

Health and Safety Essentials

Lecture 12 – Safety Management Systems

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**Undergraduate Diploma in
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Recap last week's topic

Kahoot Quiz:

<https://play.kahoot.it/v2/lobby?quizId=acb34fc4-72c0-43bc-80b7-508219f9b13e>



Objectives

- The evolution of Safety Management Systems (SMS).
- Understand key SMS models:
 - HSG65,
 - ISO 45001,
 - ILO-OSH 2001,
 - POPMAR.
- Explore the transition from OHSAS 18001 to ISO 45001.
- Discuss practical applications and future trends.



Origins of SMS

- Driven by industrialisation and workplace incidents.
- Early UK frameworks like the Health and Safety at Work Act 1974.
 - General Duties of Employer
 - Risk Assessment
 - Written Policy
 - Worker Consultation
 - Protection of non-employees (visitors etc...)
 - Training & Information
- Influenced by internal factors (financial demands, organisational structure) and external factors (legislation, public opinion).



The Technological Age

- **Focus:** Engineering solutions to enhance safety.
- **Approach:** Implementing safety devices and design improvements.
- **Belief:** Technological advancements alone can prevent accidents.
 - 20th-century mindset that engineering solutions were sufficient to ensure safety.
 - The era's confidence in technology as the primary means to prevent accidents.
- **Limitations:** Overreliance on technology without considering human and organisational factors.

Video: 3 Mile Island (TMI) Rector -

<https://www.youtube.com/watch?v=0AI9swb3OWs>



The Human Age

- **Focus:** Human error as the primary cause of accidents. This age of safety management expanded to focus on the human (human performance) as well as technology.
 - Shift in focus during the mid-20th century towards human factors, recognising that human error contributed significantly to accidents.
- **Approach:** Training, procedures, and human factors engineering.
- **Belief:** Proper human performance combined with technology can prevent accidents.
 - Yet in 1986, the Challenger, Chernobyl, aviation and oil & gas accidents happened!
 - <https://www.youtube.com/watch?v=TJIXIhypGL0>
- **Limitations:** Neglect of organisational and systemic influences on human behaviour.



The Organisational Age

- **Focus:** Organisational culture and management systems.
 - This age of safety management expanded to focus on the organisation as well as the human and technology.
- **Approach:** Developing safety cultures, leadership commitment, and organisational learning.
- **Belief:** Organisational factors significantly influence safety outcomes.
- **Limitations:** Potential oversight of complex interactions between technology, humans, and organisations.
- **Case Study:** Reference the **Herald of Free Enterprise** disaster, where organisational failures and a poor safety culture were identified as root causes
 - <https://www.youtube.com/watch?v=j5lfcYcYsu8>
 - International Safety Management (ISM) Code
<https://www.youtube.com/watch?v=Y3C35TDjeW4>



The Systems/Holistic Age

- **Focus:** Integration of technological, human, and organisational factors.
- **Approach:** Systems thinking, recognising complex interactions and interdependencies.
- **Belief:** Safety emerges from the interplay of all system components.
- **Advancements:** Adoption of holistic safety models and comprehensive risk management strategies.
- **Columbia Space Shuttle (2003) and Herald of Free Enterprise** disasters, where the investigations highlighted the need for a holistic approach to safety management.
 - <https://sma.nasa.gov/SignificantIncidents/assets/columbia-accident-investigation-board-report-volume-1.pdf>



Historical Timeline of SMS in Aviation

1944: The **Chicago Convention** established the **International Civil Aviation Organization (ICAO)**, which became the global authority for aviation safety.

1970s–1980s:

- **Proactive Safety Efforts:** Aviation began shifting from a reactive approach (investigating accidents) to a more **proactive risk management approach**.
- The focus started moving towards organisational and systemic factors contributing to safety, as opposed to individual blame.
- Development of frameworks for **safety culture** and **systematic hazard management** began.

1990s:

- **James Reason's Swiss Cheese Model (1990)** provided a conceptual framework for understanding system-level safety.
- Airlines and regulatory bodies began adopting internal safety management practices informally, with an emphasis on continuous improvement.
- Introduction of **Flight Data Monitoring (FDM)** and **Operational Risk Management (ORM)** practices as proactive tools.

