SAFETY, HEALTH AND ENVIRONMENT MANAGEMENT

COURSE CONTENTS

1.1 INTRODUCTION

1.1.1 MANAGEMENT AND management principles and types of management

1.1.2 Management principles: general principles of management, managerial role, authority, responsibility and power, span of management, delegation and decentralization of authority.

1.1.3 Safety, health and environment management(SHE), occupation Safety, health and Environmental Safety Management – Principal and Practices

1.1.4 Role of management in industrial safety

1.1.5 Organization behaviaraion human factors contributing to accident

1.2 PLANNING FOR SAFETY

1.2.1 Planning for safety: definition, purpose, nature, scope and procedure, range of planning, variety of plans.

1.2.2 Strategic planning and tools of implementation. Management by objectives and its role in safety, health and management by objectives and its role in safety, health and management (SHE). Policy formulation and implementation

1.3 ORGANIZATION FOR SAFETY

1.3.1 Organization: definition, need, nature and principles. Organizing for safety, health and environment Organization structure, functions and responsibilities

1.3.2 safety committee: structure and functions

1.3.3 line and staff function for safety, health and environment

1.4 DIRECTING FOR SAFETY

1.4.1 direction: definition: definition, process, principles and techniques

1.4.2 Leadership: role functions and attributes of a leader.

1.4.3 Communication: purpose, process, types and channels, essential rules for communication. Two – way communication. Barriers in communication, essentials of effective commination. Communication and group dynamics

1.5 MONITORING FOR SAFETY, HEALTH AND ENVIRONMENT

1.5.1 occupational safety, health and environment management system, bureau of Indian standards on safety and health: 14489-1998 and 15001-2000, ILO and EPA standards

1.6 PRINCIPLES OF ACCIDENT PREVENTION

1.6.1 Definition: incident, accident, injury, dangerous occurrences, unsafe acts, unsafe conditions, hazards, errors, oversight, mistakes etc.

1.6.2 Accident prevention: theories/models of accident occurrences. Principles of accident prevention. Accident and financial implication

1.7 SAFETY, HEALTH AND ENVIRONMENT (SHE) EDUCATION AND TRAINING

1.7.1 SHE: elements of training cycle, Assessment of needs. Techniques of training, design and development of training program. Training methods and strategies types of training. Evaluation and review of training programs

1.7.2 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

1.8 EMPLOYEE PARTICIPATION IN SAFETY

1.8.1 Employee participation: purpose, areas of participation, methods. Role of trade Awards and suggestion schemes, safety competitions, safety incentives publicity schemes, Audio visual publicity, other promotional methods.

1.9

1.9.1 Global warming and mitigation measures

1.9.2 Human behavior: individual differences, behavior as function of self and situation, perception of danger and acceptance of risk, knowledge, and responsibility vis-a-vis safety performance, theories of motivation and their application to safety, role of, supervisors and safety departments in motivation

1.9.3 Conflict & frustration: identification of situations leading to conflict and frustration and techniques of management

1.10 MANAGEMENT INFORMATION SYSTEM FOR SAFETY

1.10.1 Sources of information on safety, health and environment protection. Compilation and collation of information, analysis and use of modern methods of programming, storing and retrieval of MIS for safety, health and environment

1.10.2 QCC HS computer software application and limitation

1.10.3 Status and future goals of computer utilization in safety, health and environment (SHE) services in industries.

SAFETY ENGINEERING – 1

COURSE CONTENTS

2.1 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. – build-in safety device, maintenance and repairs of guard`s incidental safety devices and tools

2.2 SAFETY IN THE USE OF MACHINES

2.2.1 Safety in the use of 1) power presses (all types) 2) sharing 3)bending 4) rolling 5) drawing 6) tuning 7) boring 8)milling, shaping 9) planning broaching, planting 10) grinding 11)CNCS

2.2.2 Need of selection and care of cutting tools

2.2.3 Preventive maintenance, periodic checks for safe operation

2.2.4 Associated hazards and their prevention

2.3 MATERIAL HANDLING AND STORAGE OF MATERIALS

2.3.1 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 unsticking, floor loading conditions. Lay-out conditions for safety in storage, Ergonomics of manual handling and storage.

