

# International Oil and Gas

## SAMPLE RESOURCES



This RMS sample resources pack contains a selection of powerpoint slides together with a supporting lesson plan and are representative of the full set of RMS trainer materials for the NEBOSH International Oil and Gas qualification.

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A large offshore oil rig is shown in the background, situated in the middle of a blue sea under a clear blue sky. The rig has a complex structure with multiple levels, cranes, and a tall derrick. The image is framed by a white curved border at the bottom.

# NEBOSH International Certificate in Oil and Gas



# 1 Health, safety and environmental management in context



# 1 – Health, safety and environmental management in context

## Learning outcomes

- 1.1 Explain the purpose of and procedures for investigating incidents and how the lessons learnt can be used to improve health and safety in the oil and gas industries
- 1.2 Explain the hazards inherent in oil and gas arising from the extraction, storage, and processing of raw materials and products
- 1.3 Outline the risk management techniques used in the oil and gas industries
- 1.4 Explain the purpose and content of an organisation's documented evidence to provide a convincing and valid argument that a system is adequately safe in the oil and gas industries

# 1 – Health, safety and environmental management in context

## Content

- 1.1 Learning from incidents
- 1.2 Hazards inherent in oil and gas
- 1.3 Risk management techniques used in the oil and gas industries
- 1.4 An organisation's documented evidence to provide a convincing and valid argument that a system is adequately safe

# 1 – Health, safety and environmental management in context

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- 1.1 Learning from incidents
- 1.2 Hazards inherent in oil and gas
- 1.3 Risk management techniques used in the oil and gas industries
- 1.4 An organisation's documented evidence to provide a convincing and valid argument that a system is adequately safe

## Learning from incidents

- Accident/incident causation and investigation
- Accident and incident causation
- The domino theory
- Basic incident investigation process
- Importance of learning lessons from major incidents

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## **Accident/incident causation and investigation**

### Types of incident

- Accident/incident
- Near miss
- Dangerous occurrence

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## **Accident/incident causation and investigation**