2001:

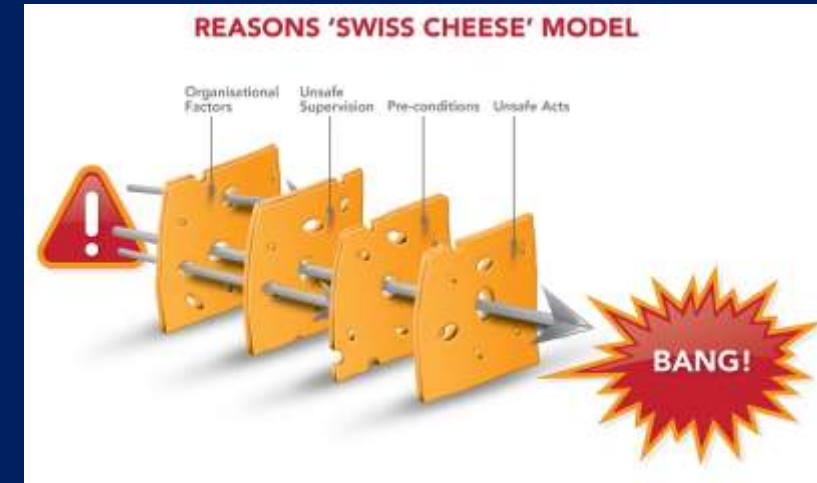
- ICAO introduced **Safety Management Manual (Doc 9859)**, which laid the groundwork for formal SMS implementation.
- ICAO began requiring member states to implement SMS in certain aviation domains, such as air navigation services and airports.

2006:

- SMS became mandatory under **ICAO Annexes 1, 6, and 8**, targeting areas such as operations, licensing, and airworthiness.
- ICAO formalised SMS requirements for states and organisations.

2013:

- ICAO consolidated safety management provisions into **Annex 19 – Safety Management**.
- Annex 19 introduced the **Four Pillars of SMS** explicitly as a standardised structure for global adoption.



HSG65

- **What is HSG65?**

A framework for managing health and safety, published by the UK Health and Safety Executive (HSE).

- **Key Components of HSG65:**

- **Plan:** Establish policy, set objectives, and plan to ensure risks are managed.
- **Do:** Implement plans by identifying risk controls, training staff, and ensuring compliance.
- **Check:** Monitor and measure performance through inspections, audits, and reviews.
- **Act:** Learn from incidents and implement changes to improve continuously.

