

# Lecture 14 – Emergency Preparedness and Response

## Student Notes

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### 1. Introduction to Emergency Planning

Emergencies can strike any organisation, posing serious risks to the business, its premises, and personnel. While certain emergencies, such as fires, are common across many industries, others, like bomb threats or acts of terrorism, have increasingly become crucial considerations in modern emergency planning. Regardless of the specific emergency, one constant remains: preparedness is essential for mitigating harm and ensuring business continuity.

#### The Importance of Foreseeability

Effective emergency planning begins with the concept of foreseeability—identifying potential emergencies that could reasonably occur within the organisation's operational context. By analysing past incidents, industry trends, and site-specific risks, organisations can anticipate and prepare for emergencies, reducing their impact on people and operations. Planning for foreseeable events is a proactive approach to ensuring safety and resilience.

#### Key Elements of Emergency Planning

##### 1. Risk Identification and Assessment:

- Identify potential emergency scenarios specific to the organisation.
- Assess the likelihood and potential consequences of each scenario.

##### 2. Development of Emergency Procedures:

- Outline clear, step-by-step instructions for responding to each type of emergency.
- Assign roles and responsibilities to personnel, ensuring everyone understands their part in the response plan.

##### 3. Communication Systems:

- Implement reliable systems to notify employees, emergency services, and other stakeholders during an emergency.
- Ensure communication plans account for potential disruptions, such as power outages or network failures.

#### 4. **Resource Allocation:**

- Stock emergency equipment and supplies, such as fire extinguishers, first aid kits, and communication devices.
- Train employees in the use of this equipment to enhance their response capabilities.

#### 5. **Business Continuity Planning:**

- Develop strategies to maintain or quickly resume critical operations following an emergency.
- Identify alternative workspaces, supply chain contingencies, and data recovery methods.

### **The Role of Well-Planned and Practised Procedures**

Comprehensive and well-rehearsed emergency procedures significantly reduce the impact of emergencies. By ensuring that all employees understand their roles and the actions required, organisations can:

- **Minimise Escalation:** Prompt and coordinated responses can prevent minor incidents from becoming major emergencies.
- **Protect Personnel:** Clear evacuation routes, safety drills, and communication systems ensure employees' safety during high-stress situations.
- **Preserve Business Operations:** Rapid containment of incidents reduces downtime and financial losses, supporting business continuity.

### **Emergency Drills and Training**

Regular emergency drills are a cornerstone of preparedness. These exercises allow organisations to:

- Evaluate the effectiveness of their emergency plans.
- Identify gaps or weaknesses in the current procedures.
- Build confidence among employees, ensuring calm and efficient responses during real emergencies.

### **Continuous Improvement**

Emergency planning is not a one-time task; it requires ongoing review and updates to reflect changes in the organisation, its operations, and the external environment. Conducting post-incident reviews and incorporating lessons learned is essential to improving emergency preparedness over time.

## 2. Understanding Emergencies

### Defining an Emergency

An emergency is typically characterised by its seriousness and the need for immediate action to prevent or mitigate harm. Emergencies often occur unexpectedly, requiring rapid responses to address risks effectively. ISO 45001 (BSI, 2018, p.30) provides a clear definition of potential emergency situations, which includes:

1. **Unplanned or Unscheduled Situations:** These are incidents requiring immediate response, such as:
  - A fire breaking out in the workplace.
  - Natural disasters occurring in the vicinity of the workplace or at a remote location where workers are performing job-related tasks.
2. **Urgent Situations Due to Civil Unrest:** These involve scenarios like civil disturbances at work-related locations, necessitating the immediate evacuation of personnel.

Understanding and planning for such emergencies are vital to protecting lives, property, and business continuity.

### Legal Requirements in Emergency Preparedness

Under UK law, health and safety regulations mandate the assessment and control of all reasonably foreseeable risks, including emergencies. Specific legal provisions include:

- **The Confined Spaces Regulations 1997:** Requires planning for emergencies in confined spaces to ensure worker safety.

