

MMIS 201 – Safety in Civil and disaster Management

Unit-I General safety consideration – analyzing construction jobs for safety – Contract document
Safety certificate for statutory authorities for old building and construction

Unit-II Excavation, foundation and utilities – Cordoning – Demolition – Dismantling –Clearing debris –
Types of foundations – Open footings. Types of construction hazards- Wood frame
construction, concrete form work, masonry failures, tilt-ups lift slabs, steel erections,
Trenching, Tunneling.

Unit-III Crane & Access Hazard-
Crane Hazard- Two blocking, Crane upset from overload, lattic work, boom disassembly, power
line contact.
Access Hazard- Fall prevention protection, falling objects, ladders, Dangerous Access to
Equipments.

Unit-IV Operation & Maintenance Hazards- Contributory Factors, applicable standards &
Recommendation for fire prevention confined spaces, lighting, Toxic Fumes & Gases, Wind &
Flooding, Sanitation.

Unit-V Disaster Management: Introduction Man-made and natural disaster, disaster management
cycle, disaster management Act; Case study on mazor man made and natural disaster

References:

1. Construction Safety Engineering Principles – By David V. Maccollum.
2. Accident Prevention Manual for Industrial Operations, NSC, Chicago, 1982.
3. Fulman, J.B., Construction Safety, Security, and Loss Prevention, John Wiley and Sons, 1979.

MMIS 202 – Fire Engineering and Explosion Control

Unit-I Fire Chemistry, fire Triangle, Tetrahedron, Heat transfer and Fire extinguishment, Fire properties of solid liquid & Gas, Flammability limits, vapour pressure , flash point, boiling point, flammable liquid classification system, the ignition process.

Unit-II Pyrolytic Decomposition of fuel: Vapours & combustion chain reactions, pyrolytic decomposition, flame velocities, Flame Flickers, Fire Extinguishment, Identification & Hazardous Material, Hazardous Reaction, mechanism of Extinguishment and classification of fire extinguishing agent.

Unit-III Building & Site planning for Fire & Safety: Types of Building Construction, non combustible construction its types with fire resistance rating, combustible construction & its types, classification of types of constructions, Building Material, Building failure & concern, Impact of fire in Building.

Unit-IV Industrial Fire Protection System: Hydrant systems, Discharge & pressure Requirement for different types of occupancy in Sprinklers System, Inlet pipes system, dry pipe system, deluge system, High velocity water spray system.

Unit-V Explosion- Gas and vapour cloud explosions: Combustion of gases & vapours ignition of premixed gas/vapour & air, means of preventing & mitigating gas/vapour explosions in the process industries.

References:

1. James, D., *Fire Prevention Handbook*, Butterworths, London, 1986.
2. Gupta R.S., *Handbook of Fire Technology*, Orient Longman, Bombay, 1997.

MMIS 203 – Hazardous Material Handling

Unit-I Introduction to Hazardous Material:-

Regulations of Hazardous material- Definition & types of Hazardous Material Explosives, Flammable gas, Flammable & Combustible liquids, Flammable Solids, Oxidizers, Radioactive & Corrosive Material.

Unit-II General Classification of Explosive & their Marking-

Common shipping containers, Incident response plan for explosives, Gas emergencies, Physical & Chemical Properties of Gases, Shipping containers for gases, fixed site storage vessels, pipelines, label Requirement, Tank & Cylinder Safety Devices.

Unit-III Combustible materials:

Definition of flammable & combustible liquids, Labels & placard Requirements, Storage Containers, Carbo tank trucks, Storage tanks, pipelines.
Flammable solids & their dot classification- Radioactive pyrophoric metals, Extinguishing agents for combustible metal fire.

Unit-IV Oxidizer and poisons: Common Inorganic Oxidizing material, Hazard associated with oxidizers, Organic peroxides and related hazards.

Poisons- Poisons classification, target organ of some selected chemicals, pesticides labeling.

Unit-V Corrosives: Physical & Chemical properties corrosives, Hazard associated with acids & bases, Placard & label requirement, shipping containers, other miscellaneous hazardous material.