2.3.2 Mechanical: lifting machinery, lift and Hoists; safety aspects in design and construction, testing, use and care, signaling, inspection and maintenance. Safety in design and construction, operation, inspection and maintenance of industrial trucks, lifting trackless 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 on safety legislation – duties and responsibilities.

2.4 WORKING AT HEIGHTS:

2.4.1 Working at heights: incidence of accidents. Safety features associated with design construction and use of stairways, ramps, working platforms, gangways, ladders of different types, working on roofs other safety requirements while working at heights.

2.4.2 Working in confined spaces

2.4.3 Working underground

2.5 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 used for metal cutting, wood cutting, miscellaneous cutting work, other hand tools such as torsion tools, shock tools, non-sparking tools. Portable power tools and their selection, inspection, maintenance, repair and safe use.

2.6 PLANT DESIGN AND HOUSEKEEPING

Plant layout and 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 spelling. 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-list. Benefits of good housekeeping. Role of preventive maintenance in safety and healthy. Importance of standard and codes of practice for plant and equipment

2.7 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

Measurements of illuminations – photometer level

2.8 VENTILATION AND HEAT STRESS

Purpose of ventilation – physiology of heat regulation – thermal environment and its measurements – 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

asurements of ventilation	
Measurement of thermal Dry bulb temperature Wet bulb temperature Determination of relative humidity and ctive corrective effective	Aspirator Hygrometer parameters Kata-thermometer Globe-thermometer

2.9 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, measurements and control measures such as vibration damping

se level measurements	
Measurement of sound pressure level in dbA db linear Frequency analysis of noise	Sound level meter Octave filter set

2.10 ELECTRICAL HAZARDS

2.10.1 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 against surges and voltage fluctuation

2.10.2 Hazards arising out of 'Borrowed' naturals – other precaution – 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

2.11 STATIC ELECTRICITY

2.11.1 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

2.12 LIGHTING ARRESTORS

2.12.1 Definition, lighting splash, lighting strokes, lighting protection systems. Characterization of health effects. Function of lighting. Where lighting protection is required – system design, material of construction, component of a lightning arrestors, earth terminal / network.

2.13 Safety check list for buying new machinery for the plant

SAFETY ENGINEERING-II

COURSE CONTENTS

3.1 AGRO INDUSTRY/SUGAR INDUSTRY

3.1.1 Agro Industry/Sugar Industry

3.1.2 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

3.2

3.2.1 Manufacture of basic metals: Ferrous and Non ferrous

3.2.2 Metallurgy: Foundry, Steel plant

3.2.3 Hazards in the process of melting (Furnaces) Casting, forging, working on hot rolling and cold rolling, N.D.Test, pollution control measures

3.3

3.3.1 Automobile manufacturing activity like pattern making, melting, molding, machining, forging, chipping, grinding, heat treatment N.D.Test, pollution control measures

3.4 TEXTILE INDUSTRY

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

3.5 CONSTRUCTION INDUSTRY

3.5.1 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.

3.6 IT INDUSTRY

3.6.1 Manufacture of computers, Radio, Television and communication equipment and apparatus

3.6.2 Manufacture of electronic valves and tubes and other Electro-Magnetic Devices

3.6.3 Safety in semiconductor industry

3.7 SAFETY IN DOCKS

3.7.1 Safety in docks

3.7.2 Handling of cargo

3.7.3 Container Operation

3.7.4 Lifting appliance

3.7.5 Responsibility of different agency for safety, health and environment involved in dock work

3.8

3.8.1 Safety in Boilers

3.8.2 Safety Precautions and operations of boilers

3.8.3 Different types of boilers when not in use

3.8.4 Preservations of boilers when not in use
3.8.5 Steam pressure, Pressure gauge
3.8.6 Treatment of feed water etc.

3.9

3.9.1 Environment Protection
3.9.2 Principle and Practices for Prevention and control of air pollution, water pollution, solid and Hazardous waste management