**EU Equivalent: Directive 89/654/EEC** - Minimum safety and health requirements for the workplace.

**Maltese Equivalent:** Work Place (Minimum Requirements for Work) (Confined Spaces and Spaces having Explosive Atmospheres) Regulations

- **The Control of Major Accident Hazards Regulations 1999 (COMAH):** Focuses on preventing and mitigating major industrial accidents.

**EU Equivalent: Directive 2012/18/EU** - Seveso III Directive.

**Maltese Equivalent:** Control of Major Accident Hazard Regulations

- **The Control of Substances Hazardous to Health Regulations 2002 (COSHH):** Covers emergency measures for hazardous substances exposure.

**EU Equivalent: Directive 98/24/EC** - Protection of workers from risks related to chemical agents at work.

**Maltese Equivalent:** Protection of Workers from the Risks related to Exposure to Chemical Agents at Work Regulations

- **The Regulatory Reform (Fire Safety) Order 2005:** Requires employers to establish fire safety measures, including emergency evacuation procedures.

**No direct equivalence in EU or Malta but mentioned in:**

Work Place (Minimum Health and Safety Requirements) Regulations

- **The Control of Asbestos Regulations 2012:** Mandates emergency plans to manage asbestos exposure incidents.

**EU Equivalent: Directive 2009/148/EC** - Protection of workers from risks related to exposure to asbestos.

**Maltese Equivalent:** Protection of Workers from the Risks related to Exposure to Asbestos at Work Regulations

- **The Construction (Design and Management) Regulations 2015 (CDM):** Includes requirements for managing health and safety risks during construction projects, including emergencies.

**EU Equivalent: Directive 92/57/EEC** - Temporary or mobile construction sites.

**Maltese Equivalent:** Work Place (Minimum Health and Safety Requirements for Work at Construction Sites) Regulations

Compliance with these regulations ensures organisations are prepared to handle emergencies effectively, protecting both workers and operations.

## **The Disaster Cycle**

The disaster cycle (Figure 1) is a framework used to understand and manage emergency situations. It consists of four key phases:

1. **Prevention:** Taking proactive measures to reduce the likelihood of emergencies occurring.
2. **Preparedness:** Developing and practising plans to respond effectively to emergencies.
3. **Response:** Implementing immediate actions during an emergency to protect people, property, and the environment.

4. **Recovery:** Restoring normal operations and learning from the incident to improve future preparedness.

This cyclical approach underscores the importance of continuous improvement in emergency management.

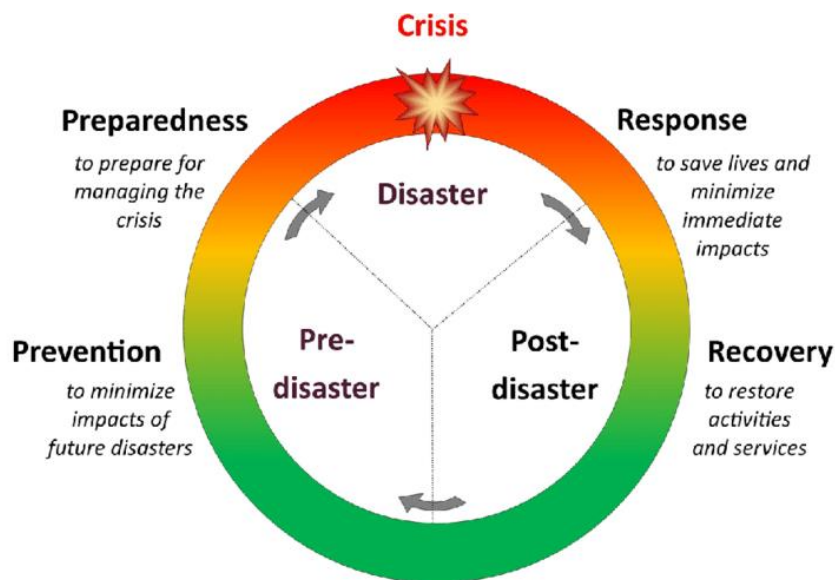


Figure 1: The disaster cycle

### The Role of Contingency Planning

Contingency planning is central to emergency preparedness, ensuring organisations have predefined strategies to handle various scenarios. As health and safety practitioners, it is our responsibility to:

- Identify potential emergency situations through risk assessments.
- Develop emergency response plans tailored to the organisation's specific needs.
- Conduct regular training and drills to familiarise staff with their roles during emergencies.
- Review and update plans based on changing risks and lessons learned from past incidents.

