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CHAPTER 5

HEALTH & SAFETY

Chapter 5

SAFETY AND HEALTH

- At the end of this chapter, students should be able to
 - discuss rules and regulations in typical engineering works related to safety and health

5.0 SAFETY & HEALTH

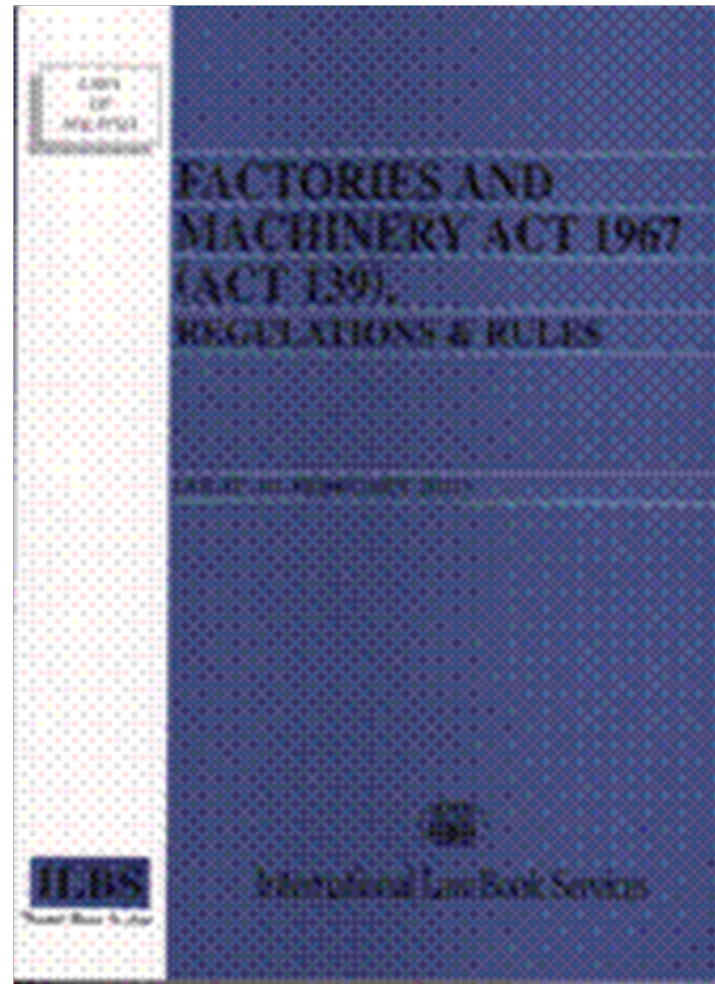
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5.1 Factory and Machinery Act, 1967

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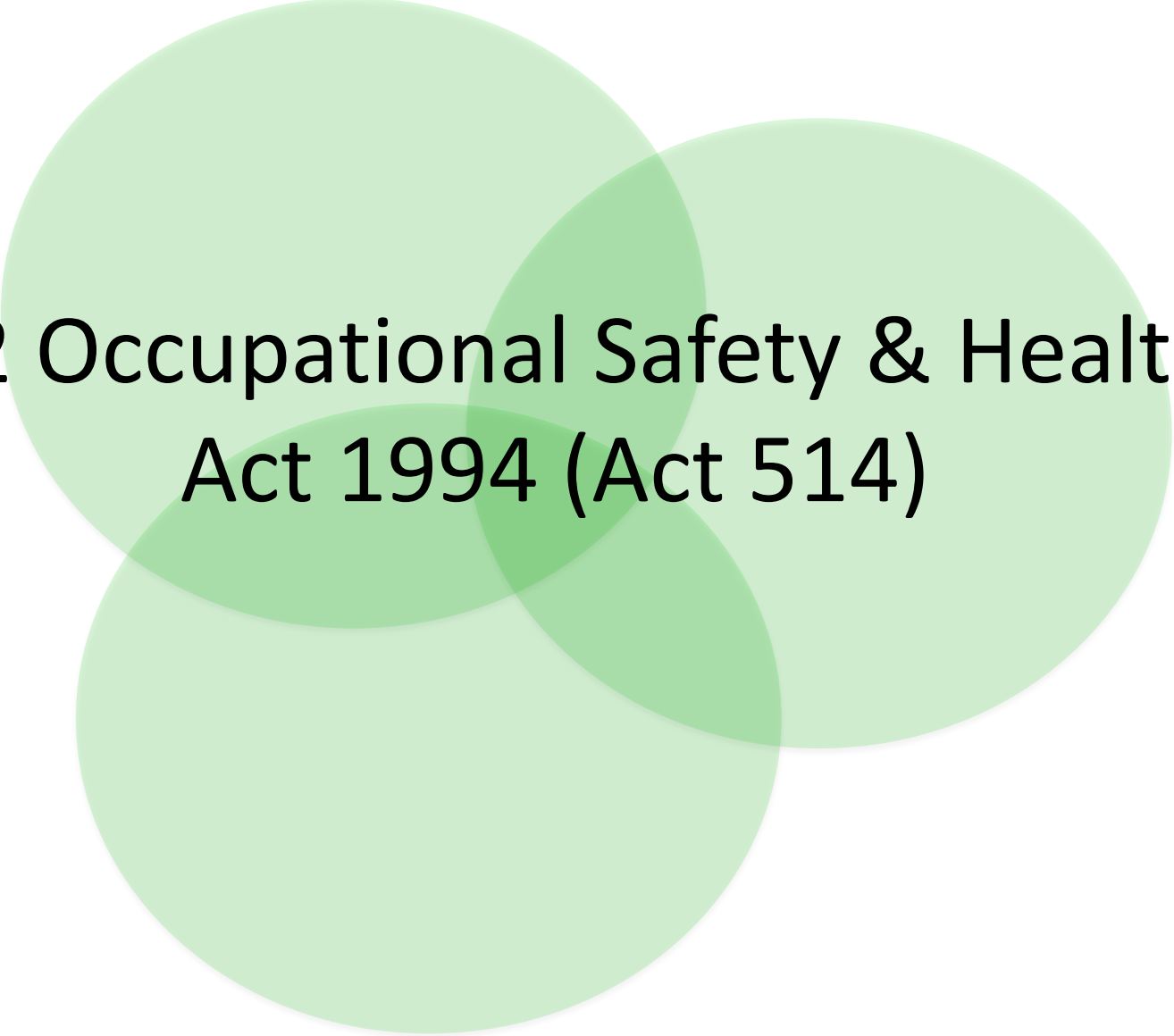


5.1 Factory and Machinery Act, 1967

- To address safety and health issues at the workplace, the government has developed a set of policies on occupational safety and health that are clear and coherent
- The first protective legislation was enacted in 1967, referred to as the Factories and Machinery Act
- With the enactment of this Act, the Factories and Machinery Department was established under the Ministry of Human Resources, which was then known as the Ministry of Labour, to provide a governmental platform for enforcement of occupational safety and health legislations

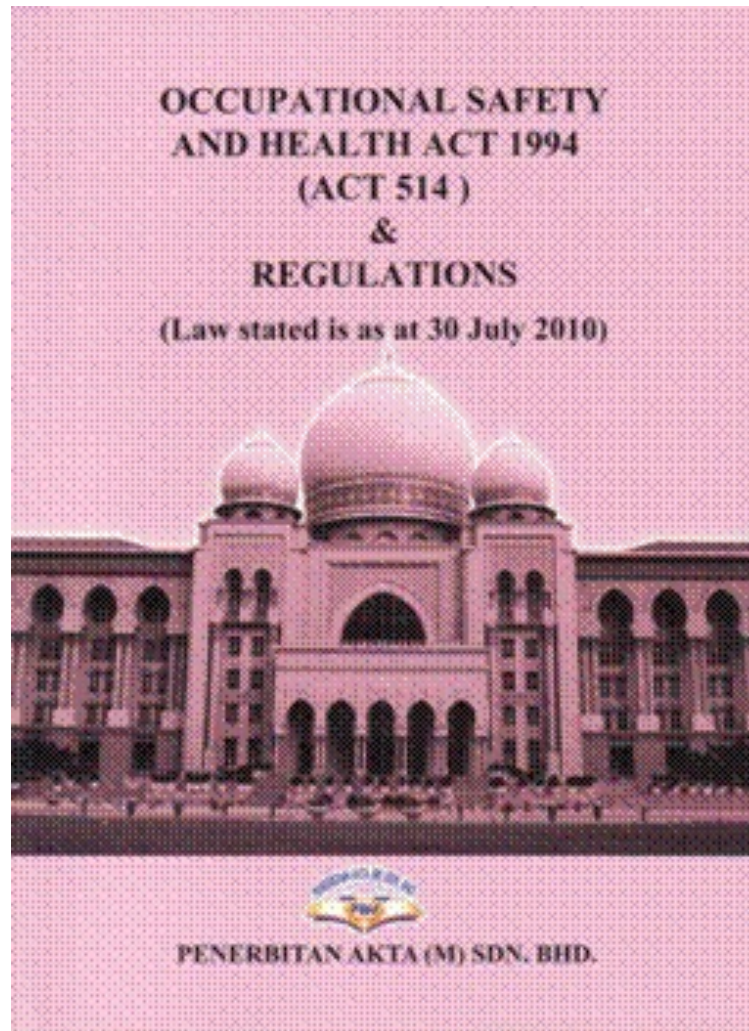
5.1 Factory and Machinery Act, 1967

- But the Act only covered safety and limited health aspects in the manufacturing, mining, and construction sectors
- As such, the Factories and Machinery Department was only mandated to enforce policies and regulations in these sectors and no others
- As the country's economy grew and diversified, the government felt the need to expand protective legislations to cover the safety and health of all workers. So, in 1994, a new Act, referred to as the Occupational Safety and Health Act (OSHA) was passed



5.2 Occupational Safety & Health Act 1994 (Act 514)

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)



5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Under the OSHA, the responsibility of enforcing occupational safety and health policies and regulations still resided with the Factories and Machinery Department, which was renamed as the Department of Occupational Safety and Health (DOSH)
- DOSH is now responsible for safeguarding the safety and health of all workers in Malaysia
- An OSH Information Centre has been set up at the National Institute of Occupational Safety and Health (NIOSH)

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part I – PRELIMINARY
 - This Act applies throughout Malaysia to the industries specified in the First Schedule
 - The provisions of this Act shall be in addition to, and not in derogation of, the provisions of any other written law relating to occupational safety and health

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part I – PRELIMINARY
 - The objectives of this Act are-
 - (a) to secure the safety, health and welfare of persons at work against risks to safety or health arising out of the activities of persons at work;
 - (b) to protect person at a place of work other than persons at work against risks to safety or health arising out of the activities of persons at work;

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part I – PRELIMINARY
 - The objectives of this Act are-
 - (c) to promote an occupational environment for persons at work which is adapted to their physiological and psychological needs;
 - (d) to provide the means whereby the associated occupational safety and health legislations may be progressively replaced by a system of regulations and approved industry codes of practice operating in combination with the provisions of this Act designed to maintain or improve the standards of safety and health

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part II explains the appointment of officers
- Part III deals with the National Council for Occupational Safety and health:
 - Membership of the council
 - Powers and functions of the council

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part V describes the general duties of designers, manufacturers and suppliers
 - General duties of manufacturers, etc. as regards with plant used at work
 - General duties of manufacturers, etc. as regards with substances used at work
 - Penalty for an offence

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part VI explains the general duties of employees:
 - General duties of employees at work
 - An employer who, or a trade union which, contravenes the provisions of this section shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding ten thousand ringgit or to a term of imprisonment not exceeding one year or to both

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part VI explains the general duties of employees:
 - Discrimination against employee:
 - No employer shall dismiss an employee, injure him in his employment, or alter his position to his detriment by reason only that the employee-
 - (a) makes a complaint about a matter which he considers is not safe or is a risk to health;
 - (b) is a member of a safety and health committee established pursuant to this Act; or
 - (c) exercises any of his functions as a member of the safety and health committee

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part VII deals with safety and health organizations:
 - Safety and health officer
 - Establishment of safety and health committee at place of work
 - Functions of safety and health committee

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part VIII explains the procedures for notification of accidents, dangerous occurrence, occupational poisoning and occupational diseases and inquiry
- Part IX explains the prohibition against use of plant or substance
- Part X deals with the industry codes of practice
- Part XI describes matters regarding to enforcement and investigation
- Part XII explains the liability for offences

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part XIII is on appeals
- Part XIV is on regulations

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part XV which discusses miscellaneous matters such as the duty to keep secret:
 - (1) Save for an inquiry under this Act or in any court proceedings relating to the commission of an offence under this Act, **no person shall disclose any matter including any manufacturing or commercial secret which has come to his knowledge or which he has acquired while performing his duties under this Act**

5.2 OCCUPATIONAL SAFETY AND HEALTH ACT 1994 (Act 514)

- Part XV which discusses miscellaneous matters such as the duty to keep secret:
 - (2) A person who contravenes the provision of this section shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding twenty thousand ringgit or to imprisonment for a term not exceeding two years or to both



5.3 Occupational Safety & Health Management Systems

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Legislation is essential but insufficient on its own to address these changes or to keep pace with new hazards and risks
- **Organizations must also be able to tackle occupational safety and health challenges continuously and to build effective responses into dynamic management strategies**
- Occupational safety and health, including compliance with the OSH requirements pursuant to national laws and regulations, are the responsibility and duty of the employer

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- The employer should show strong leadership and commitment to OSH activities in the organization, and make appropriate arrangements for the establishment of an OSH management system
- The system should contain the main elements of:
 - **policy**
 - **organizing**
 - **planning and implementation**
 - **evaluation**
 - **action for improvement**

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Policy:
 - The employer, in consultation with workers and their representatives, should set out in writing an OSH policy, which should be:
 - (a) specific to the organization and appropriate to its size and the nature of its activities
 - (b) concise, clearly written, dated and made effective by the signature or endorsement of the employer or the most senior accountable person in the organization
 - (c) communicated and readily accessible to all persons at their place of work
 - (d) reviewed for continuing suitability
 - (e) made available to relevant external interested parties, as appropriate

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Policy:
 - Worker participation is an essential element of the OSH management system in the organization
 - **The employer should ensure that workers and their safety and health representatives are consulted, informed and trained on all aspects of OSH, including emergency arrangements, associated with their work**

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Organizing:
 - **Responsibility and accountability**
 - **The employer should have overall responsibility for the protection of workers' safety and health, and provide leadership for OSH activities in the organization**
 - **The employer and senior management should allocate responsibility, accountability and authority for the development, implementation and performance of the OSH management system and the achievement of the relevant OSH objectives**

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Organizing:
 - **Competence and training**
 - **Occupational safety and health management system documentation**
 - **Communication**

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- **Planning and implementation :**
 - **Initial review**
 - **System planning, development and implementation**
 - **Emergency prevention, preparedness and response**

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Planning and implementation :
 - Hazard prevention
 - Preventive and protective measures should be implemented in the following order of priority:
 - **(a) eliminate the hazard/risk;**
 - **(b) control the hazard/risk at source, through the use of engineering controls or organizational measures;**
 - **(c) minimize the hazard/risk by the design of safe work systems, which include administrative control measures; and**
 - (d) where residual hazards/risks cannot be controlled by collective measures, the employer should provide for appropriate personal protective equipment, including clothing, at no cost, and should implement measures to ensure its use and maintenance

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Evaluation
 - Performance monitoring and measurement
 - Investigation of work-related injuries, ill health, diseases and incidents, and their impact on safety and health performance
 - Audit
 - Management review

5.3 OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEMS

- Action for improvement
 - Preventive and corrective action
 - **Continual improvement**



5.4 Industrial Safety In Malaysia

5.4 Industrial Safety in Malaysia

- Generally accidents are classified under 3 different categories:
 - **Type**
 - **Agency**
 - **Industry**
- The classification according to types gives the most useful information
- The type of accident can be associated with certain aspects of industrial safety

5.4 Industrial Safety in Malaysia

Classification of accidents according to type	Aspect of Industrial Safety
A12 Fall of person on the same level A31 Stepping on objects A32 Striking against stationary objects	Industrial housekeeping
A33 Striking against moving objects A42 Caught between stationary and moving objects A43 Caught between moving objects	Guarding

5.4 Industrial Safety in Malaysia

Classification of accidents according to type	Aspect of Industrial Safety
A23 Struck by falling objects during handling A51 Over exertion in lifting objects A52 Over exertion in pushing or pulling objects A54 Strenuous movements	Materials handling
A61 Exposure to heat A63 Contact with hot objects A70 Expose or contact with electric current	Personal protective equipment

5.4 Industrial Safety in Malaysia

- Guarding of Machinery and Mechanism
 - Accidents happen due to the followings:
 - Supervisors not using safe procedures during maintenance or breakdown
 - **Operators not properly attired**
 - Unsafe acts by operators

5.4 Industrial Safety in Malaysia

- Industrial Housekeeping
 - Smaller factories
 - **Movement of materials is haphazard**
 - **Fire prevention is minimal**
 - **Poor housekeeping seems to be a tradition – resistance to change is great**

5.4 Industrial Safety in Malaysia

- Materials handling
 - Caused by unsafe work practices – improper lifting, overloading, failure to wear protective clothing etc
 - Strains, sprain, fractures and bruises are common injuries
 - Requires training in safe working habits and adequate supervision

5.4 Industrial Safety in Malaysia

- Industrial hazards
 - The basic step of preventing accidental injury is to eliminate the hazards by:
 - Engineering the hazards out of the operations
 - Controlling the hazard at its source by an enclosure or a guard
 - Prescribing personal protective clothing as a shield

5.4 Industrial Safety in Malaysia

- The followings are examples of accidents and statistics obtained from the official website of the Department of Safety and Health Malaysia(DOSH)
- Summary of accident cases reported by DOSH as at 12 August 2011

5.4 Industrial Safety in Malaysia

Bil.	Tarikh Date	Tajuk Kes Case Title	Lokasi Location
1	31-07-2011	<u>Tersepit diantara badan lori</u>	Bengkel – Chainage 900, Projek 3F, Kg. Kubang Rusa, Sg Yu, Kuala Lipis, Pahang
2	28-07-2011	<u>Mati dihempap objek yang terjatuh</u>	Tapak projek - Setia Sky Residences-PH2, Lot 28 & 29, Jalan Raja Muda Abdul Aziz, Seksyen 42, Kuala Lumpur
3	04-07-2011	<u>Mati terjatuh dari eskalator</u>	Ibu Pejabat Jabatan Imigresen Malaysia, No. 15, Tingkat 1-7, (Podium), Persiaran Perdana, Presint 2, 62550 Putrajaya
4	02-06-2011	<u>Mati akibat terjatuh</u>	Tapak bina - Taman Putra, Jalan Raja Muda, 01000 Kangar, Perlis
5	31-05-2011	<u>Maut digilis jentera</u>	Kilang – Bahagian Log Cutting 3
6	23-05-2011	<u>Maut akibat di hempap <i>luffing boom</i></u>	Tapak pembinaan - Mukim Batu, Kuala Lumpur
7	17-04-2011	Maut akibat tanah runtuh	Perladangan- Tanah Merah, Kelantan
8	17-04-2011	<u>Maut ketika berada dalam ruang terkurung</u>	Manhole - Tanjung Tokong, Pulau Pinang
9	14-04-2011	<u>Maut dihempap oleh balak</u>	Kawasan pembalakan - Sungai Betis, Gua Musang, Kelantan
10	09-04-2011	<u>Maut terjatuh dari tempat tinggi</u>	Tapak pembinaan - Seberang
11	05-04-2011	<u>Maut terjatuh dari tempat tinggi</u>	Tapak pembinaan - Kuala Lumpur
12	29-03-2011	Maut dihempap traktor	Ladang - Batu Pahat, Johor
13	26-03-2011	<u>Maut digilis oleh jentera penggelek jalan</u>	Ladang Getah Persendirian, Gemas, Neeri Sembilan.
14	25-03-2011	<u>Maut tersepit antara cages</u>	Kilang - Mukim Bera, Pahang
15	16-03-2011	Maut akibat tona drum meletup	Kilang - Johor Bahru, Johor
Bil.	Tarikh Date	Tajuk Kes Case Title	Lokasi Location
16	09-03-2011	<u>Maut bergelincir dari tangga</u>	Kemudahan lampu jalan - Kedah
17	01-03-2011	<u>Maut terjatuh dari trailer</u>	Perladangan - Johor
18	24-02-2011	<u>Maut terjatuh dari tempat tinggi</u>	Tapak pembinaan - Johor

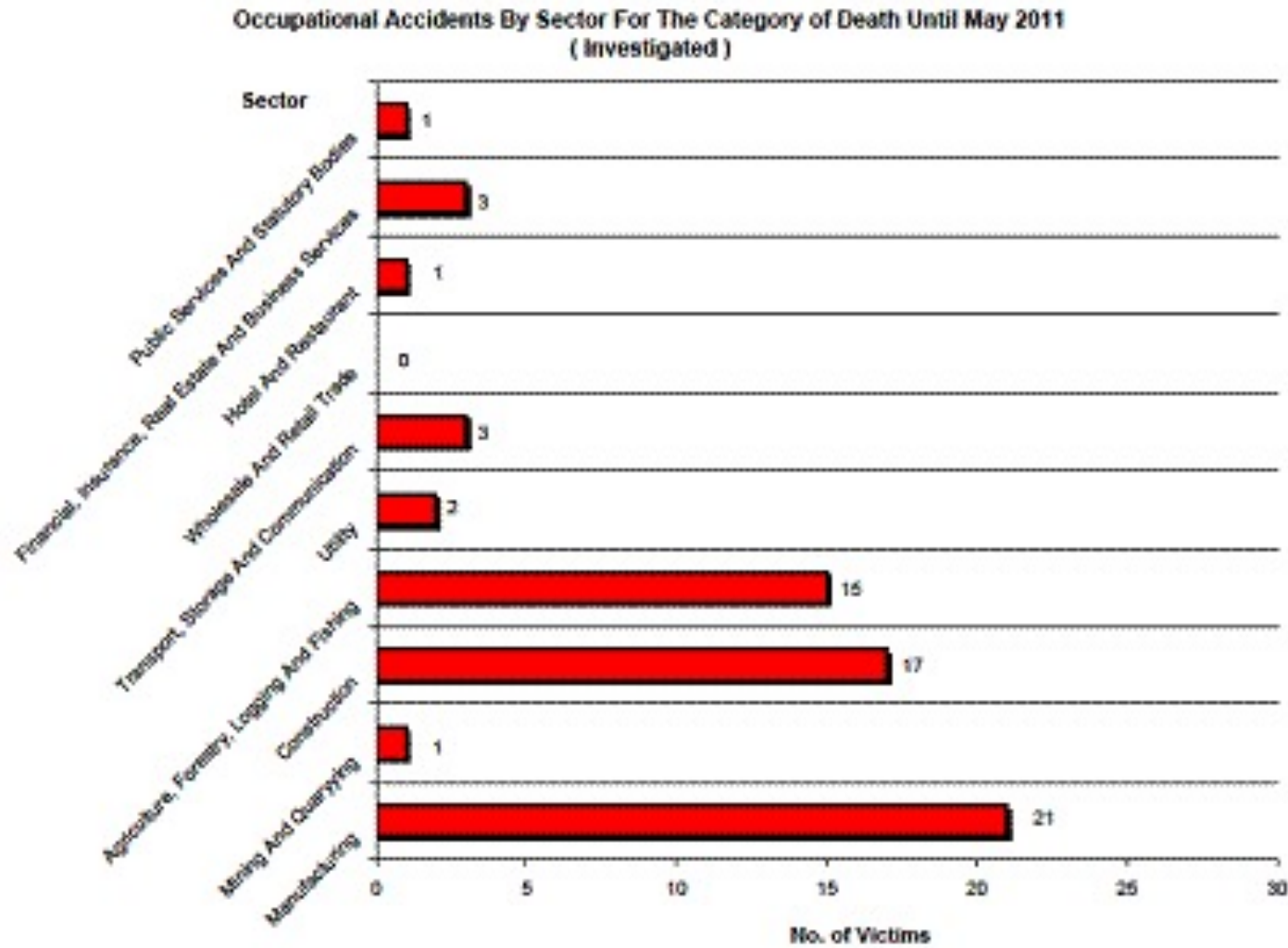
5.4 Industrial Safety in Malaysia

19	14-02-2011	<u>Maut dihempap kayu balak</u>	Pembalakan - Kelantan
20	13-02-2011	<u>Maut terjatuh dalam sungai</u>	Perlombongan Pasir - Kelantan
21	12-02-2011	Maut terlatuh dari tangga mudah-aluh	Tapak pembinaan - Pulau Pinang
22	27-01-2011	Maut digilis traktor	Kawasan Ladang Kelapa sawit, Sarawak
23	12-01-2011	<u>Maut terlatuh dari bumbung kilang</u>	Kilang - Pulau Pinang
24	03-01-2011	<u>Maut akibat lantai runtuh secara tiba-tiba</u>	Tapak pembinaan - Kuala Lumpur
25	02-01-2011	<u>Maut akibat termasuk dalam mesin</u>	Sektor perkilangan - Johor

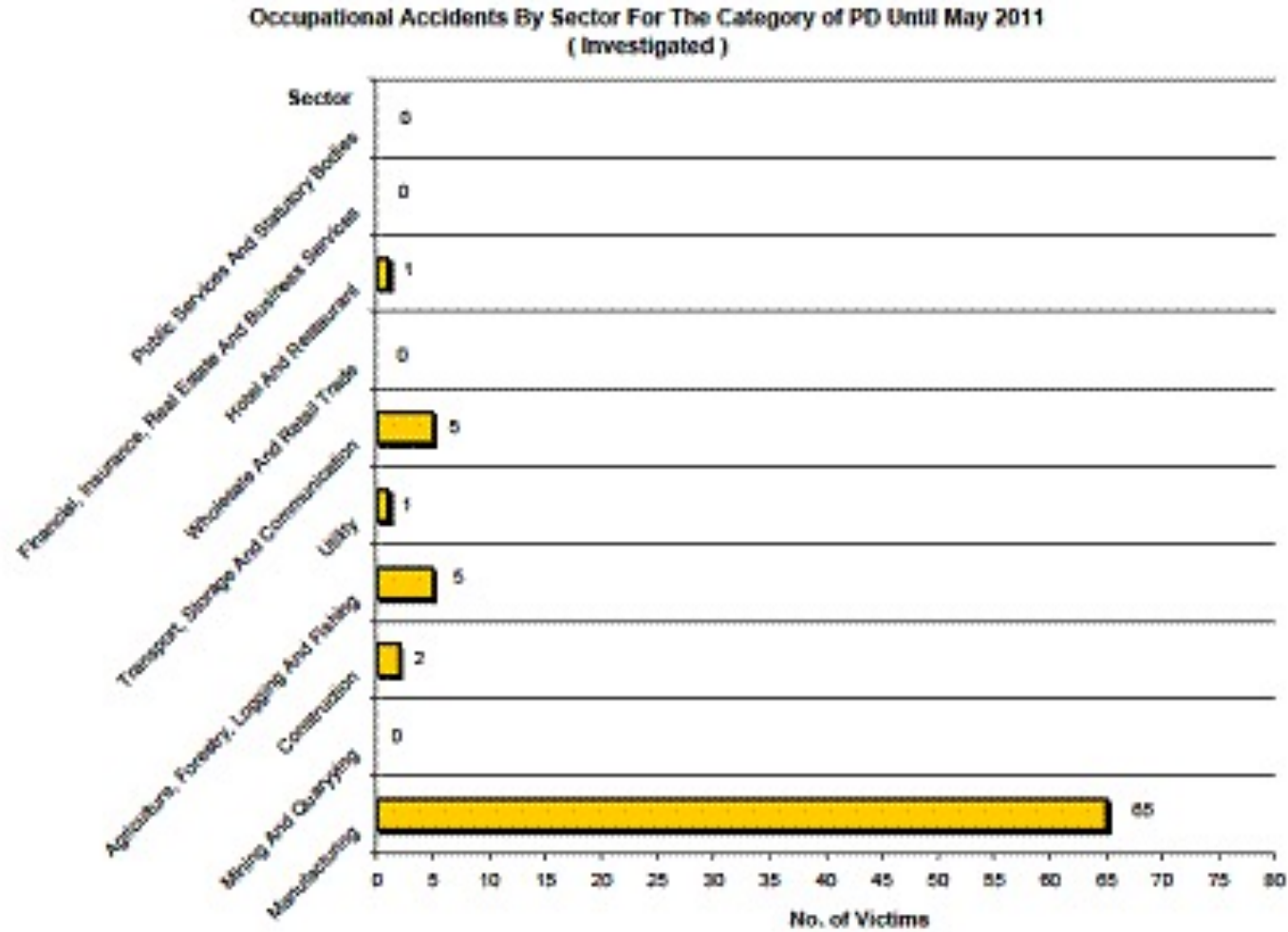
5.4 Industrial Safety in Malaysia

- Statistics from DOSH indicates that the Manufacturing sector has the highest occupational accident rate

5.4 Industrial Safety in Malaysia



5.4 Industrial Safety in Malaysia



5.4 Industrial Safety in Malaysia

- Example of an accident case
 - **LPG Explosion in a supermarket, December 2009**
 - **Case synopsis**
 - **Two workers were killed and nine injured when an explosion occurred inside a new shopping complex in Malacca**
 - **During the accident, the workers were making final preparations for the official opening of the complex**

5.4 Industrial Safety in Malaysia

- Example of an accident case
 - The LPG was channeled from the bulk storage tanks through a gas piping network and controlled by a shut-off valve at each of the shop-lot- which is used as a food and beverages outlet
 - Forensic engineering investigation found out that the explosion happened when a shut-off valve in one of the shop-lots was inadvertently left opened

5.4 Industrial Safety in Malaysia

- Example of an accident case
 - The LPG leakage was detected and discovered by the one of the workers working near the shop-lot
 - However no action was taken to evacuate the building and the shut-off valve inside the shop-lot cannot be turned off because the door was shuttered and locked
 - The LPG which had escaped and accumulated in the shop-lot can be easily ignited by any sparks from the on-going work outside the shop
 - The combination of accumulated LPG and spark caused a confined vapor cloud explosion (VCE)

5.4 Industrial Safety in Malaysia

- Example of accident cases
 - This resulted in building walls being cracked and damaged, window glasses shattered and ceilings collapsed
 - Death and injuries were due to flying debris from the explosion

5.4 Industrial Safety in Malaysia



Gas Supply From 2 LPG Tanks



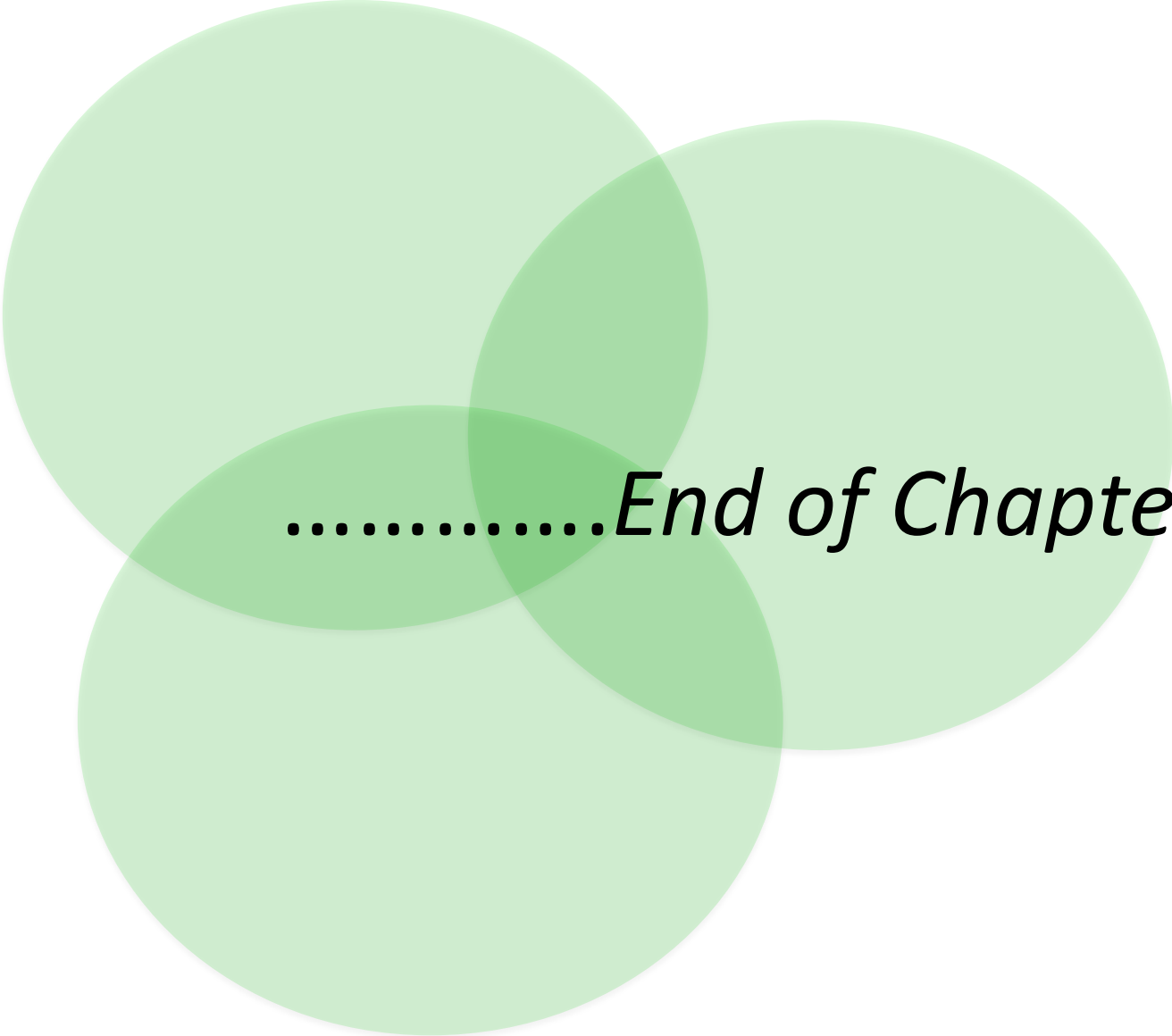
Damages caused by the explosion

5.4 Industrial Safety in Malaysia

- Lessons learnt and recommendations:
 1. A comprehensive LPG safe system of work need to be established. On top of that the management must ensure that the system is implemented and followed through by anyone who works with LPG
 2. Thorough inspection on the LPG piping and fittings need to be done before the commissioning process to ensure that all shut-off valves in the shop-lots were properly turned off
 3. The gas piping contractor shall ensure that the end pipes were closed with 'end caps' to prevent any leakage of gas even though the shut-off valves were closed

5.4 Industrial Safety in Malaysia

- Lessons learnt and recommendations:
 4. The contractor should be briefed about the dangers of LPG and the safety evacuation measures to be taken in the event of any leakage
 5. To ensure good ventilation in the building, especially for enclosed and confined places where LPG could accumulate if a leakage occur
 6. The location of the LPG main emergency shut-off valve shall be easily and readily accessible

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