Graduate Certificate in Human Factors in Process Safety Management

Human Factors in Training and Competency

Human Factors: Human factors refer to the study of how humans interact with systems, machines, tools, and environments. It involves understanding human capabilities and limitations to design systems that are efficient, safe, and easy to use.

Training: Training is the process of acquiring knowledge, skills, and competencies through instruction, practice, and experience. In the context of human factors in process safety management, training is essential to ensure that individuals understand the importance of human factors and how they impact safety within an organization.

Competency: Competency refers to the ability of an individual to perform a specific task or job effectively and efficiently. Competency in human factors in process safety management involves having the necessary knowledge, skills, and attitudes to apply human factors principles in the workplace.

Process Safety Management: Process safety management (PSM) is a systematic approach to managing the risks associated with the processing of hazardous materials. It involves identifying, evaluating, and controlling process hazards to prevent accidents and ensure the safety of personnel, the environment, and the community.

Graduate Certificate: A graduate certificate is a postgraduate qualification that provides specialized knowledge and skills in a specific area of study. In the context of human factors in process safety management, a graduate certificate program equips professionals with the expertise needed to effectively apply human factors principles in the process industry.

Key Terms and Vocabulary in Human Factors in Training and Competency:

1. Situational Awareness: Situational awareness is the perception of environmental elements and events, understanding their meaning, and the projection of their status in the near future. It is crucial for individuals working in high-risk environments to maintain situational awareness to anticipate potential hazards and make informed decisions.

2. Human Error: Human error refers to mistakes or deviations from intended actions that result in undesirable outcomes. Understanding the types of human errors, such as slips, lapses, and mistakes, is essential for designing training programs that mitigate the risk of errors in process safety management.

3. Risk Perception: Risk perception is the subjective judgment that people make about the characteristics and severity of a risk. Individuals perceive risks differently based on their personal experiences, knowledge, and cultural background. Effective training in risk perception can help employees make informed decisions in hazardous situations.

4. Decision-Making: Decision-making is the process of selecting a course of action from multiple

alternatives. In process safety management, decision-making plays a critical role in identifying and mitigating risks. Training in decision-making can help individuals consider all relevant factors and make informed choices to ensure safety.

5. Communication Skills: Communication skills are essential for effective interaction and information exchange among individuals in the workplace. In the context of human factors in training and competency, communication skills are crucial for conveying safety-critical information, collaborating with team members, and reporting incidents or near misses.

6. Workload Management: Workload management involves balancing the demands of a task with an individual's capacity to perform it. In process safety management, excessive workload can lead to errors and accidents. Training in workload management helps employees prioritize tasks, allocate resources efficiently, and maintain focus on safety-critical activities.

7. Teamwork and Collaboration: Teamwork and collaboration are essential for ensuring effective communication, coordination, and decision-making in high-risk environments. Training in teamwork equips employees with the skills to work together seamlessly, share information, support each other, and respond to emergencies as a cohesive team.

8. Fatigue Management: Fatigue management involves strategies to prevent or mitigate the impact of fatigue on individual performance and safety. In process safety management, fatigue can impair cognitive function, decision-making, and reaction times. Training in fatigue management includes recognizing the signs of fatigue, implementing rest breaks, and promoting healthy sleep habits.

9. Safety Culture: Safety culture refers to the shared values, beliefs, and norms regarding safety within an organization. A positive safety culture fosters a proactive approach to safety, where employees prioritize safety, report hazards, and continuously improve safety practices. Training in safety culture helps cultivate a strong commitment to safety at all levels of the organization.

10. Human Factors Analysis: Human factors analysis involves evaluating the interactions between humans, technology, and the environment to identify potential safety hazards and risks. Training in human factors analysis equips individuals with the skills to conduct thorough investigations, analyze human errors, and implement preventive measures to enhance safety in the workplace.

11. Task Analysis: Task analysis is the process of breaking down a task into its component steps to understand the cognitive, physical, and environmental demands involved. In process safety management, task analysis helps identify potential points of failure, design effective training programs, and optimize work processes to reduce the risk of errors and accidents.