By integrating contingency planning into workplace safety practices, organisations can minimise the impact of emergencies and safeguard their employees and assets.

### 3. Contingency Planning

A **contingency plan** outlines the steps to be taken when the primary strategy is disrupted or fails. It is, in essence, a backup or “Plan B” designed to ensure business continuity and minimise losses in the event of unforeseen circumstances. Contingency planning addresses a wide range of risks, including safety, health, environmental, security, financial, and other operational challenges.

#### Key Features of Contingency Planning

1. **Comprehensive Coverage:** Plans must address multiple types of risks and provide a structured response tailored to the organisation's specific needs.
2. **Customisation:** There is no universal solution for contingency planning; each plan must reflect the organisation's unique context and vulnerabilities.
3. **Emergency Response:** The required response can range from simple actions, like shutting off power in a localised incident, to complex strategies, such as coordinating an evacuation across multiple locations.

#### Stages of Emergency Planning

Effective contingency planning involves two critical stages:

1. **Identification of Precipitating Events:**
  - Recognising potential emergencies that could disrupt normal operations.
  - Examples include natural disasters, industrial accidents, cyberattacks, or public health crises.
2. **Identification of Actions and Timescales:**
  - Defining the necessary steps to address the emergency.
  - Setting realistic and actionable timelines for implementing these steps.

#### Implementation vs Activation

- **Implementation:** Refers to the work required to establish the contingency plan. This includes conducting risk assessments, assembling resources, and training personnel.
- **Activation:** Refers to the execution of the plan in response to an actual emergency.

## Challenges in Emergency Planning

Planning for emergencies poses unique challenges:

1. **Inability to Simulate Real Emergencies:** As Boyle (2019, p.358) explains, the efficacy of an emergency plan cannot be tested by creating a real emergency. This limitation necessitates alternative methods, such as:
  - **Desktop Exercises:** Simulated discussions and walkthroughs of the plan to identify potential gaps.
  - **Full-Scale Drills:** Controlled exercises to test the plan in a realistic, albeit simulated, environment (e.g., fire evacuation drills).
2. **Intermittent Nature of Emergencies:** Unlike ongoing processes, emergencies are sporadic, which makes regular testing and preparation essential.

## Maintaining a Dynamic Document

An emergency plan is not static; it is a **dynamic document** that must be:

1. **Reviewed Regularly:**
  - After incidents.
  - When organisational changes occur that may affect the plan.
  - At scheduled intervals to ensure continued relevance.
2. **Actively Monitored:** Regular reviews ensure the plan reflects current risks and operational realities.
3. **Tested and Updated:**
  - Using drills, simulations, and post-incident analyses to identify weaknesses and implement improvements.
  - Engaging all relevant personnel to ensure their understanding and competence.

## Contingency Planning at Different Levels

Contingency planning is carried out at various levels, including:

1. **Organisational Level:** Focused on specific operational risks within businesses and organisations.

2. **Regional and National Levels:** Broader plans to address large-scale emergencies, such as natural disasters, public health crises, or acts of terrorism.

In the UK, the **Civil Contingencies Act 2004** governs responses to civil emergencies. This legislation ensures a coordinated approach by local authorities, emergency services, and government agencies to protect public safety and continuity of services during emergencies.

The European Union (EU) does not have a direct equivalent to the United Kingdom's Civil Contingencies Act 2004, however it has established comprehensive frameworks to enhance disaster preparedness and response across member states. The primary mechanism for this is the **EU Civil Protection Mechanism**, established in October 2001. This mechanism aims to strengthen cooperation among EU countries and participating states to improve prevention, preparedness, and response to disasters. It allows any country affected by a disaster, within or outside the EU, to request assistance, with the European Commission coordinating the response through the Emergency Response Coordination Centre (ERCC).

