



# Introduction to Safety and Health



**Sandia  
National  
Laboratories**

# Learning Outcomes

- ▶ At the end of this module, participants will be able to
  - ❖ describe the objectives of the Safety and Health Act
  - ❖ describe the Theory of Accident
  - ❖ identify and list hazards in a picture exercise
  - ❖ recognize the responsibility to immediately report hazards to the PIC

# Module Outline

- ▶ Common safety terminologies
- ▶ General legislation on safety and health
- ▶ Theory of Accident
- ▶ Classification of hazards
- ▶ Safety responsibilities

# Safety and Health Terminology

- ▶ Hazard

a source or situation with potential to cause injury and ill health.

(ISO, 45001)

- ▶ Occupational Health and Safety Risk

the combination of the likelihood of occurrence of a work-related hazardous event(s) or exposure(s) and the severity of the injury and ill health that can be caused by the event(s) or exposure(s).

(ISO, 45001)

# Safety and Health Terminology

- ▶ Exposure

The likelihood that a worker is or was subjected to effects or influences of occupational hazards that can result in occupational poisoning or disease.

- ▶ Work environment

Consists of the employers' premises and locations where employees are engaged in work-related activities or where they must be present as a condition of their employment. The work environment includes physical locations, equipment, and materials used by employees during the course of their work.

# Safety and Health Terminology

## ► Accident

An occurrence arising out of or in the course of work that results in non-fatal or fatal injury.

## ► Near-miss

a work-related incident where no injury or ill health occurs, but has the potential to cause these conditions

## ► Lost Time

- ❖ Lost days (consecutive or not)
- ❖ calculated in calendar days, the employee was away from work, from and including the day following the accident, injury, and diagnosis of occupational poisoning or disease.

# Identify the hazards



Picture A



Picture B

# General Legislation on Safety and Health



LAWS OF MALAYSIA

REPRINT

Act 514

OCCUPATIONAL SAFETY AND  
HEALTH ACT 1994

The purpose:

1. to secure the safety, health, and welfare of people at work against hazards and risks arising from the activities at work
1. to promote an occupational environment for people at work that is adapted to their physiological and psychological needs

**Act A1648 : OCCUPATIONAL SAFETY AND HEALTH (AMENDMENT) ACT 2022**

# What you need to know about Safety and Health

- ▶ Applicable to university staff and students.
- ▶ Primary responsibility for the safety and health of work lies with those who create and work with the risks.
- ▶ Must follow Safe Work Practices (SWP).
- ▶ Do not work in an environment with reasonable evidence of imminent danger.
- ▶ Must report/notify any accident or incident in the laboratory



# Workplace Accident Statistics

| SECTOR                                                   | NPD         | PD         | DEATH      | TOTAL       |
|----------------------------------------------------------|-------------|------------|------------|-------------|
| Hotel and Restaurant                                     | 125         | 1          | 0          | 126         |
| Utilities (Electricity, Gas, Water and Sanitary Service) | 198         | 1          | 8          | 207         |
| Finance, Insurance, Real Estate and Business Services    | 264         | 4          | 17         | 285         |
| Construction                                             | 147         | 5          | 65         | 217         |
| Transport, Storage and Communication                     | 281         | 5          | 6          | 292         |
| Manufacturing                                            | 4015        | 206        | 48         | 4269        |
| Wholesale and Retail Trade                               | 182         | 3          | 2          | 187         |
| Public Services and Statutory Authorities                | 68          | 2          | 4          | 74          |
| Mining and Quarrying                                     | 44          | 4          | 8          | 56          |
| Agriculture, Forestry and Fishery                        | 939         | 18         | 16         | 973         |
| <b>TOTAL</b>                                             | <b>6263</b> | <b>249</b> | <b>174</b> | <b>6686</b> |

