



ACHARYA NAGARJUNA UNIVERSITY

2022 Onwards

Detailed syllabus

ADVANCE DIPLOMA IN INDUSTRIAL SAFETY - 12 Months

PAPER-1: Health Safety and Environment (HSE)

Management

PAPER-2: Safety Engineering -1

PAPER-3: Safety Engineering -2

PAPER-4: Quality Control in Occupational Health and
Safety

PAPER-5: Safety Health and Environment Legislation

PAPER-6: Industrial Hygiene & Occupational Health

PAPER-7: Safety in Chemical & Petrochemical Industry

PAPER-8: Safety in Construction Industry



ACHARYA NAGARJUNA UNIVERSITY

Detailed Syllabus

ADVANCE DIPLOMA IN INDUSTRIAL SAFETY

PAPER-1

HEALTH SAFETY AND ENVIRONMENT (HSE) MANAGEMENT

Unit-I

INTRODUCTION- Management and management principles and types of management, managerial role, authority, responsibility and power, span of management, delegation and decentralization of authority. Safety, Health and Environment Management (SHE), Occupational Safety, Health and Environment Safety Management – Principles and Practices. Role of Management in industrial safety. Organization behavior. Human factors contributing to accident

Planning for safety: Definition, Purpose, Nature, Scope and Procedure, Range of Planning, variety of plans. Strategic planning and tools of implementation. Management by objectives and its role in safety, health and management (SHE). Policy formulation and implementation. **Organizing** - Definition, need, nature and principles. Organizing for safety, Health and Environment Organization structure, functions and responsibilities. **Safety Committee:** Structure and functions. Line and staff functions for safety, Health and Environment

Unit-II

Directing for Safety- Direction: Definition, process, principles and techniques. **Leadership:** Role functions and attributes of a leader. **Communication:** Purpose, process, types and channels, essential rules for communication. Two-way communication. Barriers in communication, essentials of effective communication. Communication and group dynamics.

Monitoring for Safety, Health and Environment - Occupational Safety, Health and Environment Management System, Bureau of Indian Standards on Safety and Health: 14489-1998 and 15001-2000, ILO and EPA standards.

Unit-III

Principles Of Accident Prevention- Definition: Incident, Accident, Injury, Dangerous occurrences, Unsafe Acts, Unsafe Conditions, Hazards, Error, Oversight, Mistakes etc. **Accident Prevention:** Theories/Models of accident



occurrences. Principles of accident prevention. Accident and Financial implication.

Safety, Health And Environment (SHE) Education And Training-
SHE: Element of training cycle, Assessment of needs. Techniques of training, design and development of training programs. Training methods and strategies types of training. Evaluation and review of training programs. Competence Building Technique (CBT), Concept for training, Safety as a on-line function. Role of Multi-media communication, Applications of Computers. Relevance of WTO regarding safety, Health and Environment.

Unit-IV

Employee Participation In Safety- Employee Participation: Purpose, areas of participation, methods. Role of trade union in Safety Health and Environment Protection. Safety Competitions, Safety Promotion and Safety Awards and Suggestion Schemes, Safety Competitions, Safety Incentives Publicity schemes, Audio visual publicity, Other Promotional methods

Human behavior: Individual differences, behavior as function of self and situation, perception of danger and acceptance of risk, knowledge, and responsibility vis-à-vis safety performance, theories of motivation and their application to safety, role of, supervisors and safety departments in motivation. Conflict & Frustration: Identification of situations leading to conflict and frustration and techniques of management

Unit-V

Management Information System for Safety - Sources of information on Safety, Health and Environment Protection. Comilation and collation of information, Analysis and use of modern methods of programming, storing and retrieval of MIS for safety, health and environment

QCC HS computer software application and limitation. Status and future goals of computer utilization in Safety, Health and Environment (SHE) services in industries

Reference Books

1. ABC of Industrial Safety Remember ABC Publication: MEEDS Author: V P M Mani.
2. Dangerous Properties of Industrial Materials Author: N Irving sax
3. Safety, Security and Risk Management – Singh U. K.
4. Industrial Safety Management Publication: Tata Mc Graw-Hill Publishing Company Ltd. Author: L. M. Deshmukh



PAPER-2

SAFETY ENGINEERING - 1

Unit-I

Machine Operation and Guarding - Principles in machine guarding – Ergonomics of machine guarding – Type of guards, their design and selection – Guarding of different types of machinery including special precautions for wood working, paper, rubber and printing machinery, machine, tools etc.- Built-in safety devices, maintenance and repairs of guard's incidental safety devices and tools

Safety in The Use of Machines- Safety in the use of 1) Power presses (all types) 2) Shaping 3) Bending 4) rolling 5) Drawing 6) Turning 7) Boring 8) Milling, shaping 9) Planing broaching, Planing 10) Grinding 11) CNCs. Need of selection and care of cutting tools. Preventive maintenance, Periodic checks for safe operation. Associated hazards and their prevention.