#### [EU Civil Protection & Humanitarian Aid](#)

Additionally, the **Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO)** oversees the EU's civil protection and humanitarian aid efforts. DG ECHO manages the EU Civil Protection Mechanism and coordinates the response to disasters, both within Europe and globally. It also administers humanitarian aid funding and collaborates with various partners to provide assistance to those affected by natural and man-made disasters.

#### [Wikipedia](#)

These frameworks, while not identical to the UK's Civil Contingencies Act, serve to ensure a coordinated and effective response to emergencies across EU member states and beyond.

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#### 4. Identifying the Emergency Event

Emergency events share common characteristics that set them apart from routine operations. These include:

##### 1. Urgent Response Required:

- Emergencies necessitate the rapid deployment of resources beyond those typically used in daily operations.

##### 2. Specialised Competences:

- Emergencies demand skills and knowledge not required in everyday activities.

##### 3. Concerted and Rapid Actions:

- Immediate actions are essential, including evacuation, equipment and environmental damage control, and collaboration with emergency services.
- **Preservation of life and personal safety** is always the primary objective.

#### Examples of Emergency Events

Emergency events can vary widely in scope and nature, including but not limited to:

- **Serious Incidents:** Leading to injuries or ill health.
- **Fires and Explosions**
- **Release of Hazardous Materials or Gases**
- **Natural Disasters:** Such as storms, floods, and earthquakes.
- **Utility Failures:** E.g., loss of electricity, water, or other critical utilities.
- **Pandemics/Epidemics:** Such as outbreaks of communicable diseases (e.g., swine flu, COVID-19).
- **Civil Disturbance or Terrorism:** Including sabotage and workplace violence.
- **Equipment Failures:** Affecting critical business operations.
- **Transport Accidents:** Involving road, marine, or aircraft incidents.

**Intentional vs Accidental Events:** Some emergencies may result from deliberate acts (e.g., sabotage), while others are accidental. Additionally, a single precipitating event may have multiple outcomes. For example, a hazardous material spillage could result in fire, environmental damage, and health risks.

## Predictive Techniques in Emergency Identification

To forecast and identify potential emergencies, predictive risk assessment techniques are invaluable:

1. **Fault Tree Analysis (FTA):** Analyses potential causes leading to a specific undesirable event.
2. **Cause-Consequence Analysis (CCA):** Explores possible consequences following an initiating event.

These techniques are outlined in **ISO 31010:2019** (BSI, 2019) and support the modelling and extrapolation of likely scenarios using past data or simulation.

## Differentiating Risk Assessment and Emergency Planning

- **Risk Assessment:** Aims to prevent the occurrence of undesirable outcomes.
- **Emergency Planning:** Focuses on mitigating the effects if an adverse event occurs, identifying necessary actions to respond effectively.

Emergency planning also considers short-time-frame scenario analysis to determine actions for immediate response.

## Actions for Emergency Preparedness and Response

**ISO 45001 (BSI, 2018)** provides clear guidance on emergency preparedness and response. Organisations are required to:

1. **Establish a Planned Response:**
  - Develop comprehensive response strategies, including first aid.
2. **Provide Training:**
  - Ensure workers are equipped with the knowledge and skills to respond effectively.
3. **Test and Exercise the Plan:**
  - Regularly test response capabilities through drills and simulations.
4. **Evaluate and Revise Plans:**
  - Review performance after drills or real emergencies and update plans as necessary.
5. **Communicate Roles and Responsibilities:**

- Inform workers of their duties and responsibilities during emergencies.

#### 6. **Engage Stakeholders:**

- Share relevant information with contractors, visitors, emergency services, government authorities, and, where appropriate, the local community.

#### 7. **Consider Needs and Capabilities:**

- Involve all relevant parties in the development of emergency plans, ensuring inclusivity and adaptability.