## LEGEND:

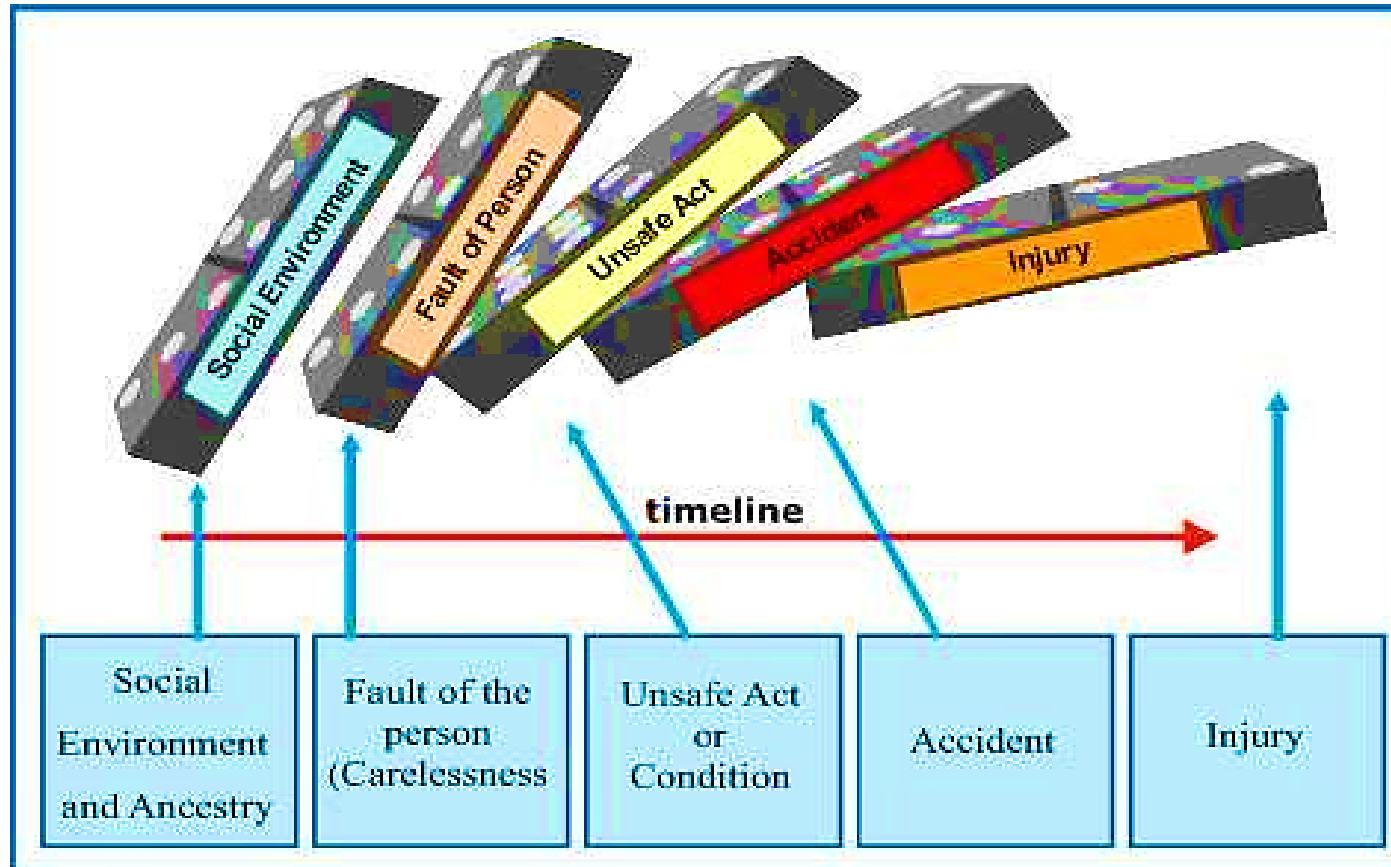
PD - PERMANENT DISABILITY

NPD- NON PERMANENT DISABILITY

Source: International Policy and Research Development Division

