

# Intro to Health & Safety

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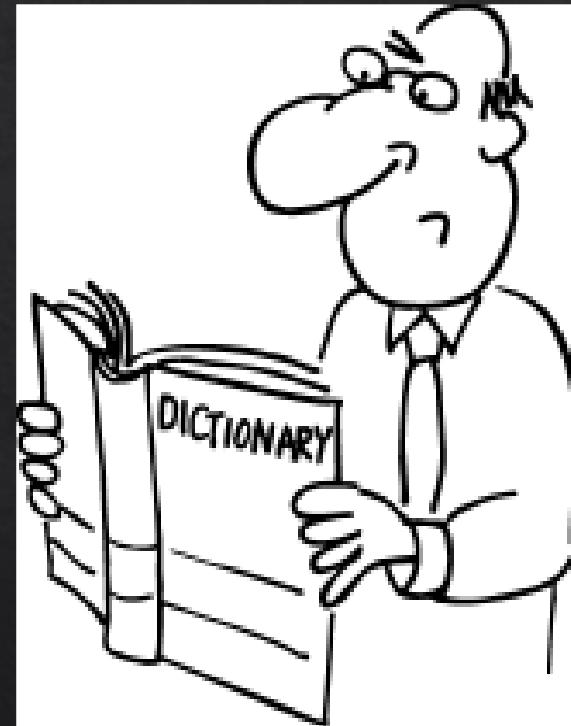
Lecture 1

Kashif Liaqat

BUIITEMS – MECHANICAL ENGINEERING

# Health and Safety

Health and safety is intended to bring about **condition free from risk of injury or threat to our health and well-being.**



# We Believe

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Workplace accidents, illness and incidents  
are preventable  
provided that  
Health and Safety  
is Managed

# What could happen?

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Near-miss



Minor injury



Major injury



Death



# Accidents

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Undesired circumstances which give rise to ill-health or injury, damage to property, plant, products or the environment; production losses or increased liabilities.



# Incident

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Undesired circumstances and ‘near misses’ which could cause accidents.

# ILL Health

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Acute and chronic ill health caused by physical, chemical or biological agents as well as adverse effects on mental health.



# Why report accidents?

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Accidents should be reported because:

- The law requires some specific types of accidents to be reported to the Enforcing Authorities.
- The organization Safety Policy requires all accidents and near misses to be reported to the authorities or concerned safety department.
- It enables investigations so as to prevent further accidents.
- Reports enable the organization to identify trends.

# Hazard –

The **potential to cause harm**. Harm including ill health and injury, damage to property, plant, products or the environment, production losses or increased liabilities.

# Risk

Means the likelihood that a specified undesired event will occur due to the realisation of a hazard by, or during work activities or by the products and services created by work activities.

# Hazards/Danger

*Observable or predicted from knowledge*



# Risk

*Not directly observable - probability of harm to system elements being realised from exposure to hazards and danger.*



# Harm

*Damage to system elements - long or short term*



# Accidents



**Injuries   Ill-Health   Damage**

# Safety

The '*control of accidental loss*'.

# Reasons for Preventing Accidents

There are three main reasons for preventing accidents and ill-health.

# Moral / Humane

*No-one comes to work to be injured or killed*



# Cost

Accidents cost organisations money.

*e.g. Piper Alpha – 167 people killed – estimated to have cost over £2 billion including £746 million in direct insurance payouts.*