### **Flexibility in Emergency Response**

**BS 45002-2:2019 (BSI, 2019a)** highlights the importance of adaptability:

- Organisations should anticipate likely emergencies and develop detailed plans.
- Real emergencies may not unfold as expected, necessitating **on-the-spot risk assessments** and flexible responses.

By understanding potential emergencies and implementing dynamic, well-tested plans, organisations can minimise the impacts of emergency events and protect lives, property, and the environment.

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## **5. Identifying Required Actions and Procedures**

Effective emergency preparedness requires a structured approach to identifying the necessary actions and procedures to respond to potential emergencies. Although **BS 18004:2008** has been withdrawn, its **Annex D** provides practical and relevant guidance on emergency planning. The following elements should be considered when developing an emergency response procedure:

### **Key Considerations for Emergency Response Procedures**

#### **1. Inventory and Location of Hazardous Materials:**

- Maintain an up-to-date record of hazardous materials, including their storage locations, to ensure effective risk management.

#### **2. Numbers and Locations of People:**

- Identify the total number of personnel present, their usual locations, and any individuals requiring special assistance during emergencies.

#### **3. Critical Systems Impacting OH&S:**

- Determine systems essential for the organisation's occupational health and safety (OH&S) and ensure they are prioritised during emergencies.

#### **4. Provision of Emergency Training:**

- Deliver training to workers to equip them with the skills necessary to respond appropriately to emergencies.

#### **5. Detection and Emergency Control Measures:**

- Implement systems for detecting emergencies (e.g., fire alarms, gas leak detectors) and initiating immediate control measures.

#### **6. Medical Equipment and First Aid Kits:**

- Ensure the availability of first aid kits and medical equipment, strategically located and accessible in emergencies.

#### **7. Primary and Secondary Control Systems:**

- Develop robust primary systems for immediate response and secondary systems as backups.

#### **8. Monitoring Systems for Hazardous Materials:**

- Establish mechanisms to monitor hazardous materials continuously, ensuring early detection of potential issues.

#### **9. Fire Detection and Suppression Systems:**

- Install and maintain fire alarms, sprinklers, and other suppression systems to protect personnel and assets.

#### **10. Emergency Power Sources:**

- Ensure the availability of backup power systems (e.g., generators) to maintain critical operations during power outages.

#### **11. Local Emergency Services and Existing Arrangements:**

- Liaise with local emergency services and establish details of any existing arrangements for collaboration.

#### **12. Legal and Other Requirements:**

- Ensure compliance with legal obligations and other relevant requirements in emergency planning.

#### **13. Previous Emergency Response Experience:**

- Review lessons learned from past emergencies to improve the current response plan.

### **Team Approach to Emergency Response**

A **team-based approach** is essential for emergency response planning. This involves:

#### **1. Assigned Roles and Responsibilities:**

- Clearly define roles for team members, ensuring that everyone understands their tasks during an emergency.

#### **2. Sources of Specialist Equipment:**

- Identify and ensure access to specialised equipment required for specific emergency scenarios.

#### **3. Training Requirements:**

- Provide targeted training to enhance team members' competence and readiness.

#### **4. Communication Lines and Liaison Arrangements:**

- Establish clear communication channels and liaise with relevant stakeholders, such as emergency services and regulatory authorities.

## **Documentation, Review, and Testing**

An emergency response plan must be:

### **1. Documented:**

- Comprehensive and accessible documentation is essential to ensure that all stakeholders can refer to the plan during an emergency.

### **2. Reviewed Periodically:**

- Regular reviews should be conducted to keep the plan current, especially after organisational changes or incidents.

### **3. Tested:**

- Conduct periodic drills and simulations to test the plan's effectiveness, identify weaknesses, and implement improvements.
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## 6. Learning from Experience

The study of past disasters offers vital lessons, enabling organisations to enhance their emergency preparedness, response, and recovery processes. Significant incidents, such as the **Buncefield fire (UK)**, **Fukushima nuclear disaster (Japan)**, and the **Beirut explosion**, underline the importance of robust planning, effective regulation, and organisational learning. Adding to these is the **Um El Faroud explosion (Malta)**, which provides a local example of the tragic consequences of inadequate safety practices.