<https://www.hse.gov.uk/pubns/books/hsg65.htm>



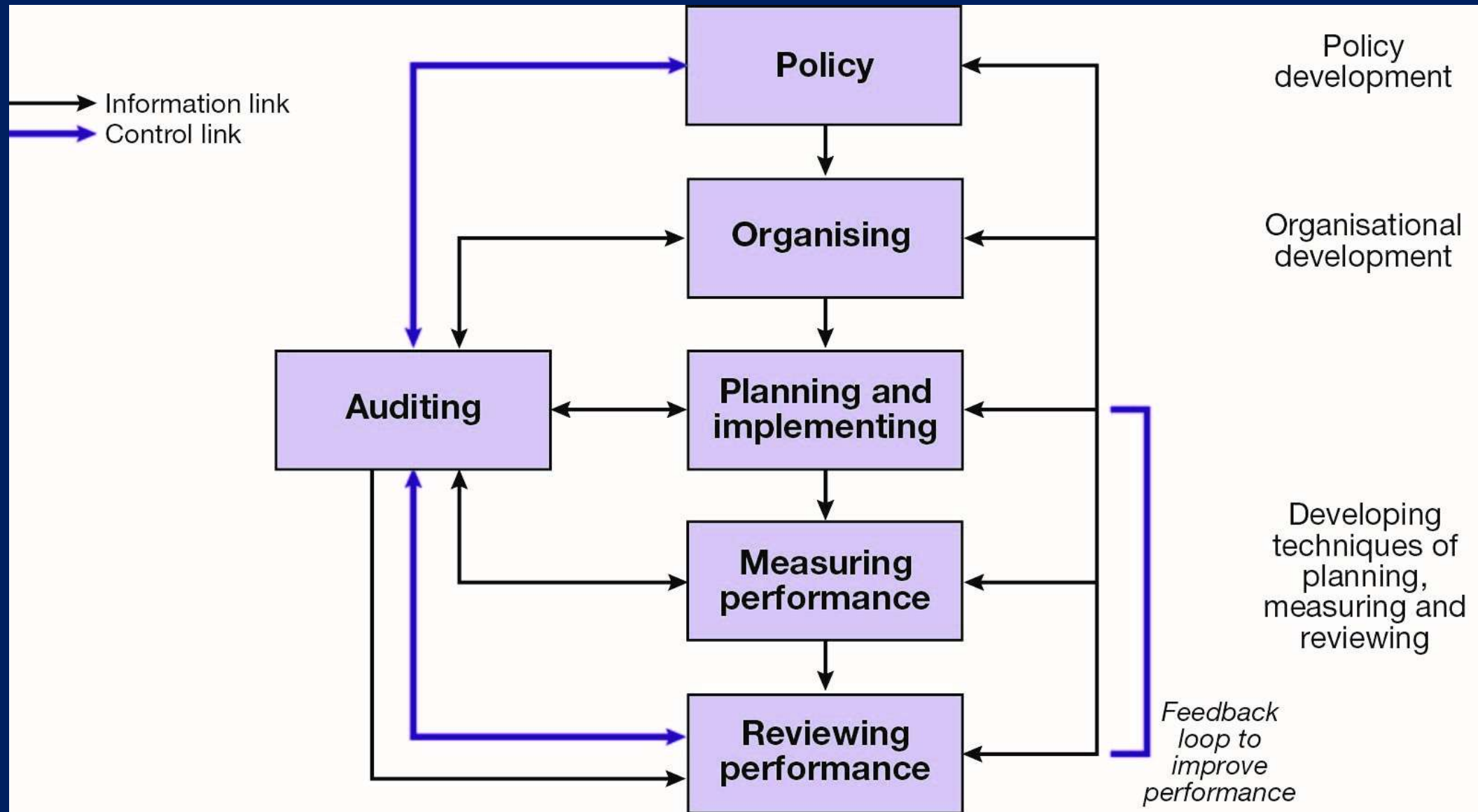
PDCA



POPMAR

- The **POPMAR model** was developed by the British Standards Institution (BSI) as part of the **BS 8800:1996 Guide to Occupational Health and Safety Management Systems**. The acronym stands for:
 - Policy
 - Organising
 - Planning and Implementation
 - Measuring Performance
 - Auditing and
 - Reviewing
- This model was designed to provide a structured approach to managing occupational health and safety (OHS), forming a precursor to the widely known **Plan-Do-Check-Act (PDCA)** model. POPMAR was influential in shaping the development of later OHS standards, including **OHSAS 18001** and **ISO 45001**.





ILO-OSH 2001

- The **ILO-OSH 2001 Guidelines on Occupational Safety and Health Management Systems** were developed by the **International Labour Organization (ILO)**, a specialised agency of the United Nations.
- The voluntary guidelines were created through a collaborative process involving experts from government bodies, employer organisations, and worker representatives,
- They were officially adopted in **2001**.
- The primary aim of **ILO-OSH 2001** was to provide practical guidance on establishing, implementing, and improving occupational safety and health (OSH) management systems.
- The guidelines emphasise:
 - **Policy Framework**: Encouraging organisations to develop OSH policies aligned with their operations.
 - **Participatory Approach**: Ensuring worker involvement and consultation.
 - **Continuous Improvement**: Using the **Plan-Do-Check-Act (PDCA)** model for systematic management.



Guidelines on Occupational Safety and Health Management Systems **ILO-OSH 2001**



- <https://www.ilo.org/publications/guidelines-occupational-safety-and-health-management-systems-ilo-osh-2001>

Break



OHSAS 18001

- **Developed** by a group of leading national standards bodies, certification bodies, and industry associations in response to a demand for a globally recognised standard for occupational health and safety management systems.
- First published in **1999** by the **OHSAS Project Group**, which included organisations such as:
 - **British Standards Institution (BSI)** (key contributor)
 - Certification bodies like Lloyd's Register and Bureau Veritas
 - Other international organizations and national standards bodies
- The aim of **OHSAS 18001** was to provide a framework for managing occupational health and safety risks and improving workplace performance.
- It was not developed by the International Organization for Standardization (ISO), which distinguishes it from ISO standards.