12. Human Reliability: Human reliability refers to the probability that a human operator will successfully perform a task without error. Understanding human reliability is essential for assessing the risk of human error in process safety management and implementing measures to enhance human performance through training, procedures, and design improvements.

13. Error Recovery: Error recovery involves the ability of individuals to detect and correct errors before they

lead to adverse consequences. Training in error recovery teaches employees to recognize early warning signs, implement corrective actions, and recover from errors to prevent accidents and maintain safety in high-risk environments.

14. Automation and Human-Machine Interaction: Automation and human-machine interaction refer to the integration of technology and human operators in complex systems. Training in automation and human-machine interaction helps individuals understand the capabilities and limitations of automation, effectively collaborate with automated systems, and intervene when necessary to ensure safe and efficient operations.

15. Change Management: Change management involves implementing organizational changes effectively to minimize disruptions and maximize the benefits of new initiatives. In process safety management, change management is crucial for implementing human factors interventions, such as training programs, safety procedures, and equipment upgrades, to enhance safety performance and prevent accidents.

16. Incident Investigation: Incident investigation is the process of analyzing safety incidents, near misses, or accidents to identify root causes, contributing factors, and lessons learned. Training in incident investigation equips individuals with the skills to conduct thorough investigations, analyze human factors issues, and implement corrective actions to prevent similar incidents in the future.

17. Regulatory Compliance: Regulatory compliance refers to adherence to laws, regulations, and standards governing safety, health, and environmental protection. In process safety management, regulatory compliance is essential for ensuring that organizations meet legal requirements, implement best practices in human factors, and maintain a safe working environment for employees and the community.

18. Continuous Improvement: Continuous improvement is a systematic approach to enhancing processes, systems, and performance over time. In process safety management, continuous improvement involves identifying opportunities for optimization, collecting feedback from employees, and implementing changes to enhance safety culture, training effectiveness, and overall safety performance.

19. Hazard Identification and Risk Assessment: Hazard identification and risk assessment are processes for identifying potential hazards, evaluating their likelihood and consequences, and implementing controls to mitigate risks. Training in hazard identification and risk assessment helps employees recognize hazards, assess risks, and take proactive measures to prevent accidents and ensure safety in the workplace.

20. Safety Critical Task Analysis: Safety critical task analysis involves identifying tasks that have a significant impact on safety if performed incorrectly. Training in safety critical task analysis helps employees understand the importance of these tasks, recognize potential errors or deviations, and implement safeguards to prevent accidents and maintain safety in high-risk environments.

21. Safety Leadership: Safety leadership refers to the role of leaders in promoting a culture of safety, setting clear expectations for safety performance, and empowering employees to prioritize safety in their daily activities. Training in safety leadership equips managers and supervisors with the skills to lead by example, communicate safety expectations, and support employees in maintaining a safe work environment.

22. Human Performance Modeling: Human performance modeling involves predicting human behavior,

decision-making, and performance in complex systems using mathematical, computational, or simulation models. Training in human performance modeling helps organizations assess human factors risks, optimize system design, and develop interventions to enhance human performance and safety in the workplace.

23. Resilience Engineering: Resilience engineering is an approach to safety management that focuses on building the capacity of organizations and individuals to adapt to unexpected events, recover from failures, and maintain safety in complex and dynamic environments. Training in resilience engineering helps employees develop the skills to anticipate and respond to disruptions, learn from incidents, and continuously improve safety practices.

24. Safety Critical Communication: Safety critical communication involves conveying safety-critical information accurately, clearly, and timely to prevent misunderstandings, errors, or accidents. Training in safety critical communication teaches employees how to communicate effectively in high-stress situations, follow established protocols, and confirm understanding to ensure that critical information is transmitted and received correctly.

25. Human Factors Integration: Human factors integration involves incorporating human factors considerations into the design, operation, and maintenance of systems to enhance safety, efficiency, and usability. Training in human factors integration helps organizations integrate human factors principles early in the design process, identify potential risks, and optimize system performance to prevent accidents and improve safety outcomes.