Reference:

1. Hazardous Material Hand book – By Joe Varela.
2. Quantitative Risk Assessment in Chemical Process Industries” American Institute of Chemical Industries, Centre for Chemical Process safety.
3. Fawcett, H.h. and Wood, “Safety and Accident Prevention in Chemical Operations” Wiley inters, Second Edition.
4. Encyclopedia of Occupational Health and Safety, by Jeanne Mager Vol. II, International Labour Organisation, Geneva, 1985.

MMIS 204 – Safety in Mechanical Industries

- Unit-I SAFETY IN METAL AND WOOD WORKING MACHINES: General safety rules, principles, maintenance, Inspections of turning machines, boring, machines, milling machine, planning machine and grinding machines, CNC machines, Wood working machinery, types, safety principles, electrical guards, work area, material handling, inspection, standards and codes-saws, types, hazards.
- Unit-II PRINCIPLES OF MACHINE GUARDING: Guarding during maintenance, Zero Mechanical State (ZMS), Definition, Policy for ZMS, guarding of hazards - point of operation protective devices, machine guarding, types, fixed, guard, interlock guard, automatic guard, trip guard, electron eye, positional control guard, fixed guard fencing- guard construction- guard opening. Selection and suitability: lathe-drilling-boring-milling-grinding-shaping-sawing-shearingpresses- forge hammer-flywheels-shafts-couplings-gears-sprockets wheels and chains-pulleys and belts-authorized entry to hazardous installations-benefits of good guarding systems.
- Unit-III SAFETY IN WELDING AND GAS CUTTING: Gas welding and oxygen cutting, resistances welding, arc welding and cutting, common, hazards, personal protective equipment, training, safety precautions in brazing, soldering and metalizing – explosive welding, selection, care and maintenance of the associated equipment and instruments – safety in generation, distribution and handling of industrial gases-colour coding – flashback arrestor – leak detection-pipe line safety-storage and handling of gas cylinders.
- Unit-IV SAFETY IN COLD FORMING AND HOT WORKING OF METALS: Cold working, power presses, point of operation safe guarding, auxiliary mechanisms, feeding and cutting mechanism, hand or foot-operated presses, power press electric controls, power press set up and die removal, inspection and maintenance-metal sheers-press brakes; Hot working safety in forging, hot rolling mill operation, safe guards in hot rolling mills – hot bending of pipes, hazards and control measures. Safety in gas furnace operation, cupola, crucibles, ovens, foundry health hazards, work environment, material handling in foundries, foundry production cleaning and finishing foundry processes.
- Unit-V SAFETY IN FINISHING, INSPECTION AND TESTING: Heat treatment operations, electro plating, paint shops, sand and shot blasting, safety in, inspection and testing, dynamic balancing, hydro testing, valves, boiler drums and headers, pressure vessels, air leak test, steam testing, safety in radiography, personal monitoring, devices, radiation hazards, engineering and administrative controls, Indian Boilers Regulation.

References:

1. "Accident Prevention Manual" – NSC, Chicago, 1982.
2. "Occupational safety Manual" BHEL, Trichy, 1988.
3. "Safety Management"; John V. Grimaldi & Rollin H. Simonds, All India Travelers Book seller, New D
4. "Safety in Industry" N.V. Krishnan Jaico Publisher House, 1996.
5. Indian Boiler acts and Regulations, Government of India.
6. Safety in the use of wood working machines, HMSO, UK 1992.
7. Health and Safety in welding and Allied processes, welding Institute, UK, High Tech.Publishing Ltd

MMIS 205 – Safety in Electrical Systems

Unit-I	Review of Electrical concept, Electrostatic – Electro magnetism – Stored energy – Working principle of major electrical equipment – Typical supply situation
Unit-II	Standards and statutory requirements – Indian electricity acts and rules - statutory requirements from Electrical inspectorate.
Unit-III	Electrical Hazards – Energy leakage – Clearance and insulation – Excess energy – Current surges – Electrical causes of fire and explosion – National electrical Safety code.
Unit-IV	Selection of Environment, Protection and Interlock – Discharge rods and earthing device – Safety in the use of portable tools - Preventive maintenance
Unit-V	Hazardous area classification and classification of electrical equipments for hazardous areas (IS, API and OSHA standards).

References

1. Fordham Cooper W., Electrical Safety Engineering, Butterworths, London, 1986.
2. Accident Preven
3. www.osha.gov