

EASTERN UNIVERSITY, SRI LANKA

FACULTY OF COMMERCE AND MANAGEMENT

**Final Year First Semester Examination in Bachelor of Business
Administration Hons in Human Resource Management – 2021/2022**

February 2024 – Proper/Repeat

HRM 4133 Occupational Health and Safety

Answer all 5 questions.

Allocated Time: 03 hours

1. Read the following case study and answer the questions below:

**A MULTIPLE FATALITY INCIDENT AT THE TOSCO AVON REFINERY,
MARTINEZ, CALIFORNIA**

The Tosco Martinez project is an 88-megawatt combined-cycle cogeneration facility located at the Avon Refinery, now called the Golden Eagle Refinery. The project was granted a Small Power Plant Exemption by the CEC on November 29, 1983, and began commercial operation on August 1, 1987.

On February 10, 1999, a pinhole leak was discovered in the crude unit on the inside of the top elbow of the naphtha piping, near where it was attached to the fractionator at 112 feet above grade. Tosco personnel responded immediately, closing four valves in an attempt to isolate the piping. The unit remained in operation. Subsequent inspection of the naphtha piping showed that it was extensively thinned and corroded. A decision was made to replace a large section of the naphtha line. Over the 13 days between the discovery of the leak and the fire, workers made numerous unsuccessful attempts to isolate and drain the naphtha piping. The pinhole leak reoccurred three times, and the isolation valves were retightened in unsuccessful efforts to isolate the piping.

On the morning of the incident, prior to the fire, one operations supervisor briefly visited the unit, but he did not oversee the work in progress and no safety personnel visited the unit. The maintenance supervisor was the only management representative present during the piping removal work. Nonetheless, Tosco supervisors proceeded with scheduling the line replacement while the unit was in operation. On the day of the

incident, the piping contained approximately 90 gallons of naphtha, which was being pressurized from the running process unit through a leaking isolation valve. A work permit authorized maintenance employees to drain and remove the piping. After several unsuccessful attempts to drain the line, a Tosco maintenance supervisor directed workers to make two cuts into the piping using a pneumatic saw. After a second cut began to leak naphtha, the supervisor directed the workers to open a flange to drain the line. As the line was being drained, naphtha was suddenly released from the open end of the piping that had been cut first. The naphtha ignited, most likely from contacting the nearby hot surfaces of the fractionator, and quickly engulfed the tower structure and personnel.

On February 23, 1999, a fire occurred in the crude unit at Tosco Corporation's Avon oil refinery in Martinez, California. Workers were attempting to replace piping attached to a 150-foot-tall fractionator tower while the process unit was in operation. During removal of the piping, naphtha was released onto the hot fractionator and ignited. The flames engulfed five workers located at different heights on the tower. Four men were killed, and one sustained serious injuries. Unfortunately, in the 3 years prior to the incident, neither Tosco's corporate safety group nor Avon facility management conducted documented audits of the refinery's line breaking, lockout/tag out or blinding procedures and practices.

- a. List out the un-safe practices carried out while the removal of the naphtha piping at Tosco Corporation's Avon oil refinery.
(03 Marks)
- b. Briefly explain the root causes for the incident at the Tosco Avon Refinery that discussed above in the case study.
(04 Marks)
- c. Suggest the ways the safety audits of oil refinery perform to alleviate the hazardous situation noticed throughout the case.
(05 Marks)
- d. If you are appointed as safety personnel, suggest the procedures to implement a programme to ensure the safe conduct of hazardous non-routine maintenance.
(08 Marks)

(TOTAL 20 Marks)

2.

- a. What is Workplace Hazardous Material Information System (WHMIS), List out two (02) responsibilities of the suppliers, employers and workers under WHMIS.
(04 Marks)
- b. Illustrate different types of safety protocols that took place to clean-up the various chemical spills in the organization.
(06 Marks)
- c. List out five (05) gaps in nominal compliances of workmen's compensation ordinance of 1934 while providing compensation to the victims.
(05 Marks)
- d. *"If you only react to accidents you will not deal with the unsafe conditions which cause them"*. Evaluate the statement with an appropriate example.
(05 Marks)

(TOTAL 20 Marks)

3.

- a. List out the duties of Health and Safety Professional to promote secure workplace.
(06 Marks)
- b. Appraise the requirements of the "Personal Protective Equipment" at Work Regulations and outline the factors which should be considered when selecting personal protective equipment.
(08 Marks)
- c. State various types of shift works and justify essentiality for having shifts in a particular work in an organization.
(06 Marks)

(TOTAL 20 Marks)

4.

- a. List 02 types of injury that may be caused by the incorrect manual handling of loads and Outline a good lifting technique that could be adopted by a person required to lift a load from the ground.
(05 Marks)

b. Explain why water should not be used on fires involving electrical equipment and identify 02 suitable extinguishing agents that could be used in such circumstances.

(04 Marks)

c. Describe measures that could be taken in order to minimize the health effects of working in such hot environments.

(05 Marks)

d. Appraise why young persons (Newly hired) may be at a greater risk from accidents at work. Outline the measures that could be taken to minimize the risks to young employees.

(06 Marks)

(TOTAL 20 Marks)

5.

a. Briefly describe at least 03 components of a positive health and safety culture.

(03 Marks)

b. Relate four types of human error that can lead to accidents in the workplace using practical examples.

(04 Marks)

c. A contractor has been engaged to undertake building maintenance work in a busy warehouse. Outline the elements that should be covered in an induction programme for the contractor's employees.

(08 Marks)

d. How the elements of an effective industrial hygiene program contributes safe and healthy work environment

(05 Marks)

(TOTAL 20 Marks)