Unit-II

Material Handling and Storage of Materials - Manual: Kinetics of manual material handling, maximum loads that could be carried. Lifting and carrying of objects of different shapes, size and weight. Safe use of accessories for manual handling storage of materials. Safety in stacking and un-stacking, floor loading conditions. Layout conditions for safety in storage, Ergonomics of manual handling and storage.

Mechanical: Lifting machinery, Lifts and Hoists; Safety aspects in design and construction, testing, use and care, signaling, inspection and maintenance of industrial trucks, lifting tackles and loose gears, conveyors. Safety features, safe locations, testing, inspection and maintenance of lifting tackles, safe working load for all mechanical material handling equipment. The competent persons in relation to safety legislation –duties and responsibilities.

Unit-III

Working at Heights: Working at heights: Incidence of accidents. Safety features associated with design construction and use of stairways, ramps, working platforms, gangways, ladders of different types, and scaffolds of different types including Boatswain's chair and safety harness, working on roofs other safety requirements while working at heights. Working in Confined Spaces, Working Underground – Hazards and Controls.



Hand tools and Portable Tools - Main causes of tool accidents and Control of tool accidents. Centralized and personal tool issue system. Purchase, storage and supply of tools. Inspection, maintenance and repairs of tools. Detectable causes of tool failures. Tempering, safe ending, and dressing of certain tools. Safe use of various types of hand tools used for metal cutting, wood cutting, wood cutting, miscellaneous cutting work, other hand tools such as torsion tools, shock tools, on- sparking tools. Portable power tools and their selection, maintenance, repair and safe use.

Unit-IV

Plant Design and Housekeeping- Plant layout, design, and safe distance. Need for planning and follow up. Safety and good Housekeeping. Typical accidents due to poor housekeeping. Disposal of scrap and other trade wastes. Prevention of spillage. Marking of aisles space and other locations. Use of color as an aid for good housekeeping. Housekeeping contests. Cleaning methods. Employee assignment. Inspections and check-lists. Benefits of good housekeeping. Role of preventive maintenance in safety and health. Importance of standards and codes of practice for plant and equipment

Industrial Lighting & Illumination - Purpose of lighting. Benefits of good illumination – Phenomenon of lighting and safety – Lighting and the work – Sources and types of artificial lighting – Principles of good illumination – Recommended optimum standards of illumination – Design of lighting installation – Maintenance, standards relating to lighting and color.

Unit-V

Ventilation and Heat Stress- Purpose of ventilation – Physiology of heat regulation – Thermal environment and its measurement – Thermal comfort – Indices of heat stress – Thermal limits or comfort, efficiency and freedom from health risk – Natural ventilation – Mechanical Ventilation – Air conditioning – Control of heat exposures at source, dilution and local ventilation – Recommended values for air changes required for various areas as per Factories Act,1948 and national standards IS3103-1975 code of practice for Industrial ventilation, national building code Part VIII, Building services

Noise and Vibration - Continuous and impulse noise – The effect of noise on man – Measurement and evaluation of noise – Noise isolation – Noise absorption techniques, Silencers – Practical aspect of control of noise – Vibration: Effects, measurement and control measures such as vibration damping.



Unit-VI

Electrical Hazards- Hazards of electrical energy – Safe limits of amperages, voltages – Safe distance from lines – Capacity and protection of conductors – Joints and connections – Means of cutting off power – Overload and short circuit protection – No load protection – Earth fault protection – Earth insulation and continuity tests – Earthing standards – Protection against surges and voltage fluctuation

Hazards arising out of ‘Borrowed’ neutrals – other precautions – Safety in the use of portable electrical apparatus – Types of protection for electrical equipment in hazardous atmosphere – Electrical area classification – Criteria in their selection, installation, maintenance and use.

