

## SAFETY MANAGEMENT IN CONSTRUCTION

<b>Offering Branches</b>	CE		
<b>Course Category:</b>	HONORS	<b>Credits:</b>	4
<b>Course Type:</b>	Theory	<b>Lecture-Tutorial-Practical:</b>	3-1-0
<b>Prerequisites:</b>	20ES1301-Construction Materials & Concrete Technology	<b>Continuous Evaluation:</b>	30
		<b>Semester End Evaluation:</b>	70
		<b>Total Marks:</b>	100

### Course Outcomes

Upon successful completion of the course, the student will be able to:

<b>CO1</b>	<b>Explain</b> the principles of SHE management including hazards and accidents in construction	K2
<b>CO2</b>	<b>Describe</b> the safety measures in handling tools, plants and equipment in construction site, including safety in excavation	K2
<b>CO3</b>	<b>Explain</b> the risks in underground construction & use of explosives, preventive & safety measures to be observed during their execution.	K2
<b>CO4</b>	<b>Describe</b> the safety practices in building construction, storage of materials and handling, safety precautions in civil works in confined spaces	K2
<b>CO5</b>	<b>Describe</b> the safety precautions in construction. Regulations, planning and precautions in demolition of structures including electrical safety practices	K2

### Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>		2		2		2	2				2			2
<b>CO2</b>		2		2		2	2				2			2
<b>CO3</b>		3		3		2	2				2			2
<b>CO4</b>		2		2		2	2				2			2
<b>CO5</b>		2		2		2	2				2			2
<b>Avg.</b>		2		2		2	2				2			2

1- Low

2-Medium

3-High

### Course Content

<b>UNIT-1</b>	<p><b>Introduction</b>-Integration of safety, health and environment (SH &amp; E), SH &amp; E concept, safety in construction, She policy &amp; planning, hazards, their identification, control &amp; types. Safety programme, education and training. <b>Accident and their prevention:</b> Introduction, cases of accidents, contributing factors, types, classification of accidents, according to the nature of work, severity, principal causes, preventive measures, safe workplace and working conditions, Types of fatigues, their elimination, safe materials handling, Personal protection devices.</p> <p><b>Safety, Health and Environment (SHE) Management:</b> Introduction, safety policy, guiding principles, SHE targets and goals, contractor's SHE policy, safety objectives &amp; implementation, objectives with targets and performance indications, SHE Planning, Initial SHE review, risk assessment and its control, legal and other requirements.</p>	CO1
<b>UNIT-2</b>	<p><b>Tools, Plants and other equipment :</b> Introduction, safety on plants, screening and processing in aggregate mixing plant, asphalt mixing plants, concrete mixing (batching) plants, miscellaneous construction equipment, concrete vibrators, air compressors and air receivers, belt conveyors, cable ways, forklift trucks, hydraulic system, pile driving equipment, concrete pumps, aggregate production equipment (crushing plants), safety in use of tools, hand tools, pneumatic and power tools, jacks, drills.</p> <p><b>Safety in excavation work :</b> Introduction, general safety provisions, excavation hazards and safety considerations &amp; requirements, safe slopes, loose side material and minimum berm, excavations near adjacent structures, Protection of employees</p>	CO2

	and public, use of plant and machinery, responsibilities of in-charge & workers, shoring, timbering, sheathing, wales, struts, stability of structure, safer practices, planning, investigations, material supply, fencing, separation of traffic, handling large diameter pipes, surface water and drainage, harmful gases, underground services, quarries, borrow areas etc.	
<b>UNIT-3</b>	<p><b>Explosives, Drilling and Blasting</b> : Introduction, important terms and definitions, safety from explosives, precautions during storage, transportation, handling, use of explosives, their disposal, drilling, general precautions in loading, wiring, blasting, firing, use of safety fuse, precautions after blasting, Gases and flammable substances.</p> <p><b>Safety in underground works</b> : Introduction, underground excavation, tunnels, vertical / inclined shafts, caverns, safety responsibilities, safety in underground excavation, drilling, explosive loading and blasting, Water handling, Drainage in tunnels, power house caverns, flooding of tunnels, Fire protection in underground, Safety for underground machinery, scaling and mucking, supporting the excavation, ventilation, concreting, grouting and guniting, electrical and lighting &amp; miscellaneous precautions.</p>	CO3
<b>UNIT-4</b>	<p><b>Fall protection, structural framework and concreting</b>: Introduction, fall protection, scaffold, platforms, gangways and runs, ladders, openings and dangerous corners, Structural framework, structural steel erection, Concreting, grouting, guniting and shotcreting.</p> <p><b>Confined – space (including sewers) entry</b> : Introduction, responsibilities, confined space entry procedures, pre-entry planning, work procedures, rescue procedures, rescue plans and procedures, permit required for confined spaces, sewer hazards, atmosphere in confined spaces, efficient ventilation, testing the atmosphere, protection from flammable atmosphere, isolation techniques, personal protective equipments (PPEs), general safety precautions</p> <p><b>Safety in Materials handling and storage</b> : Introduction, potential hazards, safe and efficient material handling, functions of materials handling, safety principles, Safe working conditions, good housekeeping, use of protection devices, extent of mechanization, manual handling, handling by equipment, types of material handling, storage and handling equipment, safety (protection) of stores, tips for safe and efficient storage in the projects, safety precautions for different materials, General provision in material handling.</p>	CO4
<b>UNIT-5</b>	<p><b>Safety in building construction and demolition</b>: Introduction, general building regulations, components of a building, stairs and exits, earthquake proof construction, structural joints, fire resistant buildings, fire safety in public assembly buildings &amp; multistory building, Demolition planning, precautions before demolition work, sequence of demolition and removal of materials, demolition of walls, partition etc., access to floor, mechanical demolition, general precaution in demolition</p> <p><b>Electrical safety</b> : Introduction, electrical injuries, planning the work, safety provisions related to owners, safety related to power transmission, high voltage distribution overhead, working around high voltage, mains and apparatus, portable lamps and appliances, electrical installations, fire, electric shock, inspection and maintenance, general safety precautions.</p>	CO5

### Learning Resources

<b>Text Books</b>	1. S.C. Sharma, Vineet Kumar, Safety, occupational Health and Environmental Management in Construction, 2013, Khanna Publishers.
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