# **Legislation**

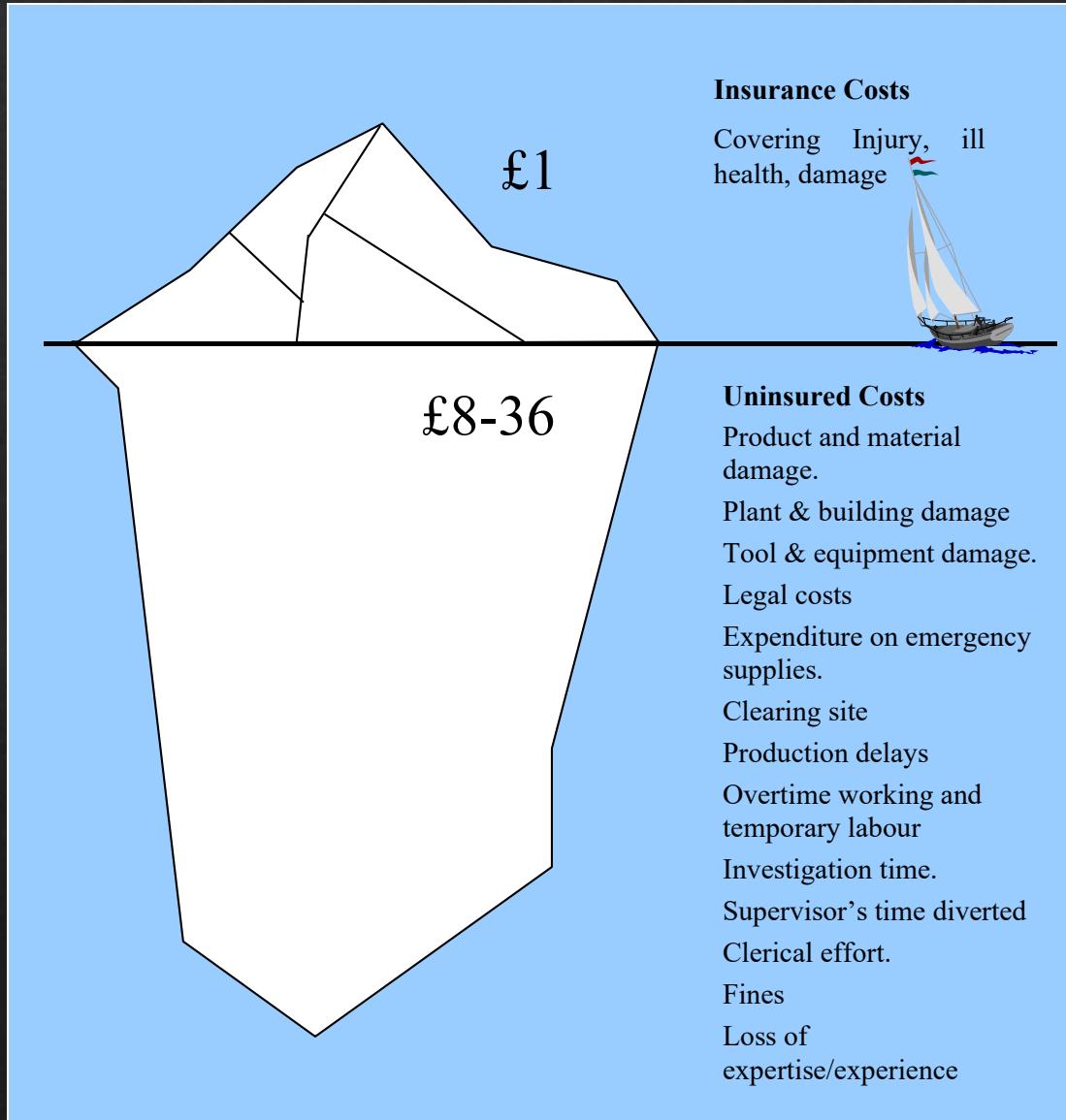
*Organisations have a legal obligation.*

*Health & Safety at Work Act*

*Management of Health & Safety at Work*

*Quarry Regulations*

# Accident Costs ‘Iceberg’



# How big is the Accident Problem?

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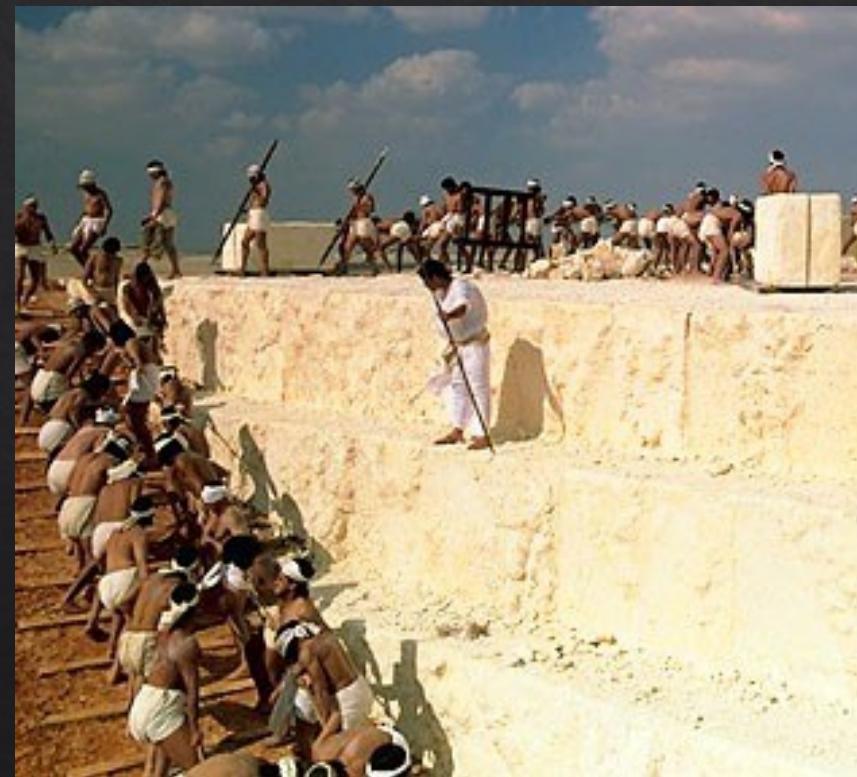
Costs estimation provided by HSE, Uk

- 37% of annualised profit.
- 8.5% of tender price.
- 5% of running costs.

