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Core topic areas:

**Risk Assessment and Reliability Engineering**

- Risk assessment, risk management, consequence analysis, and uncertainty quantification.
- Supply chain risk management.
- Cyber and physical security vulnerability assessment.
- Risk assessment of hydrogen-based technologies.
- Human reliability analysis (HRA) and human-machine interface (HMI).
- Reliability predictions of integrated systems and high-temperature power electronics.
- Integrity management and reliability, availability and maintainability (RAM).
Technical Safety and Loss Prevention
- Fire and gas detection.
- Firewater systems.
- Functional safety and safety integrity levels (SIL)
- Layer of protection analysis (LOPA)
- Bowtie analysis.
- Emergency response
- HAZOP and other hazard/risk identification techniques.

Modelling
- Modelling liquid, gaseous, and two-phase releases and dispersion.
- Consequence modelling, including: fire, explosion, toxic, eco-toxic effects and projectile impacts.
- Methods, including computational fluid dynamics (CFD).
- Accident investigation and modelling.

Chemical Toxicity and Exposure Assessment
- Toxic releases and exposure assessment.
- Process plant health issues.

Process Pipelines, Storage and Security
- Process pipelines security and terrorism.
- Pipeline leak detection and measurement and corrosion assessment.
- Carbon capture and storage (CCS) and CO2 transport.

Fire and Explosion
- Fire, combustion, and explosion phenomena.
- Dust explosions.
- Fire and blast protection and survivability.

Human Factors in Design and Management
- HSE performance measurement including leading and lagging indicators.
- Human and organizational factors in safety cases.
- Human performance optimization by design.
- SIMOPS (simultaneous operations).
- Situational awareness.
- Communications and risk control systems.
- Resilience engineering.
- Technical assurance and workforce training.

Inherent Safety and Inherently Safer Design• Hazard identification
- Design and development of new processes and equipment.
- Methodologies for ranking inherent safety.
- Retrofitting inherently safer solutions and upgrading existing plant for improved safety.

Nuclear Safety
- Waste disposal.
- Design for decommissioning.
- Passively safe reactor designs.
- Nuclear reactor protective and monitoring systems.

Reaction Hazards
- Chemical thermal stability and thermal reaction hazards.
- Influence of impurities on reaction hazards.
- Development of reactivity hazard index ranking tools.
- Runaway reactions, including detection and mitigation.
- Compatibility/reactivity of chemicals involved in a chemical process.

Industrial Hazards and Safety Cases
- Major accident hazards
• ALARP and cost-benefit analysis.
• Industrial safety cases.

**Incident investigations and case histories**
• Case histories of incidents and lessons learned integration into design and operations.
• Technical analysis of incidents.
• Computational modelling to simulate actual incidents
• Use of incidents in training and improvement of safety performance
• Incident investigation methodologies
• Incident databases and their applications.

**Air pollution prevention and treatment**
• Methods and technologies for prevention and treatment of air pollution
• Air dispersion modelling
• Prediction and mitigation of air pollution incidents
• Health impacts from air pollution

**Resource and waste management**
• Recovery and recycling of materials and products
• Energy from waste and alternative resources
• Waste minimisation
• Waste treatment technologies
• Waste management: systems and processes for energy and material recovery and waste treatment; disposal
• Landfill and waste repository design, operation and management
• Land remediation and recovery

**Water pollution prevention and treatment**
• Industrial, pure and ultrapure water production
• Municipal and industrial effluent treatment
• Potable water treatment
• Sludge processing, energy recovery and disposal
• Mitigation of water pollution incidents
• Water pollution dispersion modelling
• Health impacts from water pollution

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