26. Safety Management System: A safety management system is a comprehensive framework for managing safety risks, implementing safety policies, and achieving safety objectives within an organization. Training in safety management systems helps employees understand their roles and responsibilities, comply with safety procedures, and contribute to a culture of safety that prioritizes risk management and accident prevention.

27. Organizational Resilience: Organizational resilience is the ability of an organization to anticipate, adapt, and recover from disruptions while maintaining its core functions and objectives. Training in organizational resilience helps organizations build robust systems, empower employees to respond effectively to crises, and enhance their capacity to maintain safety, continuity, and performance in challenging conditions.

28. Safety Performance Indicators: Safety performance indicators are metrics used to assess the effectiveness of safety programs, monitor safety performance, and identify areas for improvement. Training in safety performance indicators helps organizations define key metrics, collect relevant data, analyze trends, and use performance indicators to drive continuous improvement in safety practices and outcomes.

29. Safety Critical Systems: Safety critical systems are systems whose failure could result in catastrophic consequences, such as loss of life, property damage, or environmental harm. Training in safety critical systems helps individuals understand the principles of system safety, identify potential failure modes, implement safeguards, and respond effectively to system failures to prevent accidents and ensure safety.

30. Human Factors in Incident Prevention: Human factors in incident prevention involve applying human factors principles to identify and mitigate human error, cognitive biases, and organizational factors that contribute to accidents. Training in human factors in incident prevention helps organizations analyze

incidents, address root causes, and implement preventive measures to reduce the risk of accidents and improve safety performance.

31. Safety Training and Competency Development: Safety training and competency development involve designing and delivering training programs that equip employees with the knowledge, skills, and attitudes needed to perform their jobs safely and effectively. Training in safety training and competency development helps organizations assess training needs, develop customized programs, and evaluate the effectiveness of training initiatives to enhance safety performance and employee competence.

32. Safety Critical Task Performance: Safety critical task performance involves executing tasks that have a direct impact on safety, reliability, or environmental protection. Training in safety critical task performance helps employees understand the importance of these tasks, follow established procedures, anticipate potential hazards, and respond appropriately to ensure that critical tasks are performed safely and accurately.

33. Safety Management Practices: Safety management practices are procedures, protocols, and guidelines implemented to ensure the safety of employees, assets, and the environment. Training in safety management practices helps organizations establish a safety culture, comply with regulatory requirements, and continuously improve safety performance through effective risk management, incident prevention, and safety promotion initiatives.

34. Safety Critical Competencies: Safety critical competencies are the knowledge, skills, and behaviors required to perform safety critical tasks effectively and safely. Training in safety critical competencies helps individuals develop the necessary competencies, practice safe behaviors, and demonstrate proficiency in executing safety critical tasks to prevent accidents and maintain safety in high-risk environments.

35. Safety Culture Assessment: Safety culture assessment involves evaluating the beliefs, attitudes, and behaviors of employees regarding safety within an organization. Training in safety culture assessment helps organizations conduct surveys, interviews, and observations to assess safety culture, identify areas for improvement, and implement interventions to strengthen the safety culture and enhance safety performance.

36. Safety Critical Decision-Making: Safety critical decision-making involves making choices that directly impact safety, risk, or environmental protection. Training in safety critical decision-making helps individuals analyze risks, consider consequences, weigh alternatives, and make informed decisions to prioritize safety, prevent accidents, and protect personnel, assets, and the environment from harm.

37. Safety Leadership Development: Safety leadership development involves training managers, supervisors, and leaders to promote safety, set safety expectations, and create a culture of safety within an organization. Training in safety leadership development helps leaders communicate safety priorities, support safety initiatives, and engage employees in safety activities to enhance safety performance and promote a strong safety culture.

38. Safety Critical Communication Skills: Safety critical communication skills involve the ability to convey safety-critical information effectively, accurately, and timely to prevent misunderstandings or errors. Training

in safety critical communication skills helps employees develop clear communication strategies, practice active listening, confirm understanding, and communicate critical information in high-stress situations to ensure safe and efficient operations.