Bear in mind that these were large and well organised companies that already had a high standard of loss control and lower than average accident rates.

# In the Beginning ...

- ❖ ... low sensitivity to Consequences or the Likelihood of them!



# More Recently ...

**The Hoover Dam:  
112 people died  
during construction**

**Attitudes to Hazards  
and Risks are  
constantly evolving**



# Unrevealed Safety Issues

- Despite improving HSE Performance indicators, the Texas City refinery suffered a major event in May 2005 ... and a second event two months later



# An Increasing Complex world ... Nimrod 2006

- After an Air-to-Air Refuelling (AAR), the plane caught fire
- Experienced crew acted with calmness, bravery and professionalism, and in accordance with training, but could not control the fire
- Aircraft exploded
- All 14 on board died



# Piper Alpha



# General duties on the employer

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General employer duties at an organisation

- ❖ **provide safe place of work**
- ❖ **provide safe plant and equipment**
- ❖ **provide safe systems of work**

# General duties on employees

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General employee duties at an organization

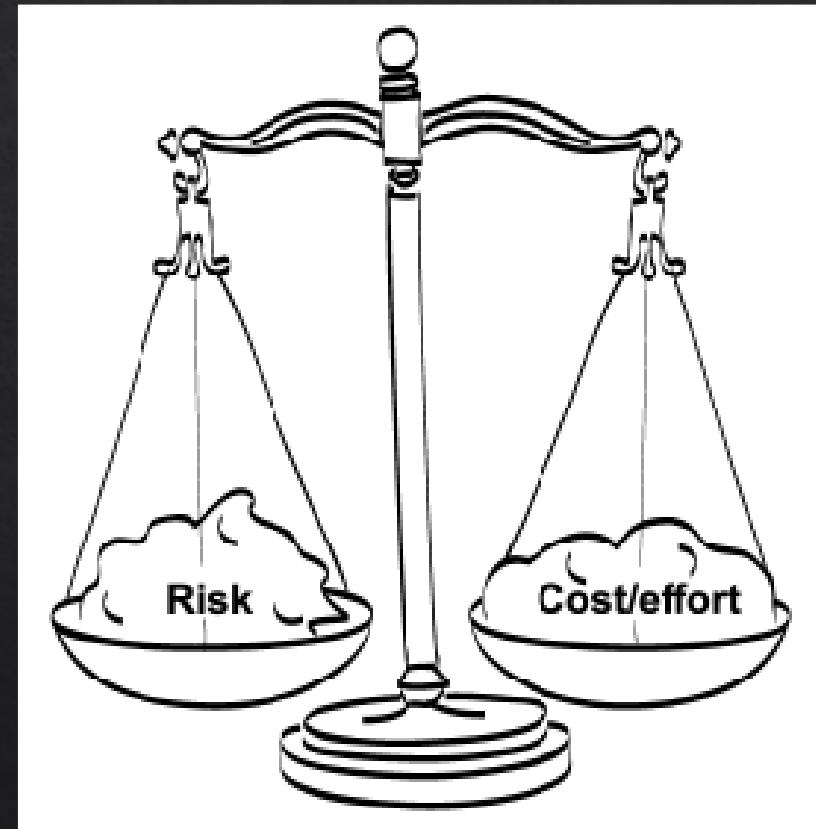
- ❖ **to take reasonable care**
- ❖ **to co-operate with the employer**
- ❖ **not to interfere with safety arrangements**

# Reasonably practicable

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Risk should be set against the effort required to remove it.

- It is not reasonably practicable if the cost of removal of risk is disproportionately high
- It is reasonably **practicable** if a risk can be removed at minimal cost and effort



# Herald of Free Enterprise

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“The failure on the **part of management** to give proper and clear direction was a contributory cause of the disaster.”



# Safety Management

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This begins with **Policy**

and uses tools such as **Local Rules**

and **Risk Assessment** to establish control of the hazards and risks of work.

It is a specific legal duty to manage safety so that all risks are suitably and sufficiently controlled.

# Safety Policy

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- Legal requirement under Law and Standards
- Organisation Policy published in a book and on web.
- Departments within the organisation need their Policies.
- Labs/buildings/plants may need additional policy/arrangements to provide more detail.
- Arrangements will need to include Local Rules.
- Some local rules are needed by law - e.g. rules for handling electric equipments.