Unit-VII

Static Electricity- Introduction, Electro-static charging – where charging can occur contact electrification. Electro Static discharges (Sparks). Electro static hazards and their control. Earthing and bonding. Recommended earthing resistance for control of electricity

Lighting Arrestors- Definition, lightning splash, lightning strokes, lightning protection systems. Characterization of health effects of lightning stroke (electrical effects, side flashers, thermal effects, mechanical effects. Function of lightning. Where lightning protection is required – System design, material of construction, component of a lightning arrestors, earth terminal/network.

Reference Books

1. ABC of Industrial Safety Remember ABC Publication: MEEDS Author: V P M Mani.
2. Safety, Security and Risk Management – Singh U. K.
3. Industrial Safety Management Publication: Tata Mc Graw-Hill Publishing Company Ltd. Author: L. M. Deshmukh



PAPER-3

SAFETY ENGINEERING-2

Unit-I

Agro Industry / Sugar Industry - Agro Industry / Sugar Industry. Harvesting and activities related to harvesting, such as preparation of crop by cleaning, trimming, grading, drying, decorticating, retting, cooling or bulk packaging. Includes cotton picking

Manufacture of basic metals: Ferrous and Non ferrous. Metallurgy: Foundry, Steel plant. Hazards in the process of melting (Furnaces) Casting, forging, working on hot rolling and cold rolling, N.D. Test and Heat treatment.

Unit-II

Textile Industry - Introduction to textile process involving cotton, jute and manmade fiber. Significant hazards and Preventive measures.

Construction Industry - Basic philosophy peculiarities and parameters governing the safety in construction such as site planning and layout, safe access, good housekeeping, safety in the use of construction machinery, signs and indication liaison for safety with local authorities, structural soundness accident and hazards their cause and effects

Unit-III

IT Industry -Manufacture of computers, Radio, Television and communication equipment and apparatus. Manufacture of electronic valves and tubes and other Electro-Magnetic Devices. Safety in semiconductor industry

Safety in Docks- Safety in docks, Handling of cargo, Container Operation, Lifting appliances. Responsibility of different agency for safety, health and environment involved in dock work

Unit-IV

Safety in Boilers - Safety Precautions and operations of boilers. Different types of boilers when not in use. Preservations of boilers when not in use. Steam pressure, Pressure gauge, Treatment of food water etc.



Environment Protection - Principles and Practices for Prevention and control of air pollution, water pollution, solid and hazardous waste management. Cleaner technologies.

Unit-V

Work permit System/ Permit to work (PTW) –Purpose and types . Work permits Application, Adoption and Enforcement

Welding, Gas cutting-Precaution in welding, gas cutting, brazing, soldering, and other operations

Reference Books

1. ABC of Industrial Safety Remember ABC Publication: MEEDS Author: V P M Mani.
2. Safety, Security and Risk Management – Singh U. K.
3. Industrial Safety Management Publication: Tata Mc Graw-Hill Publishing Company Ltd. Author: L. M. Deshmukh



PAPER-4

QUALITY CONTROL IN OCCUPATIONAL HEALTH AND SAFETY

Unit-I

Plant and Equipment Safety Appraisal and Control Techniques- Plant Safety rules and Procedures, Safe operating systems, Safety Checklists, Plant safety inspections. Safety sampling – Safety survey – Job Safety Analysis – Safety Inventory system – Product safety – Safety tag systems – Total Loss control and Prevention

Unit-II

Hazard Identification Techniques - Hazard and Risk analysis: Quantitative and Qualitative: Failure Mode and Effect Analysis (FMEA) & Maximum Credible Accident Analysis (MCA) – Fault tree analysis – Events Tree analysis – Example of each

HAZAN – HAZOP – Managerial Oversight review technique (MORT), Incident Recall technique – Critical Incident review technique – Safety integrity levels (SIL) etc.

Unit-III

Accident and Incident Investigation, Reporting and Analysis - Accident and Incident Investigation: Philosophy, Purpose, Process and types of Investigation. Identifying the key factors and the immediate and basic causes. Corrective action. Agencies investigating accident. Accident Reporting: Report forms, writing reports, essential elements

Accident and Incident analysis: Standards classification of factors associated with accidents. Methods of collecting and tabulating data, Record keeping.

