factors and analysis of related errors, as well as improve categories of non-technical skills: Situational awareness, decision making, communication, teamwork, leadership and performance training factors, stress and fatigue.

### **REGULATIONS & STANDARDS**

- ABERGO – Brazilian Association of Ergonomics;
- ANP – Brazilian National Petroleum Agency;
- CCPS - *Center for Chemical Process Safety*;
- HSE UK – *Health and Safety Executive* (United Kingdom);
- IBRAM – Brazilian Mining Institute (IBRAM);
- ICAO - International Civil Aviation Organization;
- IOGP – *International Association of Oil and Gas Production*;
- NOPSEMA - *National Offshore Petroleum Safety and Environmental Management Authority*;
- NR-17 – Ergonomics;
- NR-37 – HSE on Petroleum Platforms;
- OSHA 29 CFR 1910.119 – Process safety management of highly hazardous chemicals;
- SGSO – Operational Safety Management System;
- SGIP – Well Integrity Management System.

### **COURSE CONTENT:**

1. Fundamentals:
  - 1.1 Introduction to Process Safety;
  - 1.2 The Importance of Human Factors in Process Safety;
  - 1.3 Definition and Concepts of Human Factors;
  - 1.4 The Origin of Human Factors;
  - 1.5 Addressing Human Factors in the Occupational Safety;
  - 1.6 Addressing Human Factors in Process Safety;
  - 1.7 The Types of Human Failures;
  - 1.8 Contributing Factors to Performance;
  - 1.9 Why does it matter?
  - 1.10 Human Factors in action: Power Plant;
  - 1.11 Abandoning the traditional view of blame;
  - 1.12 Module Summary.
2. Complex Sociotechnical Systems:
  - 2.1 Human Factors in Action: Storage Facility;
  - 2.2 Definitions of complex socio-technical systems;
  - 2.3 Analysis of Human Factors in the context of modern partner complex systems in industry;
  - 2.4 Evolution of working environments and relationships in industry;
  - 2.5 The SHELL Model and its Applications;
  - 2.6 Human Factor in Action with the SHELL Model in the O&G industry;
  - 2.7 Work as Imagined Vs Work as Done.

3. Culture, Leadership and Teamwork:
  - 3.1 Culture & Safety Climate;
  - 3.2 Safety Climate Measurement;
  - 3.3 Cultural Parameters;
  - 3.4 Compliance with procedures;
  - 3.5 Reasons For Non-Compliance;
  - 3.6 Tips for Increasing Compliance with Procedures:
    - 3.6.1 Case Study: British Airways ('Blowout').
  - 3.7 Building a Culture;
  - 3.8 Effective Leadership;
  - 3.9 Supporting leadership;
  - 3.10 Teamwork in high-risk industries;
  - 3.11 Empathy;
  - 3.12 Crew Resource Management (CRM).
4. Decision Making and Risk Analysis:
  - 4.1 Effective Decision Making;
  - 4.2 Decision-Making Levels;
  - 4.3 The MACY Decision-Making Model;
  - 4.4 Risk Analysis for Decision Making.
5. Behavioral Approach and Cognitive Engineering:
  - 5.1 Relationship of Human Factors with Behavioral Safety;
  - 5.2 Critical Success Factors;
  - 5.3 Behavioral Safety and Substandard Acts;
  - 5.4 Levels of Consciousness;
  - 5.5 Cognitive Skills and Time Management;
  - 5.6 The Effects of Stress, Emotion and Fatigue on Cognition;
  - 5.7 The causes of complacency:
    - 5.7.1 Task-Induced Complacency;
    - 5.7.2 Organization-Induced Complacency;
    - 5.7.3 Fatigue-Induced Complacency;
    - 5.7.4 Automation-Induced Complacency.
  - 5.8 Compliance and Safety;
  - 5.9 Complacency and Success;
  - 5.10 Complacency and Routines;
  - 5.11 Trigger mechanism.
6. Situational Awareness:
  - 6.1 Situational Awareness Considerations;
  - 6.2 Modeling of Human Behavior – Mental Model;
  - 6.3 Baseline Disturbances;
  - 6.4 How to Realize the Clues to Loss the Situational Awareness;
  - 6.5 Keys to Keep Situational Awareness.
7. Effective Communication:
  - 7.1 Introduction & Communication Structure;
  - 7.2 Barriers to Effective Communication;
  - 7.3 Effective Communication Procedures;
  - 7.4 Common Communication Errors;
  - 7.5 Communication Through Briefings;
  - 7.6 The 7 C's for effective communication procedures;
  - 7.7 Compliance and assertiveness.

8. Limitations of Human Performance:
  - 8.1 Human Performance and Limitations;
  - 8.2 Managing Workload and Criteria that guide the distribution of work in technical systems;
  - 8.3 Awareness of Fatigue and Countermeasures;
  - 8.4 Stress Management.
  
9. Error and Threat Management:
  - 9.1 Error and Threat Management Process;
  - 9.2 Threat Recognition;
  - 9.3 Threat Management;
  - 9.4 Error Management;
  - 9.5 Management of the Unwanted Situation.
  
10. Integration of Human Factor Practices and Approaches in the Oil and Gas Industry:
  - 10.1 Characteristics of the Oil and Gas Industry;
  - 10.2 Case Study in the Oil and Gas Industry;
  - 10.3 Legal Requirements of Human Factors;
  - 10.4 Reliability Analysis Methods;
  - 10.5 Integration of Human Factors in Hazard Identification and Risk Assessment;
  - 10.6 Human Factors Used in Accident Investigation.

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**COURSE DESIGN:**

**TOTAL:** 16 hours.

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**PREREQUISITES(s):**

None.

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**MINIMUM/MAXIMUM NUMBER OF DELEGATES**

This course requires a minimum of 1, and a maximum number of 12 trainees.

To offshore trainings, the course number of attendees will comply with the vessels/rig necessity.

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**MAIN SAFETY ISSUES:**

- Understanding human factors;
- The human being, the worker, is not the problem, but the solution;
- Risk perception;
- Identification of causes of accidents;
- How the leader answers matter;
- Human Trustworthiness Analysis;
- Non-technical skills.

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**CERTIFICATION:**

Training certificate signed by responsible Engineer accredited by Brazilian CREA.

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**CERTIFICATION VALIDITY PERIOD:**

Recommended: 5 years.