3.10

3.10.1 Work permits Application, Adoption and Enforcement

3.11

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

QUALITY CONTROL IN OCCUPATIONL HEALTH AND SAFETY

COURSE CONTENTS:

4.1 PLANT AND EQUIPMENT SAFETY APPRAISAL AND CONTROL TECHNIQUES

7.1.1 Plant Safety rules and Procedures, Safe operating system, Checklist, plant safety inspections. Safety sampling – Safety survey – Job Safety Inventory system – product safety – Safety tag systems – Total Loss control and Prevention

4.2 HAZARD IDENTIFICATION TECHNIQUES

Hazard and Risk analysis: Quantitative and Qualitative: Failure Mode and Effect Analysis (FMEA) & Maximum Credible Accident Analysis(MCAA) – Fault tree analysis – Event Tree analysis – Example of each

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

4.3 ACCIDENT AND INCIDENT INVESTIGATION, REPOTING AND ANALYSIS

Accident and Incident Investigation: Philosophy, Purpose 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: Standard classification of factors associated with accident. Methods of collecting and tabulating data, Record keeping.

4.4 MEASUREMENT AND EVALUATION OF PERFORMANCE

4.4.1 Definition of Accident, Reportable, Fatal, Non-fatal

4.4.2 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 score

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

4.5 MAJOR ACCIDENTS HAZARDS CONTROL

4.5.1 Major Accident control: Definition, Major Accident Hazards, Identification and Assessment of MAH Units. Role of Government, Role of Management, Local authorities and public.

4.6

4.6.1 Preparation and Assessment of Safety audit

4.6.2 Report of BIS 14489:1998, Safety Report, Standards, ILO Code of Practice for Major Accident control

4.7

4.7.1 Major Accident control System: Local, State, National and International

SAFETY, HEALTH AND ENVIRONMENTAL LEGISLATION

COURSR CONTENTS

5.1 ILO CONVENCTION AND RECOMMENDATION

5.1.1 ILO Convention and Recommendation concerning Occupational health and safety

5.1.2 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	Conventions 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 accident; 181 – Prevention of major industrial accidents

5.2 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

5.3 SOCIAL SECURITY – LEGISLATIONS

5.3.1 Workmen's compensation act and Rules

5.3.2 ESI Act and Rules. Contract Labor (Abolition and Regulation)Act

5.3.3 Public Liability Insurance Act

5.3.4 Social Accountability 8000 SA - 8000

5.4 SAFETY, HEALTH AND ENVIRONMENT (SHE) RELATED IMPORTANT LEGISLATION: SALIENT FEATURE:

5.4.1 Sections pertaining to SHE

5.4.2 Indian Boilers Act, 1923 with allied Regulations, 1961; Indian electricity Act 2003 and Rules; Indian explosive Act, 1984 and Rules; Petroleum Act and Rules; Gas cylinders rules; Calcium Carbide rules; The Insecticides Act and rules

5.4.3 Radiation protection rules; Hazardous material transportation rules;

5.4.4 Static and mobile (Unfired) pressure vessel rules, 1981 as amended in 2000

5.4.5 The Dock workers (Safety, Health and Welfare) act 1996 and rules and regulations

5.4.6 The Building and other construction workers (regulation of employment and conditions of service) Act, 1996

5.4.7 The Building and other construction workers (Regulation of employment and conditions of service) Act, 1998

5.4.8 The Building and other construction workers Welfare Cess Act, 1996 Cess Rules, 1998

5.5 ENVIRONMENT PROTECTION LEGISLATIONS:

5.5.1 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 hazards goods rules

5.5.2 Environment protection act 1986 (Amended) and rules – MSIHC Rules – Noise Pollution Act, 1998, Bio- medical Waste, Hazardous Waste management rules