Unit-IV

Measurement and Evaluation of Performance- Definition of Accident, Reportable, Non – Reportable, Fatal, on fatal. Near miss accident – Lost time accident – Disabling injury – Accidents reportable under the factories Act and ESI act – Frequency rate – Severity rate – Incidence rate – Frequency severity index – Safe core



Temporary disablement and Permanent disablement – Partial and total disablement – Time charges schedules in workmen's compensation Act 1928 and the National and International Standards

Unit-V

Major Accidents Hazards Control- Major Accident Control: Definition, Major Accident Hazards, Identification and Assessment of MAH Units. Role of Government, Role of Management, Local authorities and Public

Safety Audit - Preparation and Assessment of Safety audit. Report of BSI 14489:1998, Safety Report, Standards, ILO Code of Practice for Major Accident control. Major Accident Control System: Local, State, National and International

Reference Books

- 1) Industrial accident prevention – publication: mc graw-hill – author: herbert william heinrich.
- 2) Industrial safety health and environmental management system publication: khanna publishers, authors: r.k jain and sunil s. Rao
- 3) Industrial safety management publication: tata mc graw-hill publishing company ltd. Author: l. M. Deshmukh



PAPER-5

SAFETY, HEALTH AND ENVIRONMENT LEGISLATION

Unit-I

ILO Convention And Recommendation - ILO Convention and Recommendation concerning Occupational health and Safety . Relevant conventions and recommendation of ILO in the furtherance of Safety, Health and Environment (SHE).SHE a human right issue. Trade policy affecting OHS

Year	Convention and Recommendations
1981	155 – OHS; 164 – OHS
1985	161 – OHS; 171 - OHS
1988	167 – Safety and Health in construction 175 – Safety and Health in Construction
1990	170 – Chemicals; 177 - Chemicals
1993	174 – Prevention of major industrial accidents;181 – Prevention of major industrial accidents

Unit-II

THE FACTORIES ACT, 1948 AND THE FACTORIES RULES - Factories Act – Provisions under the factories act and rules made there under with amendments – Case Laws under the factories act

Unit-III

Social Security - Legislations- Workmen’s Compensation Act and Rules. ESI Act and Rules. Contract Labor (Abolition and Regulation) Act. Public Liability Insurance Act. Social Accountability 8000 SA – 8000

Unit-IV

SAFETY,HEALTH AND ENVIRONMENT (SHE) related important legislation: Salient Features:

- Sections pertaining to SHE
- Indian Boilers Act, 1923 with allied Regulations, 1961;Indian electricity Act 2003 and Rules; Indian explosives Act,1984 and Rules;



Petroleum Act and Rules; Gas cylinders rules; Calcium carbide rules;
The Insecticides Act and rules

- Radiation protection rules; Hazardous material transportation rules;
- Static and mobile (Unfired) pressure vessel rules, 1981 as amended in 2000
- The Dockworkers (Safety, Health and Welfare) act 1996 and rules and regulations
- The Building and other construction workers (regulation of employment and conditions of service) Act, 1996
- The Building and other construction workers (Regulation of employment and conditions of service) Central Rules, 1998
- The Building and other construction workers Welfare Cess Act, 1996 Cess Rules, 1998

Unit-V

Environment Protection Legislations: Water (Prevention and control of pollution) Act 1974 and rules – Air (Prevention and Control of Pollution) Act, 1981 and 1982 and Rules. Motor vehicles act, 1988 as amended in 2000, The Central Motor Vehicles Rules, 1989 as amended in 2000 and transport of hazardous good rules

Environment protection act 1986 (Amended) and rules – MSIHC Rules – Noise Pollution Act, 1998, Bio Medical Waste, Hazardous Waste management rules. Chemical Accidents (Emergency Preparedness, planning and Response) Rules, 1986

Reference Books

- 1) An Introduction to Health and Safety Law: A Student Reference Hardcover – Import, 2017 by David Branson
- 2) Pressure Vessels for Industry – Mc Graw Hill by Larry M. Soring
- 3) Techniques of Safety Management-Mc Graw Hill by D. Peterson



PAPER-6

INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

Unit-I

Concept of Industrial Hygiene, industrial Hygiene: Control methods, Substitution, Changing the process, isolation, wet method, local exhaust ventilation, personal hygiene, housekeeping and maintenance, waste disposal, special control measures. Introduction to chemical hazards – Dangerous properties of chemicals, dust, gases, fumes, mist, vapors, smoke and aerosols.