# Theory of Accident

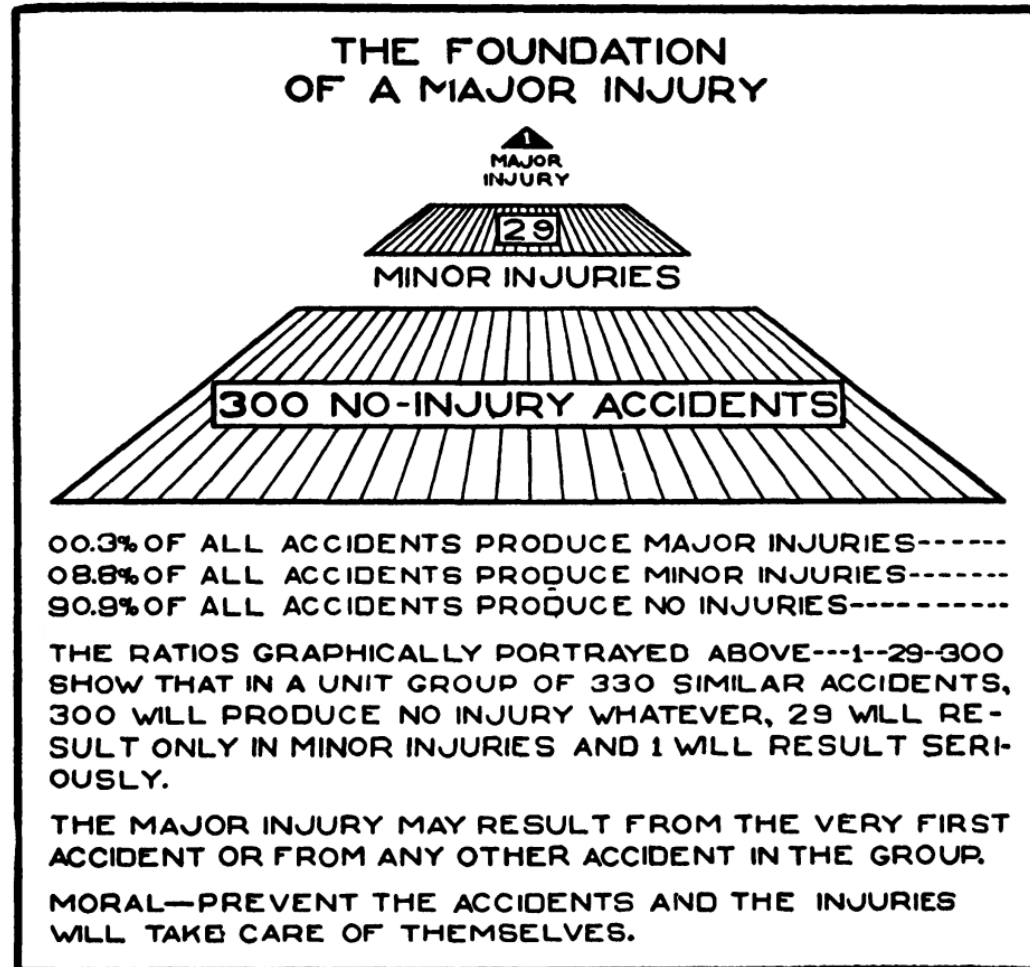
## Heinrich's Domino Model of Accident Causation



Source: Adopted from Disaster Management Institute, Bhopal, Online Explanation of Domino theory.