5.5.3 Chemical Accidents (Emergency Preparedness, Planning and Response) Rules, 1986

INDUSTRIAL HYGIENE AND OCCUPITIONAL HEALTH

COURSE CONTENTS

6.1 INDUSTRIAL HYGINENE

6.1.1 Definition 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

6.1.2 Introduction to chemical hazards – Dangerous properties of chemicals, dust, gases, fumes, mist, vapor, smoke and aerosols

6.1.3 Route of entry to human system, recognition, evaluation and control of basic hazards, Concepts of dose response relationship, Bio-chemical action of toxic substance

6.1.4 Concept of threshold limit values – Air sampling strategies – Personal exposure monitoring

6.1.5 Work environment monitoring – Biological sampling &analysis

Name of the experiment	Equipment/Glass wares to be used
1) Demonstration and calibration of Art Sampling Equipment	Personal sampler, High X volume sampler, Instantaneous Gas Delegator, Midget Impinge tubes. Rota Meter, Wet gas brow meter, Spectrometer, Automatic Absorption Spectrometer, Gas liquid Chromatograph, Phase Contract microscope
2) Sapling and Estimation of Gases work Environment by Calorimetric (a) Oxides of Nitrogen (b) Sulfur dioxide (c) Ammonia (d) Chlorine	Personal, Sampler, All Glass Bubbler, Rota meter, Spectrophotometer, Dragger Demonstration -do- -do-
3) Sampling and Estimation of Solvent vapors in work environment. Benzene-sampling by activities charcoal and analysis by gas Liquid	Low flow personal sampler, Rota meter, Activities charcoal tubes Gas liquid chromatograph. Aspirator Bottle, All glass impugner tubes

chromatography CS@ sampling by Aspiratory Bottle Analysis by Colorimetric method	
4) Sampling and analysis of Mercury	Personal sampler. All glass impinge tubes Rotometer. Mercury Analysis
5) Sampling and Estimation of dust gravimetric method	Personal sampler, Rota meter, bottle holders, electronic balance
6) Personal Protective Equipment	Respiratory and Non – Respiratory demonstration of testing facilities

6.2 PERSONAL PROTECTIVE EQUIPMENT

6.2.1 Need for personal protective equipment, selection, applicable standards, supply, use, care and maintenance of respiratory and non-respiratory personal protective equipment

6.2.1 Non-respiratory personal protective devices: head protection, ear protection, hand protection, Face and eye protection, Head protection, Foot protection, body Protection

6.2.3 Respiratory Personal protective devices: classification of Hazards, Classification of respiratory personal protective devices, Selection of respiratory Personal protective devices

6.2.4 Instruction and training in the use, maintenance and care of Self containing breathing apparatus. Training in the use of breathing apparatus (opens circuits and close unit)

6.3 OCUPATIONAL HEALTH

6.3.1 Definition: As per WHO

6.3.2 COMMON OCCUPATIONAL DISEASES:

6.3.2.1 Occupational involving risk of contracting these disease – Mode of causation of the diseases and its effects – Diagnostic methods

6.3.2.2 Biological Monition – Methods of prevention – Compensation for occupational diseases

6.3.2.3 Evolutional of injuries

6.3.2.4 Occupational Health Management Services at the work place

6.3.2.5 List of notifiable diseases schedule III of factories act - 1948

6.3.3 OCCUPATIONAL HEALTH HAZARDS

6.3.3.1adverse health effects of noise, vibration, cold, heat stress, improper illumination, thermal radiation, ionizing and Non-ionizing radiations

6.3.3.2 Permissible threshold exposure limits – Short term and long term effects of exposures – Preventive and control measures.