Route of entry to human system, recognition, evaluation and control of basic hazards, Concepts of dose response relationship, Bio – chemical action of toxic substances. Concept of threshold limit values – Air sampling strategies – Personal exposure monitoring. Work environment monitoring – Biological sampling & analysis

Unit-II

Personal Protective Equipment- Need for personal protective equipment, Selection, applicable standards, supply, use, care and maintenance of respiratory and non-respiratory personal protective equipment. Non-respiratory personal protective devices: Head protection, Ear Protection, Hand Protection, Face and eye Protection, Hand Protection, Foot Protection, Body Protection.

Personal protective devices: Classification of Hazards, Classification of respiratory personal protective devices, Selection of respiratory Personal protective devices. Instructions and training in the use, maintenance and care of Self-containing breathing apparatus. Training in the use of breathing apparatus (Open circuits and Close unit). Testing procedures and standards.

Unit-III

Occupational Health -Definition : As per WHO, **Common Occupational Diseases:** Occupational involving risk of contracting these disease – Mode of causation of the diseases and its effects – Diagnostic methods

Biological Monitoring – Methods of prevention – Compensation for occupational diseases. Evaluation of injuries. Occupational Health Management Services at the work place. List of Notifiable diseases Schedule III of Factories Act – 1948



Unit-IV

Occupational Health Hazards- Adverse health effects of noise, vibration, cold, heat stress, improper illumination, thermal radiation, Ionizing and Non-ionizing radiations. Permissible threshold exposure limits – Short term and long-term effects of exposures – Preventive and control measures.

Common Occupational Disease as per the Schedule III of the Factories Act. Pre-employment, Periodical medical examination of workers. Medical surveillance for control of occupational disease and health records.

Fundamentals of First aid-burns, fractures, Suffocation, Toxic ingestion – Bleeding wounds and Bandaging, Artificial respiratory, techniques

Unit-V

Physiology And Ergonomics at Work- Physiology of respiration, cardiac cycle, muscle contraction, nerve conduction system etc. Assessment of workload based on Human Physiological reactions. Permissible limits of load for manual lifting and carrying. Criteria for fixation limit. Working Posture: Its effects on cardio-vascular and musculo-skeletal system and implications on health. Nutrition and its importance in manual work. Nutritional requirements and nutritional of diet.

Assessment of work capacity fatigue and rest allowances. Physiological test for assessment of occupational health. Nutrition: Nutritional requirements and the Diets for exercise, work and Physical fitness. Aerobic work capacity (Physical work capacity), methods of its determination (Use of bicycle, ergo meter, treadmill, step-stool ergo meter). Factors affecting aerobic capacity and work performance. Environmental Physiology.

Unit-VI

Ergonomics- Introduction to Ergonomics, Definition, Aims and Scope, Man-machine (job), Environment System, Constituents of Ergonomics, Application of Ergonomics in industry for safety, Health and Environment. Ergonomics of Automation / Assembly, visual fatigue, Ergonomics of rehabilitation while assigning alternative jobs. Anthropometry and fundamental of bio-mechanics: basic and applied aspects: Anthropometric measurements and their usefulness in industry



Ergonomic design of workstation: Concept of workstation and its design.
Improving safety and productivity through workstation design. Technical and engineering control measures. Economics consideration

Reference Books

1. Barbara A. Plog. Fundamentals of Industrial Hygiene. 5th edition. National Safety Council Chicago. 2002
2. Industrial Safety Health and Environmental Management system
Publication: Khanna Publishers Authors: R.K Jain and Sunil S. Rao.
3. Diberardins L.J. , 1998.Hand book of occupational safety and health, John Willey, New York



PAPER-7

SAFETY IN CHEMICAL & PETROCHEMICAL INDUSTRY

Unit-I

UN Classification of Hazardous materials. Safety in chemical industry. Criteria for siting and layout of chemical and petrochemical plants. Plant area classification. Instrumentation for safe plant operations

Hazard in Unit processes and Unit operations. Control, precautions and prevention, specific safety measures for certain chemical industry like fertilizer, insecticide, pesticides-choler-alkali, explosives, and polymer plants.

Unit-II

Sampling technique for toxic and flammables, Pharmaceuticals, Petrochemical etc. Precautions in the process and operations involving explosives, flammables, toxic substances, dusts, gases, vapor cloud formations and combating.