Key Features of OHSAS 18001

- 1. Policy Development:** Organisations must establish an OHS policy.
 - 2. Hazard Identification and Risk Assessment:** A systematic approach to identifying and controlling workplace hazards.
 - 3. Legal Compliance:** Emphasis on meeting applicable legal and regulatory requirements.
 - 4. Objective Setting:** Establishing measurable OHS objectives for improvement.
 - 5. Continuous Improvement:** Using the **Plan-Do-Check-Act (PDCA)** model.
- Replaced by ISO 45001 in 2018



ISO 45001

- **ISO 45001:2018** is the first global standard for occupational health and safety (OHS) management systems, developed by the **International Organization for Standardization (ISO)**. It was published on **March 12, 2018**, after several years of development by a committee of OHS experts from over 70 countries.
- **Key Objectives of ISO 45001:**
 - 1.Prevent Workplace Injuries and Illnesses:** Proactively identify and manage risks.
 - 2.Promote a Safe and Healthy Work Environment:** Protect the physical and mental well-being of employees.
 - 3.Drive Continuous Improvement:** Ensure OHS management systems evolve with organisational and legal changes.



Transition from OHSAS 18001 to ISO 45001

- ISO 45001 replaced **OHSAS 18001**, and organisations certified to OHSAS 18001 were required to transition to ISO 45001 by **March 2021**. The transition introduced more robust requirements, including increased worker participation, leadership involvement, and alignment with modern management system practices.



Key Features of ISO 45001

- **High-Level Structure (HLS):**
ISO 45001 follows the Annex SL framework, aligning with other management system standards like ISO 9001 (QMS) and ISO 14001 (EMS). This makes it easier for organisations to integrate OHS with other management systems.
- **Risk-Based Thinking:**
Focus on identifying and managing both risks and opportunities in the workplace, including proactive hazard controls.
- **Worker Participation:**
Emphasises active consultation and involvement of workers at all levels in the management of OHS.
- **Leadership Commitment:**
Requires top management to take an active role in leading and promoting the OHS culture within the organisation.
- **Organisational Context:**
Encourages consideration of internal and external factors that influence OHS management, tailoring the system to specific business needs.
- **Focus on Continuous Improvement:**
Utilises
- the **Plan-Do-Check-Act (PDCA)** cycle to promote iterative progress.



OHSAS 18001 vs ISO 45001

Standard Structure:

- **OHSAS 18001:**

Based on an older structure that does not align with other ISO standards, making integration with systems like ISO 9001 (Quality) or ISO 14001 (Environment) more challenging.

- **ISO 45001:**

Uses the **Annex SL** High-Level Structure (HLS), aligning with other ISO management systems. This allows easier integration of OHS with other management systems.



Risk-Based Approach: OHSAS 18001 vs ISO 45001

OHSAS 18001: Reactive Risk Management

- **Focus:** The OHSAS 18001 standard primarily focuses on **hazard identification and risk control**.
 - Organizations are required to identify workplace hazards and assess risks associated with those hazards.
 - Risk assessments are conducted to establish controls to eliminate or reduce risks to acceptable levels.
- **Reactive Nature:** The approach is often **incident-driven** or focused on compliance, meaning actions are typically taken in response to accidents, near-misses, or inspections rather than proactively identifying risks beforehand.
- **Scope:** OHSAS 18001 places more emphasis on **physical safety risks** and hazard-specific assessments, with less emphasis on broader risk considerations like mental health, organisational culture, or external factors



ISO 45001: Proactive Risk-Based Thinking

- **Focus:** ISO 45001 adopts a **risk-based thinking** approach, which is broader and more forward-looking.
 - Risk management is integrated throughout the occupational health and safety (OHS) management system.
 - It includes the identification of **risks** (negative impacts) and **opportunities** (positive impacts) that may arise from work activities, organisational changes, or external factors.
- **Proactive Nature:** Instead of reacting to incidents, ISO 45001 emphasises **anticipating risks** and preventing issues before they occur.
 - For example, risks related to organisational culture, employee mental health, or external economic changes are considered alongside traditional physical hazards.
- **Opportunities:** ISO 45001 introduces the concept of **opportunities** to improve the workplace.
 - For example, adopting ergonomic tools to enhance employee comfort and reduce repetitive strain injuries can both mitigate risk and improve employee satisfaction.
 - This dual focus ensures not only compliance and hazard control but also fosters continuous improvement and innovation in OHS practices.



Systematic Risk Assessment Process

- 1. Risk Identification:** Includes traditional hazards (e.g., machinery risks, falls) and broader considerations (e.g., psychosocial factors, changes in legal requirements).
- 2. Risk Analysis:** Evaluate the likelihood and impact of identified risks.
- 3. Risk Prioritisation:** Prioritizes risks for mitigation, ensuring high-impact risks are addressed first.
- 4. Opportunities Analysis:** Identifies areas where positive changes can enhance safety, well-being, or organisational performance.