### Case Studies and Lessons Learned

#### 1. Buncefield Fire (UK, 2005)

Europe's largest peacetime oil depot explosion caused widespread damage, highlighting the need for improved emergency planning at industrial sites. The **Buncefield Major Incident Investigation Board (2007)** made key recommendations, including:

- Reviewing emergency plans for all reasonably foreseeable scenarios.
- Ensuring trained personnel and contingency resources are in place.
- Protecting critical emergency facilities, such as control centres and firefighting systems.

#### Key Lesson:

Operators must anticipate rare but catastrophic events and ensure comprehensive training, resource allocation, and protection of critical systems.

#### 2. Um El Faroud Explosion (Malta, 1995)

On **3rd February 1995**, the **MT Um El Faroud**, a Libyan-owned tanker, exploded while docked for repairs at the Malta Drydocks. The explosion killed nine workers and caused extensive damage. Investigations revealed:

- **Root Cause:** Residual gas inside the tanker's tanks ignited during welding operations.
- **Contributing Factors:** Inadequate risk assessments and failure to ensure a safe working environment.

#### Key Insights:

- The incident exposed the importance of adhering to stringent safety protocols during high-risk operations.

- It underscored the need for proper training, hazard identification, and use of gas detection equipment.

**Key Lesson:**

High-risk industries require meticulous planning, effective communication, and strict adherence to safety standards to prevent catastrophic outcomes.

### **3. Seveso Disaster (Italy, 1976)**

In **northern Italy**, the release of a toxic cloud of dioxin (TCDD) from a chemical plant led to widespread environmental damage and human health impacts. The incident prompted the development of the **Seveso Directive**, which now governs major industrial accident prevention across Europe.

**Key Outcomes:**

- The Seveso Directive (now **Seveso III Directive 2012/18/EU**) sets stringent requirements for safety management systems and emergency planning at sites handling hazardous substances.
- It mandates risk assessments, community notifications, and coordination with local emergency services.

**Key Lesson:**

Regulation, enforcement, and public awareness are essential to mitigate the risks associated with industrial hazards.

### **4. Fukushima Nuclear Disaster (Japan, 2011)**

A natural earthquake and tsunami triggered this man-made nuclear disaster, highlighting the need for robust infrastructure and contingency planning.

**Key Lesson:**

Organisations must prepare for compound risks and invest in resilient systems to withstand both natural and human-made events.

### **5. Beirut Explosion (Lebanon, 2020)**

The explosion of nearly 3,000 tonnes of ammonium nitrate stored improperly at the Port of Beirut caused devastating consequences.



**Key Lesson:**

Effective regulation and enforcement are critical to ensuring the safe storage and handling of hazardous materials.

**The European Approach to Emergency Preparedness**

The **European Union (EU)** adopts a collective approach to disaster management, emphasising collaboration among member states. The **EU Civil Protection Mechanism** coordinates efforts to prevent, prepare for, and respond to disasters. Key aspects include:

**1. Cross-Border Collaboration:**

- Member states share resources, expertise, and emergency response capabilities.
- The **Emergency Response Coordination Centre (ERCC)** facilitates cooperation during large-scale incidents.

**2. The Seveso III Directive (2012/18/EU):**

- Governs the prevention and mitigation of major industrial accidents.
- Requires operators to implement safety management systems, conduct risk assessments, and establish emergency response plans.

**3. Guidance from PD ISO/TS 22332:2021:**

- Offers frameworks for recovery from emergencies, ensuring a consistent and systematic approach to managing post-disaster scenarios.

**Organisational Learning and the Learning Cycle**

Disasters on the scale of Buncefield, Seveso, or Um El Faroud demonstrate the importance of **organisational learning**. **Norman, Stuart-Black & Coles (2006)** describe this as a cyclical process involving:

1. Awareness of systems and risks.
2. Identification of learning opportunities.
3. Development and validation of solutions.
4. Implementation of changes and training.
5. Embedding improvements to sustain resilience.