6.4

6.4.1 Common Occupational Disease as per the Schedule III of the Factories Act

6.4.2 Pre-employment, Periodical medical examination of workers. Medicals surveillance for control of occupational disease and health records

6.4.3 Fundamentals of first aid-burns, fractures, Suffocation, toxic ingestion – Bleeding wounds and Banding, Artificial respiratory, techniques

Occupational Health – Practice

1. Lung function test on medspirator
2. Ear testing on audiometer and demonstration of various models of audiometer, bakery audiometer, BA-3, Arphi
3. Study of Notifiable diseases by use of models
4. Study of various models of lungs (sections of lungs)
    1. Demonstration of medical laboratory equipment such as tetanus. Vision tester, blood analyzer, electrocardiography etc.
    2. Explanation on the charts of industrial noise. Notifiable diseases. Physical Health hazards, Chemical health hazards industrial dermatitis. Prevention and control
    3. Explanation of various notifiable occupational diseases with photographic models
    4. Explanation on the charts of control of noise in industry, noise levels in some industries and permissible level of exposure to noise in industry

6.5 PHYSIOLOGY AND ERGONOMCIS AT WORK

6.5.1 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 limits

6.5.2 Working posture: its effects on cardio-vascular and musculo-skeletal system and implication on health. Nutrition and its importance in manual work. Nutritional requirements and nutritional of diet

6.5.3 Assessment of work capacity fatigue and rest allowances. Physiological (use of bicycle, ergo meter, treadmill, step-stool ergo meter). Factors affecting aerobic capacity and work performance

6.5.5 Environmental Physiology

1) Evaluation of environmental stress(Heat)	Thermal kit containing i. Single psychrometer ii. Kata thermometer (of different range) iii. Globe thermometer(OC to OC) iv. Stop-Watch v. Air velo-charts, psychrometric chart vi. ET/CET chart
2) Physical fitness test (PFI) test	i. Step test stool(HT 46cm) ii. Metronome iii. Stop-Watches – 2 no`s
3) Respiratory Physiology for evaluation of pulmonary function impairment	Spirometer, Peak flow meter
4) Anthropometry practical measurements of a few body. Dimensions, its treatment and application	**i.** Anthropometer **ii.** Calipers **iii.** Skin fold caliper **iv.** Weighing machine

6.6

6.6.1 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

6.6.2 Ergonomics of Automation/ Assembly, visual fatigue, Ergonomics of rehabilitation while assigning alternate jobs. Anthropometry and fundamental of bio-mechanics: basic and applied aspect: Anthropometric measurements and their usefulness in industry

6.6.3 Ergonomic design of work station: concept of workstation and its design. Improving safety and productivity through work station design. Technical and engineering control measures. Economics consideration

SAFETY IN CHEMICAL AND PETROCHEMICAL INDUSTRY

COURSE CONTENTS

7.1

7.1.1 UN Classified of Hazardous materials

7.1.2 Safety in chemical industry

7.1.3 Criteria for sitting and layout of chemical and petrochemical plants

7.1.4 Plant area classification

7.1.5 Instrumentation for safe plant operations

7.2

7.2.1 Hazards in unit processes and unit operations

7.2.2 Control, precautions and prevention, specifies safety measures for certain chemical industry like fertilizer, insecticide, pesticides-choler-alkali, explosives, and polymer plants

7.2.3 Sampling technique for toxic and flammables, pharmaceuticals, petro-chemical etc.

7.3

7.3.1 Precaution in the process and operations involving explosives, flammables, toxic substances, dusts, gases, vapor cloud formations and combating