Integration with Organisational Strategy

- ISO 45001 emphasises that risk-based thinking should not be limited to the OHS function but integrated into the organisation's overall strategy.
- For example:
 - Introducing flexible working arrangements might reduce stress-related absenteeism (an opportunity) while mitigating risks associated with overwork or burnout.



Broader Risk Categories in ISO 45001

ISO 45001 expands the definition of risks to include:

- 1. Operational Risks:** E.g., machine malfunctions, hazardous substances.
- 2. Organisational Risks:** E.g., poor communication, inadequate safety culture.
- 3. External Risks:** E.g., regulatory changes, supply chain disruptions.
- 4. Psychosocial Risks:** E.g., workplace stress, bullying, or mental health issues.



Clauses of ISO 45001:2018

- **1. Scope**
 - Defines the purpose: establishing a framework to manage workplace safety and prevent incidents.
- **2. Normative References**
 - Lists supporting documents (ISO 45001 is self-contained).
- **3. Terms and Definitions**
 - Provides consistent definitions for key terms like hazard, risk, and interested party.
- **4. Context of the Organisation**
 - Understand internal and external factors.
 - Identify needs of interested parties.
 - Define the OHSMS scope.
- **5. Leadership and Worker Participation**
 - Leadership accountability and safety culture.
 - OHS policy development.
 - Worker consultation and participation.
- **6. Planning**
 - Identify risks, opportunities, and legal requirements.
 - Set measurable safety objectives.
- **7. Support**
 - Resources, competence, and training.
 - Awareness and communication.
 - Document control.
- **8. Operation**
 - Implement controls and manage changes.
 - Emergency preparedness and response.
- **9. Performance Evaluation**
 - Monitor and measure OHS performance.
 - Conduct audits and management reviews.
- **10. Improvement**
 - Address nonconformities and incidents.
 - Focus on continual improvement.



Critical Factors Beyond Certification

- 1. Leadership Commitment:** Genuine, ongoing involvement from top management.
- 2. Worker Engagement:** Active participation in safety processes and decision-making.
- 3. Real-World Application:** Procedures must align with daily operations.
- 4. Innovation:** Use of advanced tools (e.g., IoT, AI) for predictive and proactive safety management.
- 5. Industry-Specific Standards:** Alignment with sector-specific best practices (e.g., HACCP, IATA).



Breakout Room Scenario 1 – Global Manufacturing Company (High Risk)

- **Industry:** Automotive manufacturing.
- **Size:** Large multinational corporation with facilities in multiple countries.
- **Risk Profile:** High risk due to heavy machinery, hazardous materials, and complex supply chains.
- **Key Context:**
 - Operates globally; faces client and partner demands for certified safety standards.
 - Requires robust systems to manage diverse regulatory and operational environments.



Breakout Room Scenario 2 – Regional Construction Firm (Medium Risk)

- **Industry:** Residential and commercial construction.
- **Size:** Medium-sized company operating within one country.
- **Risk Profile:** Medium risk due to hazards like working at height, equipment handling, fatigue and psychosocial vulnerability.
- **Key Context:**
 - Focused on local projects, where certification isn't mandatory.
 - Cost-conscious and primarily concerned with meeting local regulatory compliance.



Breakout Room Scenario 3 – Local Retail Chain (Low Risk)

- **Industry:** Retail operations with multiple small stores in a single region.
- **Size:** Small company with fewer than 50 employees.
- **Risk Profile:** Low risk, involving slips, trips, falls, and manual handling injuries.
- **Key Context:**
 - Limited resources; needs to meet basic regulatory compliance.
 - No external pressure for certification; aims for simplicity and practicality.



Breakout Room - Tasks for All Groups

1. Analyse the Scenario:

1. What are the main safety risks and challenges in your assigned scenario?
2. Consider the organisation's size, industry, risk profile, and operational scope.

2. Decide on SMS Certification:

1. Would the organisation benefit from a certified SMS (ISO 45001), or would a non-certified approach (HSG65 or ILO-OSH) be sufficient? Why?

3. Recommend a Model:

1. Which SMS model would you propose, and why?
2. Justify your choice considering cost, regulatory needs, and the organisation's operations.





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