# Theory of Accident

## The accident pyramid



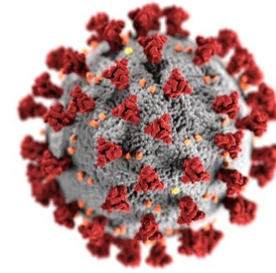
# Classification of Hazards



Physical



Chemical



Biological



Ergonomics



Psychosocial

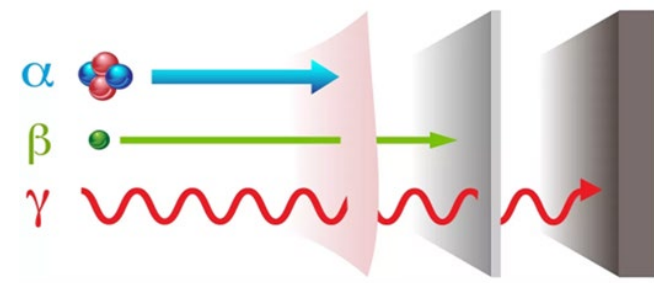
# Physical Hazards



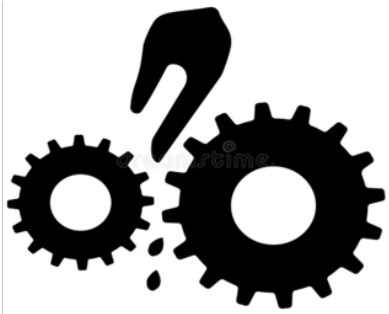
Slip, trip and fall



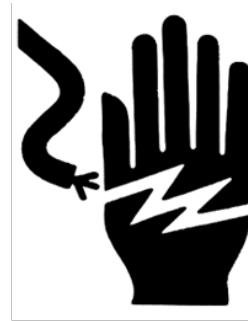
Noise exposure



Radiation exposure



Unguarded machinery



Electrical hazard



Heat stress

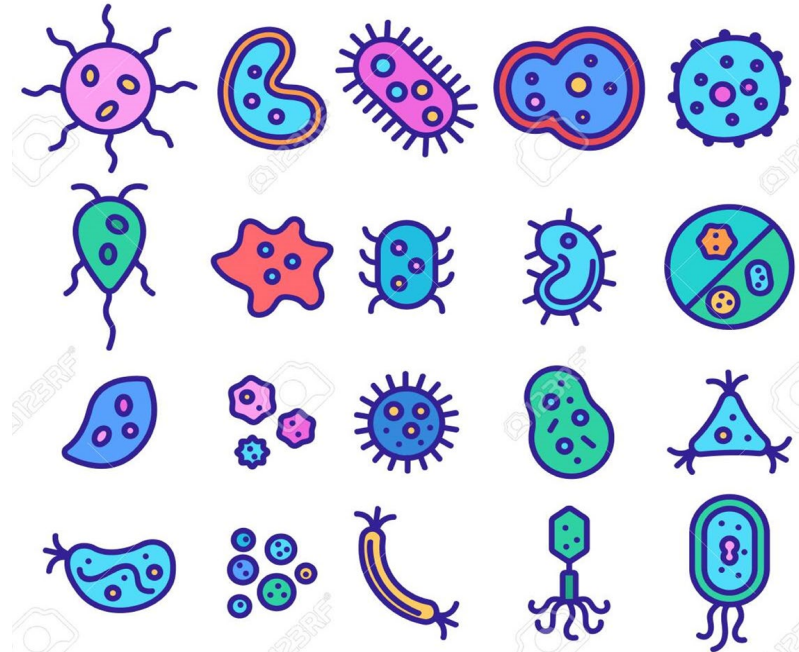
# Chemical Hazards



# Biological hazards



Biohazard symbol



Pathogenic microorganism

Micro-organisms, cells, or other organic materials of plant, animal, or human origin, including those genetically modified

# Ergonomics Hazards



Manual handling



Awkward posture



Repetitive strain

# Psychosocial Hazards



Stress



Violence



Bullying

# Safety Responsibilities

- ▶ Follow all safety instructions
- ▶ Minimize and prevent exposure to hazards and risks
- ▶ Notify any hazard and hazardous situation to the person in-charge



# Exercise 1

Each group, please identify FIVE hazards in this picture and discuss their potential harms



# Key Messages

- ▶ Everyone is responsible for safety
- ▶ Safety begins with compliance
- ▶ Make an effort to learn about safety
- ▶ Do not learn about safety only after an accident has occurred



# References

1. International Organization for Standardization. (2016). *Occupational health and safety management systems—Requirements with guidance for use* (ISO/DIS Standard No. 45001).
2. Occupational Safety and Health Act 1994 (Malaysia) (Act 514).
3. Seymour Zack Mansdorf (2019). Handbook of occupational safety and health. Third edition. Wiley publication.

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