7.4

7.4.1 Receiving, storing and handling of chemicals

7.4.2 Chemical compatibility considerations

7.5

7.5.1Transportation of Hazardous material

7.5.2 Safety precaution for transporting hazardous/toxic/flammable/explosive/radioactive substances by all modes

7.6

7.6.1 Transfer of chemicals by pipelines within and outside installations, above and underground and submarines

7.7

7.7.1 Color coding identification of contents

7.7.2 Safety precautions for working on pipelines, safe entry procedures to

7.7.3 Confined space including reaction vessels

7.7.4 Safe procedure of startup and shut down procedures

Safety in preventive and emergency maintenance operations

7.8

7.8.1 Use of material safety data sheets

7.9

7.9.1 Work permit system, confined space, hot work, working at height

7.10

7.10.1 Fire and explosion

7.10.2 Chemistry of fire, factors contributing towards fire, classification of fires. Common causes of industrial fire

7.10.3 Determination of fire load. Design of building plant, exits etc. for fire safety and fire resistance of building materials

7.10.4 Prevention of fire. Portable extinguishers. Hydrant systems, Sprinkler system, introduction to Carbon-di-oxide system, foam extinguisher system, dry chemical extinguishing system, halon replacement of firefighting product

7.10.5 Fire detection and alarm system

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

7.10.7 Fire emergency action plan. Deflagration and Detonation

7.11

7.11.1 Salient features of fire explosion and toxicity index, DOW, dispersion, Probability analysis, modeling

7.11.2 Pressure vessels fired and unfiled and unfired, codes of practices governing their safety

7.12

7.12.1 Assessment of reliability of vessels, text checks

7.13

7.13.1 Inspection techniques for plants, reaction vessels, check list for routine inspection, checklist for specific maintenance and breakdown

7.14

7.14.1 Corrosion and corrosion, location, causes inspection and prevention

SAFETY IN CONSTRUCTION INDUSTRY

COURSE CONTENTS

8.1 MEASURING 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, structure soundness, accidents and hazards – their causes and effects

8.2 SAFETIES IN CONSTRUCTION OPERATIONS

Underground works: excavation – drilling – blasting – trenching – shoring – structuring – tunneling – pilling and safety in using arid and operating machinery and equipment relating to the above works

Above ground works: scaffolding – centering – formwork ladders – concerting – wall and floor opening – staircases and special operation concerted with irrigation work – safety in use and preparation of related machinery and equipment

Movement of materials and personnel: Heavy/long items – Railway wagons – motor trucks – Vehicles etc. – Hazardous materials

Special works: high rise buildings – bridges – road – railway asphalting pneumatic caissons – electrical installations and lifts

Fire prevention and protection at work site

8.3 SAFETIES IN DEMOLITION OPERATION

Planning and permit: precaution prior to demolition – protection of the public – precautions during demolition – sequence of demolition operations from safety angle – safety while carrying out repairs, additional and alterations

8.4 Safeties with regards 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, plastic & PVC material etc.

8.5ACCIDENT PREVENTION

Occupation hazards – occupational diseases relating to construction work – safety in the use of personal protective equipment specific to construction industry – health arid welfare measures – emergency medical measure for construction site – treatment of injuries and rehabilitations

8.6 STATUTORY OBLIGATIONS

Construction safety law and obligations, IS and NB codes, local building & development by laws, accident investigation and reporting, monitoring safety performance

8.7 special precaution for works of engineering construction like distilling/fractionating columns, towers, chimney silos – silos and gas installations, transmission/communication lines, cable car installations, air fields

PROJECT WORK – VIII

Subject title : **Project Work**

Subject code : **IS-09**

Periods year : **140**

Objective:

The main aim of the preparation of project on Industrial safety is to judge the knowledge gained by the student during their tenure of the industrial safety programmer as well as their exposure to industrial environment and its safety; so that many faceted development of the students can be achieved under various skills of domain such as Personal, Social, Professional of project on their safety experiences which will certainly add values in their attitudes such as value for health, work commitment, hardworking, honesty, problem solving, punctuality, loyalty and independent study

External Exam (Marks – 70)

	Marks Secured
1) Data Collection	- 10
2) Analytical Application	- 10
3) Result	- 10
4) Report	- 20
5) Viva voice	- 20
Total	70

"Pass marks in the Project Work: 50% in external exam

No minimum for Internal Exam"

Internal - 30 Marks

External - 70 Marks