# Identifying the main hazards

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Examples which affect safety  
and/or health:

- Biological hazards
- Chemicals
- Fire
- Radiation
- Waste
- Electricity
- Noise and Vibration
- Lifting and carrying
- Repetitive movements

This is the first step in  
**Risk Assessment**

# Biohazards

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- ❖ Classification of organisms
- ❖ Control of Pathogens  
(inc. inoculations)
- ❖ Control of spread of organisms



# Chemicals

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- ❖ COSHH – Control of Substances Hazardous to Health.
- ❖ This applies to all chemicals and substances (including cultures) used in labs and elsewhere.
- ❖ There are specific additional measures for very high risk chemicals and substances – in particular

Cyanides      Pathogens      Asthmagens

- ❖ This is dealt with in more detail in the Risk Assessment Training

# Fire

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- ❖ All Fire Alarms must be treated as genuine
- ❖ Evacuate immediately
- ❖ Close doors and windows as you leave
- ❖ Go to the assembly point



# Actions to take to prevent Fire

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- ◊ Keep smoke doors closed
- ◊ Do not obstruct escape corridors
- ◊ Store fire risk materials correctly
- ◊ Control wastes.



## Dutch fire claims eight lives

“I saw disorientated youngsters with fear in their eyes... probably blind panic is the reason so many people have been injured”  
eyewitness - Mayor Frank IJsselmuiden

# Radiation

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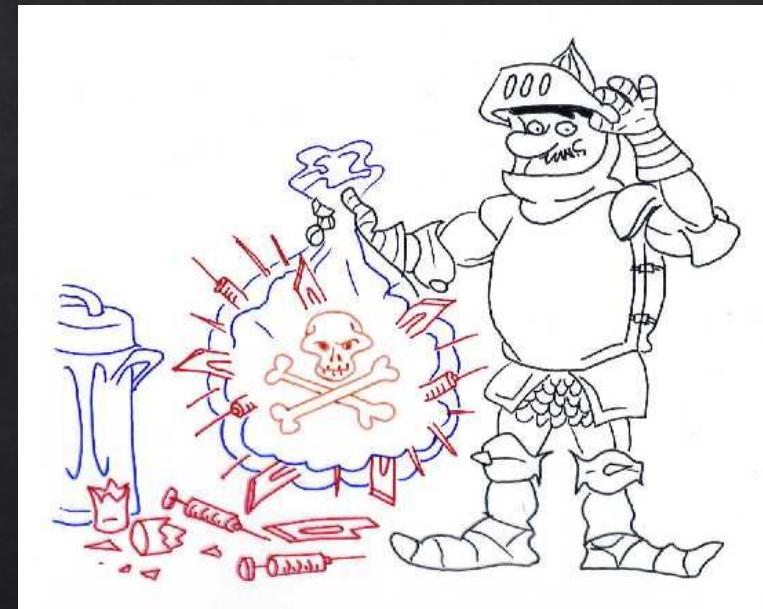
Very heavily controlled by the HSE and the Environment Agency. Specific laws relating to the use, storage and disposal of radioactive materials.

- ❖ Use is restricted to controlled areas.
- ❖ Only authorised persons permitted to use radiation.
- ❖ All use must be recorded, and all wastes controlled.
- ❖ Very specific Local Rules are in force.
- ❖ Good technique main protection against contamination.

# Waste

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- ❖ Many accidents are caused by incorrect disposal of wastes.
- ❖ Wastes must be segregated by law.
- ❖ Organisations have strict rules.
- ❖ Errors put others at risk.



# Personnel Protective Equipment

Personnel protective equipment (PPE) may be broadly divided as follows:

- ◊ Hearing protection.
- ◊ Respiratory protection.
- ◊ Eye and face protection.
- ◊ Protective clothing.



*PPE does nothing to stop the hazard at source, but simply provides protection to reduce the severity of the potential accident.*

# Getting help

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Assistance within the Organization.

- ❖ Project/Immediate Supervisor
- ❖ Safety Officer/Department
- ❖ Biological Safety Supervisor
- ❖ Radiation Protection Supervisor
- ❖ Electrical Protection Supervisor
- ❖ Radiation Protection Supervisor
- ❖ Fire Handling Units/Teams

# Legal duties

## COMMON LAW

- ❖ **duty of one individual to another - “Duty of Care”**

## STATUTE LAW

- ❖ **Criminal Law**
- ❖ **duty between individual and the state**

# The costs of failure

Health and safety law is Criminal Law

Failure to manage health and safety can result in:

- **prosecution,  
fines and imprisonment**
- **compensation claims**
- **loss of output or service**
- **replacement costs**
- **loss of reputation**



# Cases of note

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- ❖ Mr RE Hill – Asbestos
- ❖ UCL London - Sharps box
- ❖ Birmingham University - Lab Safety Regulations
- ❖ January 2006 – A University fined £70,000 following an accident

**End of Lecture!**

Hindenburg disaster