Receiving, storing and handling of chemicals. Chemical compatibility considerations. Transportation of Hazardous material. Safety precautions for transporting hazardous / toxic / flammable / explosive / radioactive substances by all modes.

Unit-III

Transfer of chemicals by pipelines within and outside installations, above and underground and submarines. Color coding identification of contents. Safety precautions for working on pipelines, safe entry procedures to Confined spaces including reaction vessels.

Safe procedure of start up and shut down procedures. Safety in preventive and emergency maintenance operations. Use of Material safety data sheets. Work permit system, confined space, hot work, working at height.

Unit-IV

Fire and Explosion. Chemistry of fire, factors contributing towards fire, classification of fires. Common causes of industrial fire. Determination of fire



load. Design of building plant, exists etc for fire safety and fire resistance of building materials.

Prevention of fire. Portable extinguishers. Hydrant system, Sprinkler system, introduction to Carbon-di-oxide systems, Foam extinguisher system, Dry chemical extinguishing system, Halon replacement of fire fighting product. Fire detection and alarm system.

Special safety precautionary measures for control of fire and explosion in handling / processing flammable liquids, gases, vapors, mists and dusts etc. BLEVE (Boiling liquids expanding vapor cloud explosion) including pesticides. Fire emergency action plan. Deflagration and Detonation

Unit-V

Salient features of fire explosion and toxicity index, Dow, dispersion, Probability analysis, modeling. Pressure vessels fired and unfired, codes of practices governing their safety. Assessment of reliability of vessels, test checks

Inspection techniques for plants, reaction vessels, check list for routine inspection, checklist for specific maintenance and breakdown. Corrosion and erosion, location, causes inspection and prevention

Reference Books

1. Chemical Reaction Hazards – A guide to Safety by John Barton.
2. The Chemical Industry – Mc Graw Hill by C.A. Heaton.
3. Dangerous Properties of Industrial Materials Author: N Irving sax



PAPER-8

SAFETY IN CONSTRUCTION INDUSTRY

Unit-I

Meaning and Scope of Safety In Construction - Basic philosophy – Peculiarities and parameters governing the safety in construction such as site planning and layout – Safe access – Good Housekeeping – Safety in use of construction machinery, signs & indication, liaison for safety with local authorities, structural soundness, accidents and hazards – their causes and effects.

Unit-II

Safety in Construction Operations- Under ground works: Excavation – Drilling – Blasting – Trenching – Shoring – Structuring – Tunneling – Piling and safety in using and operating machinery and equipment relating to the above works

Above ground works: Scaffolding – Centering – Formwork ladders – Concerting- Wall and floor openings – staircases and railings – Structural steel work including welding, cutting, erection, etc., and safety in use and operation of related machinery and equipment

Underwater Operations: River training – well sinking – caissons – Underwater concerting cofferdams and special operations concerted with irrigation work – Safety in use and preparation of related machinery and equipment.

Unit-III

Safety In Demolition Operation - Planning and permit: Precautions prior to demolition – protection of the public – Precautions during demolition – Sequence of demolition operations from safety angle – Safety while carrying out repairs, additions and alterations

Safety with regard to Storage, Stocking and Handling of Materials of Construction - Hazards-Health ill effects while handling construction material and chemicals – Safety measures with respect materials such as cement, limes, aggregates, fly ash, timber, steel, glass, paints, varnishes, petroleum products, chemicals used in construction, plastics & PVC material etc.



Unit-IV

Accident Prevention - Occupational hazards – Occupational diseases relating to construction work –Safety in the use of personal protective equipment specific to construction industry –health and welfare measures – emergency medical measure for construction site – treatment of injuries and rehabilitations

Unit-V

Statutory Obligations- Construction safety law and obligations, IS and NB codes, local building & Development by laws, accident investigation and reporting, monitoring safety performance Special precautions for works of engineering construction like distilling/fractionating columns, towers, chimney silos and gas installations, transmission/communication lines, cable car installations, air fields.

Reference Books

1. Sp 70-2001 Hand Book of Construction Safety Practices, Bureau of Indian Standards, New Delhi.
2. Construction Safety – Publication: Prentice Hall- Author: Jimmie Hinze, 1997.
3. Safety, Security and Risk Management – Singh U. K.

