Inspectorate of Factories & Boilers

INSTITUTE OF SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENT,
Altinho, Panaji Goa
Location
HEAD OF THE DEPARTMENT:
CHIEF INSPECTOR OF FACTORIES AND BOILERS
AND EX OFFICIO JOINT SECRETARY.

NATURE OF FUNCTIONS:
REGULATORY AGENCY
LEGISLATIONS FOR IMPLEMENTATION

- FACTORIES ACT, 1948.
- BOILERS ACT, 1923.
- ENVIRONMENT PROTECTION ACT, 1986 (PART IMPLEMENTATION).
- CHILD LABOUR (REGULATION & ABOLITION) ACT, 1986.
- AND RULES UNDER THE ABOVE ACTS.
FUNCTIONS UNDER FACTORIES ACT.

- APPROVAL OF FACTORY PLANS.
- GRANT OF FACTORY LICENSE.
- ACCIDENT INVESTIGATION
- FACTORY INSPECTIONS
- PROSECUTIONS
- FRAMING/AMENDMENT OF STATE RULES
FUNCTIONS UNDER BOILERS ACT.

- REGISTRATION OF BOILERS.
- ANNUAL INSPECTIONS.
- SURPRISE INSPECTIONS.
- RENEWAL OF BOILER CERTIFICATES.
- STEAM TEST
- REPAIRS TO BOILERS
- FABRICATION OF STEAM PIPE LINE.
- BOILER ACCIDENT INVESTIGATION
- BOILER PROSECUTIONS
• Functions Under Environment (Protection) Act.
• