CHAPTER 1

INTRODUCTION TO INDUSTRIAL SAFETY & QUALITY MANAGEMENT

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Lecture:

Tuesday: 2.00pm-4.00pm (DKQ2)
Thursday: 10.00am-11.00am (DKQ2)
INDUSTRIAL SAFETY

CHAPTER 1: Introduction to Industrial Safety

CHAPTER 2: Industrial Hazards

CHAPTER 3: Concept of Hazard Avoidance

CHAPTER 4: The OSHA Act, Standards, and Liability
QUALITY MANAGEMENT

CHAPTER 5: Introduction to Quality Management

CHAPTER 6: TQM Tools and Techniques

CHAPTER 7: TQM Principles and Practices

CHAPTER 8: Quality Standards
COURSE OUTCOMES

**CO1:** Ability to define and understand fundamentals of Industrial Safety and Quality Management.

**CO2:** Ability to apply techniques and tools of Quality Management.

**CO3:** Ability to apply Industrial Safety standards.

**CO4:** Ability to identify suitable techniques and tools to implement in production management.
COURSE EVALUATION

Final Examination : 50%

Course Work : 50%

a) Test 1 - (10%)
b) Test 2 - (10%)c) Test 3 - (10%)d) Quizzes - (10%)e) Assignments - (10%)
Text Book:


References:


ATTENDANCE

- Compulsory unless you have **acceptable reasons**.

- Non-attendance of up to **3 days** or more will result in a **show-cause letter** to be issued.

- Students who do not meet the minimum requirement (**80%**) of class attendance will be recommended to **repeat** the course the following year.
CHAPTER 1
INTRODUCTION TO INDUSTRIAL SAFETY

1.1 Development Before the Industrial Revolution
1.2 Milestones in the Safety Movement
1.3 Development of Accident Prevention Programs
1.4 Development of Safety Organizations
1.5 Safety and Health Movement Today
1.6 Integrated Approach to safety and Health
• **Safety** is the state of being “safe”, the condition of being protected against physical, social, spiritual, financial, or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable.

• This can take the form of being protected from the event or from exposure to something that causes health or economical losses.
Development Before The Industrial Revolution

• Understanding the past can help safety and health professionals examine the present and future with a sense of perspective and continuity.

• During ancient Babylonians, their ruler Hammurabi developed Code of Hammurabi. (circa 2000 B.C)
• The code encompassed all of the laws of the land at that time, showed Hammurabi to be just a ruler, and set a precedent followed by other Mesopotamian kings.

• The significance of the code from the perspective of safety and health is that it contained clauses dealing with injuries, allowable fees for physicians and monetary damages assessed against those who injured others.

“If a man has caused the loss of a gentleman’s eye, his own eye shall be caused to be lost.”

• This movement continued and emerged in later Egyptians civilization.
To ensure the maintenance of a workforce sufficient to build huge temple bearing his name, Rameses II created an industrial medical service to care for the workers. (circa 1500 B.C)

The workers were required to bathe daily in the Nile and they were given regular medical examinations. Sick workers were isolated.

The Romans were vitally concerned with safety and health. The remains of their construction projects were:
- Aqueducts
- Sewerage systems
- Public baths
- Latrines
- Well-ventilated houses
• Contribution of Bernardino Ramazzini (18th century), who wrote *Discourse on the Diseases of Workers*.

• Ramazzini drew conclusive parallel between diseases suffered by workers and their occupations.

• He related occupational diseases to the handling of a harmful materials to irregular or unnatural movements of the body.
The changes in production brought about by the Industrial Revolution can be summarized as follows:

(According to LaDou)

- Introduction of **inanimate power** (i.e., steam power) to replace people and animal power
- **Substitution** of machine for people
- Introduction of **new methods** for converting raw materials
- **Organization** and **specialization** of work, resulting in a division of labor
During the Industrial Revolution, child labor in factories was common (working hours were long, the work hard and the conditions often unhealthy and unsafe).

The people in Manchester, England began demanding better working conditions in the factories due to an outbreak fever among the children working in cotton mills.
• Government response; in 1802, the Health and Morals of Apprentices Act was passed.

• This was a milestone piece of legislation: It marked the beginning of governmental involvement in workplace safety.
In the United States, hazardous working conditions were commonplace. In 1867, factory inspection was introduced in Massachusetts. In 1868, the first barrier safeguard was patented. In 1869, the Pennsylvania legislature passed a mine safety law requiring two exits from all mines.
• In 1877, the Massachusetts legislature passed a law requiring safeguards for hazardous machinery.

• In 1892, the first recorded safety program was established in Joliet, Illinois.

• Around 1900, Frederick Taylor began studying efficiency in manufacturing. The purpose was to identify the impact of various factors on efficiency, productivity, and profitability.
In 1907, the U.S *Department of the Interior* created the *Bureau of Mines* to investigate accidents, examine health hazards and make recommendations for improvements.

In 1908, early form of *workers’ compensation* was introduced in the United States.

United States Bureau of Mines employee conducting a test, circa 1920
In the modern workplace, there are many different types of accident prevention programs ranging from the simple to the complex.

Widely used accident prevention techniques include failure minimization, fail-safe designs, isolation, lockouts, screening, personal protective equipment, redundancy and time replacements.

Early 1800s, employer had little concern for the safety of workers and little incentive to be concerned.
Between World War I and World War II, industry discovered the connection between quality and safety.

During World War II, troop call-ups and deployments created severe labor shortages.

According to the Society of Manufacturing Engineers, around this time industry began to realize the following:

i. Improved engineering could prevent accidents

ii. Employees were willing to learn and accept safety rules.

iii. Safety rules could be establish and enforced

iv. Financial savings from safety improvement could be reaped by savings in compensation and medical bills.
Early safety programs were based on the “Three E’s of safety”: Engineering, Education, and Enforcement.
Development Of Accident Prevention Programs

**Engineering**
Involve making design improvements to both product and process.

**Education**
Ensures that employees know how to work safely, why it is important to do so, and that safety is expected by management.

**Enforcement**
Involves making sure that employees abide by safety policies, rules, regulations, practices and procedures.
Numerous organizations involved to the promotion of safety and health in the workplace.

The ‘grandfather’ of all is National Safety Council (NSC).

NSC is the largest organization at the United States devoted solely to safety and health practices and procedures.

It purpose is to prevent losses (direct & indirect), arising out of accidents or from exposure to unhealthy environment.
• **Occupational Safety & Health Administration (OSHA)** is the government's administrative arm for the Occupational Safety and Health Act. (OSH Act 1970 U.S, OSH Act 1994 –Malaysia)

• OSHA sets and revokes safety and health standards, conducts inspections, investigates problems, issues citations, assesses penalties, petitions the courts to take appropriate action against unsafe employers, provides safety training, provides injury prevention consultation, and maintain a database of health and safety statistics.
• National Institute of Occupational Safety and Health (NIOSH) is part of the Centers for Disease Control of the Department of Health and Human Services.

• NIOSH is required to publish annually a comprehensive list of all known toxic substances.

• NIOSH also provide on-site tests potentially toxic substances.
One of the earliest and most vocal proponents of the cooperative or integrated approach was **H.G Dyktor**. He proposed the following objectives of integration:

1) **Learn more through sharing knowledge** about health problems in the work place, particularly those caused by toxic substances.

2) **Provide a greater level of expertise** in evaluating health and safety problems.

3) **Provide broad database** that can be used to compare health and safety problems experienced by different companies in the same industry.

4) **Encourage** accident prevention.

5) **Make employee health and safety a high priority.**
OSHA reinforces the integrated approach by requiring companies to have a plan for doing at least the following:

1) Providing **appropriate medical treatment** for injured or ill worker.
2) Regularly examining workers who are exposed to **toxic substances**
3) Having **qualified first-aid person** available during all working hours.
According to Hamilton and Hardy, the health and safety staff in a modern industrial company may include the following positions:

1) Providing Industrial hygiene chemist or engineer.
2) Radiation control specialist.
3) Industrial safety engineer or manager.

Thank You

Any Questions?
Dr. LaDuo: From 1992-2005, he was director of the International Center for Occupational Medicine at the University of California, San Francisco.