39. Safety Critical Task Analysis: Safety critical task analysis involves identifying tasks that have a significant impact on safety if performed incorrectly. Training in safety critical task analysis helps employees understand the importance of these tasks, recognize potential errors or deviations, and implement safeguards to prevent accidents and maintain safety in high-risk environments.

40. Safety Management Systems Audit: Safety management systems audit involves evaluating the effectiveness of safety programs, policies, and procedures to ensure regulatory compliance and continuous improvement. Training in safety management systems audit helps organizations conduct internal audits, assess safety performance, identify areas for enhancement, and implement corrective actions to strengthen safety practices and prevent incidents.

41. Safety Critical Competency Assessment: Safety critical competency assessment involves evaluating the knowledge, skills, and behaviors of individuals performing safety critical tasks to ensure they meet required standards. Training in safety critical competency assessment helps organizations assess employee competence, identify training needs, provide targeted training interventions, and verify competency to enhance safety performance and prevent accidents.

42. Safety Critical Task Simulation: Safety critical task simulation involves replicating real-world scenarios to assess how individuals perform safety critical tasks under controlled conditions. Training in safety critical task simulation helps organizations evaluate employee performance, identify areas for improvement, and provide targeted feedback and coaching to enhance safety critical task performance and prevent errors in high-risk environments.

43. Safety Critical Incident Response: Safety critical incident response involves responding promptly and effectively to safety incidents, emergencies, or near misses to prevent escalation and minimize harm. Training in safety critical incident response helps employees understand emergency procedures, practice response drills, coordinate with team members, and implement corrective actions to mitigate risks, protect personnel, and restore safety in critical situations.

44. Safety Critical Task Monitoring: Safety critical task monitoring involves observing, supervising, and evaluating the performance of individuals executing safety critical tasks to ensure compliance with safety procedures and standards. Training in safety critical task monitoring helps supervisors maintain oversight, provide feedback, address deviations, and reinforce safe behaviors to prevent errors and accidents in safety critical tasks.

45. Safety Critical Task Feedback: Safety critical task feedback involves providing constructive feedback to individuals performing safety critical tasks to reinforce safe behaviors, correct errors, and improve performance. Training in safety critical task feedback helps supervisors communicate expectations, recognize positive behaviors, address deficiencies, and support continuous improvement in safety critical task performance to enhance safety outcomes and prevent accidents.

46. Safety Critical Task Supervision: Safety critical task supervision involves overseeing and managing the performance of individuals executing safety critical tasks to ensure they are performed safely, accurately, and efficiently. Training in safety critical task supervision helps supervisors monitor task execution, provide guidance, intervene when necessary, and support employees to maintain safety and prevent errors in safety critical tasks.

47. Safety Critical Task Evaluation: Safety critical task evaluation involves assessing the performance of individuals executing safety critical tasks to determine their competence, adherence to procedures, and effectiveness in achieving safety objectives. Training in safety critical task evaluation helps organizations measure task performance, identify areas for improvement, implement corrective actions, and verify the effectiveness of training interventions to enhance safety outcomes and prevent accidents.

48. Safety Critical Task Coordination: Safety critical task coordination involves organizing and synchronizing the efforts of individuals performing safety critical tasks to ensure effective communication, collaboration, and task completion. Training in safety critical task coordination helps employees work together seamlessly, share information, allocate resources, and respond to emergencies as a cohesive team to prevent errors, enhance safety, and achieve safety critical task objectives.

49. Safety Critical Task Documentation: Safety critical task documentation involves recording, reporting, and archiving information related to the execution of safety critical tasks to maintain a record of activities, decisions, and outcomes. Training in safety critical task documentation helps employees document task procedures, record observations, report incidents, and maintain accurate records to support incident investigations, audits, and continuous improvement in safety critical task performance.

50. Safety Critical Task Compliance: Safety critical task compliance involves adhering to safety procedures, regulations, and standards when performing safety critical tasks to prevent errors, accidents, and regulatory violations. Training in safety critical task compliance helps employees understand safety requirements, follow established procedures, report deviations, and take corrective actions to ensure that safety critical tasks are executed in accordance with safety protocols and best practices.