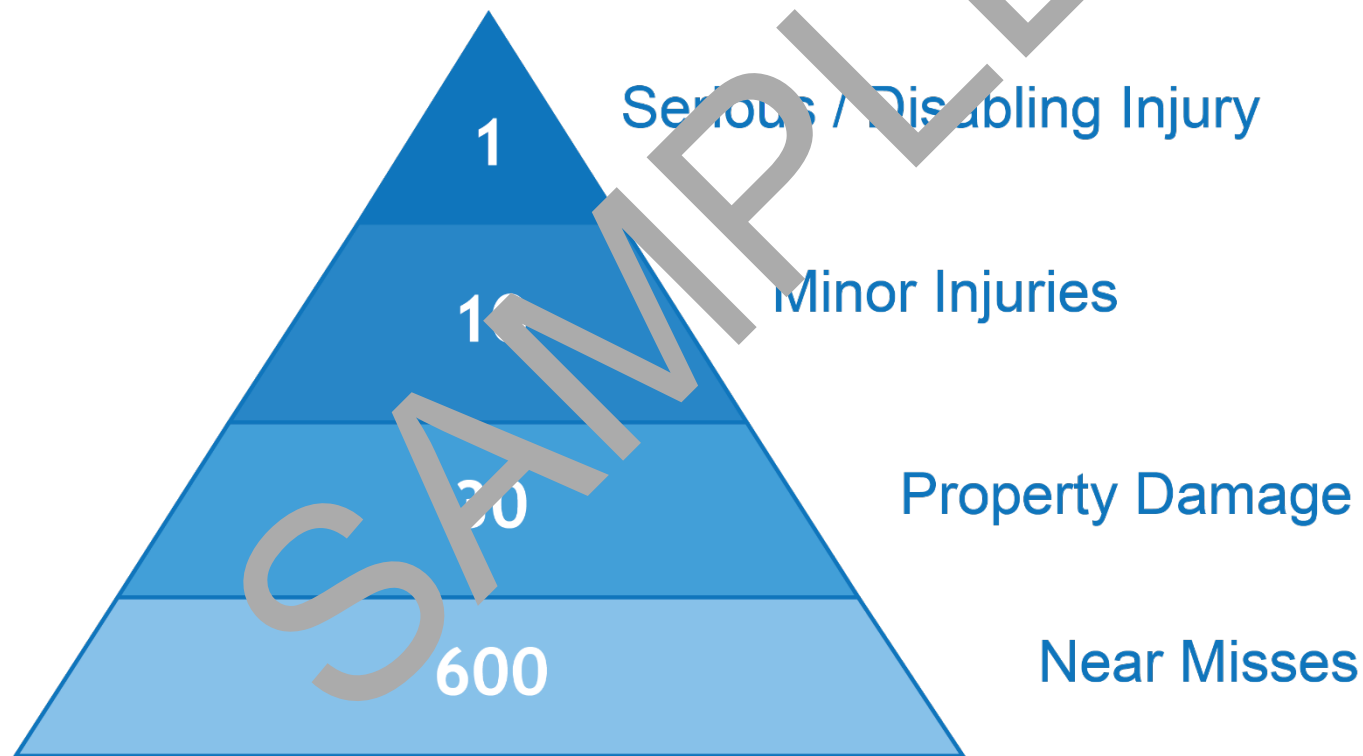
### Accident and incident causation

- Some years ago, a study of 1,750,000 accidents, in 21 industry sectors, led by Frank Bird, showed that there is a fixed ratio between losses of different severity (and accidents where no loss occurred, i.e. near misses)

## 1 – Health, safety and environmental management in context

# Accident/incident causation and investigation

## Accident ratio study



Source: Frank Bird - ILCI.

## Accident/incident causation and investigation

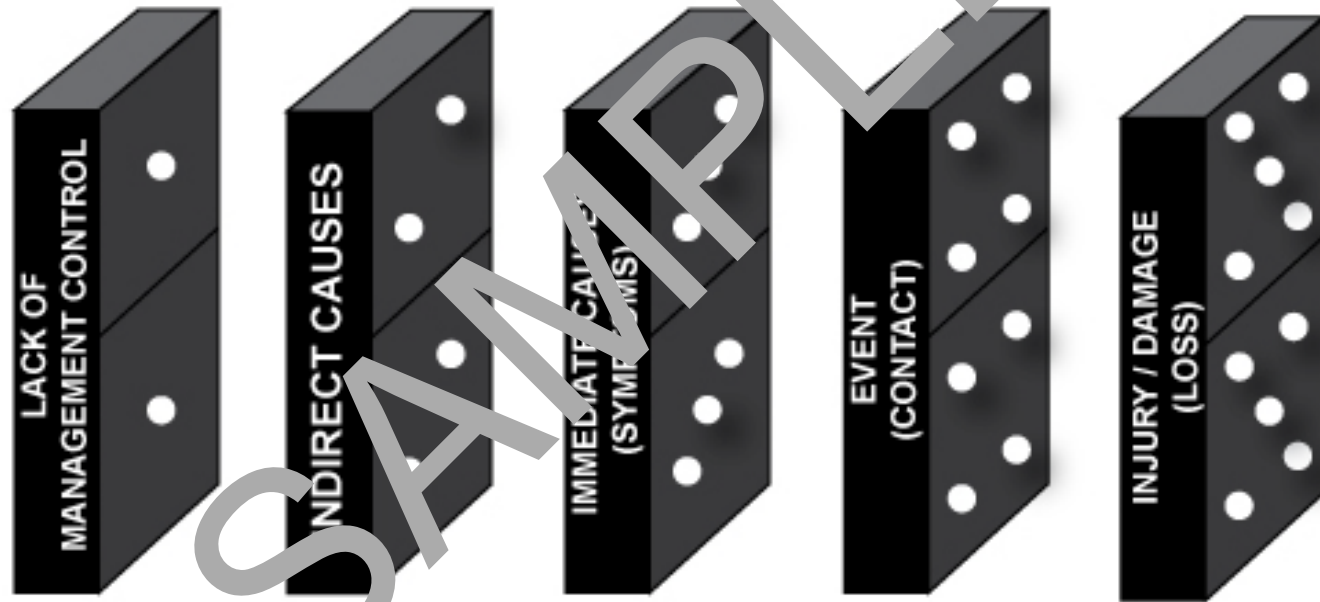
### The domino theory

- HW Heinrich proposed one of the first coherent theories of accident/incident causation
- His domino theory suggested that the series of events, which led to an injury or some other loss, were a succession of events which followed a logical pattern
- Further research by the Frank Bird ILCI into accident/incident causation led them to put forward a modified domino theory

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# Accident/incident causation and investigation

## Accident causation domino



Source: Frank Bird - ILCI.

## Accident/incident causation and investigation

### The domino theory

- Lack of management control was a key factor in the accident/incident chain
- Important to identify the immediate and root causes
- Addressing the root causes will enable us to prevent future similar incidents in the future
- In complex major accident/incident investigations it is particularly important to identify ALL causes
- Such accidents normally have several immediate causes
- These immediate causes will have one or more root causes
- This is normally referred to as the Multi Causation Theory

## Basic incident investigation process

Why incidents should be investigated?