Organisations must regularly revisit their emergency plans, incorporating lessons learned to prevent similar incidents in the future.

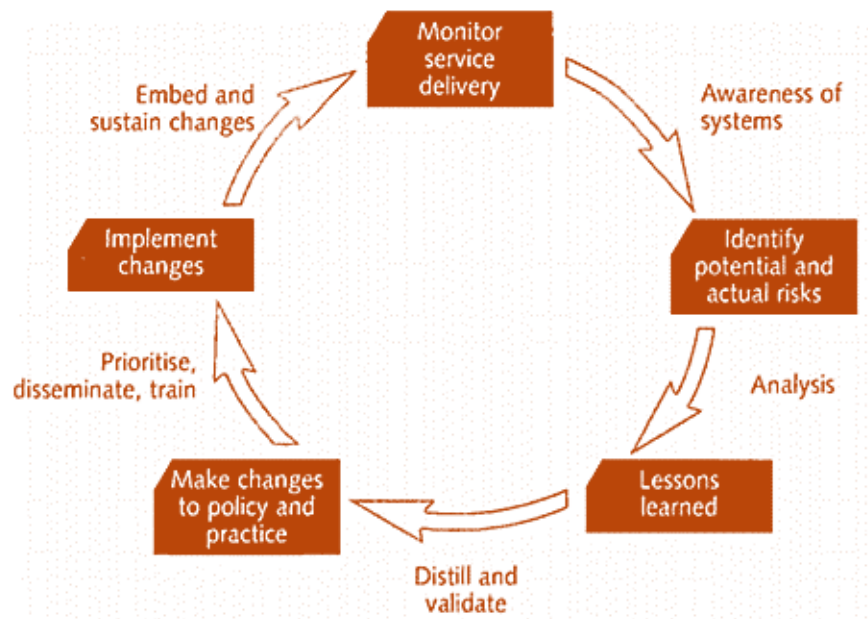


Figure 2: The learning cycle (Norman, Stuart-Black & Coles, 2006, p.17)

## Conclusion

Both European and local examples, such as the **Um El Faroud explosion**, highlight the consequences of inadequate emergency planning and the critical need for stringent safety measures. By studying past incidents and leveraging frameworks like the **EU Civil Protection Mechanism** and the **Seveso III Directive**, organisations can enhance their preparedness, ensure compliance, and build resilience to protect lives and assets.

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## Further suggested Reading:

### EU Sources

#### 1. EU Civil Protection Mechanism

- Comprehensive information on the EU's disaster preparedness and response framework.
- [European Civil Protection and Humanitarian Aid Operations](#)

## 2. **Seveso III Directive (2012/18/EU)**

- Detailed guidance on managing major accident hazards involving dangerous substances.
- [Seveso Directive Overview](#)

## 3. **ISO Standards for Risk Management and Emergency Preparedness**

- Explore standards like ISO 31010:2019 (Risk Assessment Techniques) and ISO/TS 22332:2021 (Emergency Recovery).
- [ISO Standards Catalogue](#)

## **UK Sources**

### 1. **Civil Contingencies Act 2004**

- Full details of the UK government's legislative framework for emergency preparedness.
- [Legislation.gov.uk - Civil Contingencies Act 2004](#)

### 2. **Health and Safety Executive (HSE)**

UK Health and Safety Executive (HSE) - Event Safety: Incidents and Emergencies

This resource offers detailed guidance on managing incidents and emergencies during events, including planning, response, and recovery. It is particularly useful for understanding how to prepare for and handle unexpected situations in large gatherings or public events.

- [HSE - Event Safety: Incidents and Emergencies](#)

### 3. **Dealing with Disaster (HM Government, 2001)**

- UK government's approach to disaster management, revised post-9/11.
- [HM Government's Official Website](#)

### 4. **Buncefield Investigation Reports**

- Key findings and recommendations from the Buncefield Major Incident Investigation Board.
- [HSE - Buncefield Incident Reports](#)