- Step 1: Gathering the information
- Step 2: Analysing the information
- Step 3: Identifying suitable risk control measures
- Step 4: The action plan and its implementation



## Importance of learning lessons from major incidents

### Causes of major incidents

- Direct - occurs immediately prior to the undesirable event
- Further away - either in space or time

### Human error

- The reasons that these errors occurred in the first place were the responsibility of those more senior in the organisation

## 1 – Health, safety and environmental management in context

# Importance of learning lessons from major incidents

- The Piper Alpha disaster 1988
- Buncefield, December 2005
- The Esso Longford gas explosion 1998
- The Texas City refinery explosion 2005

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# NEBOSH International Certificate in Oil and Gas

# NEBOSH International Technical Certificate in Oil and Gas Operational Safety

## Unit IOG1 Management of international oil and gas health and safety

### Lesson Plan - Day 1

TIME	ELEMENT/TOPIC	CONTENT	RESOURCE/TASK
09.00	Welcome		Complete attendance sheet
	General Introduction	Admin arrangements including emergency procedures Name, job, background, experience Course content, course materials Syllabus and exam arrangements	Local procedures Name cards  Complete paperwork if necessary
	Introduction to the Oil and Gas Industry	Crude Oil, what is it? Upstream Sector: Offshore: Discovery and Extraction Downstream Sector: Refining: Separation, Conversion, Purification	Slides Basic explanation of the upstream and downstream sections of the industry
	Programme for the day	Topics to be covered	Slides
09.30	<b>Element 1: Health, safety and environmental management in context</b>	Learning outcomes: <ul style="list-style-type: none"> <li>Explain the purpose of and procedures for investigating incidents and how the lessons learnt can be used to improve health and safety in the oil and gas industries</li> <li>Explain the hazards inherent in oil and gas arising from the extraction, storage, and processing of raw materials and products</li> <li>Outline the risk management techniques used in the oil and gas industries</li> <li>Explain the purpose and benefit of an organisation's documented evidence to provide a convincing and valid argument that a system is adequately safe in the oil and gas industries</li> </ul>	Slides / Flipchart Introduction to element
	1.1 Learning from incidents	Investigating incidents (including near misses) and effective identification of the root causes and making recommendations for improvement	Slides Accident Investigation Exercise
		The importance of learning lessons from major incidents, management, cultural, and technical failures (ie process failures) that may lead to such incidents	Slides
11.00	<b>Break</b>		
11.15	1.1 Learning from incidents (cont.)	Learning from Major incidents: The Piper Alpha Disaster  <i>Task/Practice Questions</i>	<i>Piper Alpha Video</i> ; Slides Group discussion on lessons learnt NEBOSH Questions

# NEBOSH International Technical Certificate in Oil and Gas Operational Safety

## Unit IOG1 Management of international oil and gas health and safety

TIME	ELEMENT/TOPIC	CONTENT	RESOURCE/TASK
12.30		Lunch	
13.00	1.2 Hazards inherent in oil and gas	<p>Meaning and relevance of:</p> <ul style="list-style-type: none"> <li>flash point</li> <li>vapour density</li> <li>vapour pressure</li> <li>flammable; highly flammable; extremely flammable</li> <li>upper flammable limit, lower flammable limit and the risk from working within these limits</li> </ul> <p><i>Task/Practice Question</i></p> <ul style="list-style-type: none"> <li>toxicity</li> <li>skin irritant</li> <li>carcinogenic properties</li> </ul>	<p>Slides/Flip chart</p> <p>NEBOSH Question and Group Discussion (Gas testing and flammable limits)</p>
14.45		Break	
15.00	1.2 Hazards inherent in oil and gas continued	<p>Properties and hazards of gases – hydrogen, methane, liquid petroleum gas (LPG), liquefied natural gas (LNG), nitrogen, hydrogen sulphide and oxygen</p> <p><i>Task/Practice Question</i></p>	<p>Slides</p> <p>NEBOSH Practice Questions</p>
		<p>Properties and hazards of associated products and control measures:</p> <ul style="list-style-type: none"> <li>additives eg, anti-foaming, anti-wetting agents</li> <li>micro-biocides</li> <li>corrosion preventatives</li> <li>refrigerants</li> <li>water/stress</li> <li>hydrocarbons</li> <li>drilling muds</li> <li>sludges including low specific activity (LSA) sludges</li> </ul>	Slides
17.00	Tutor setting homework	Practice Questions based on days work	Handout
17.15	End of Day 1		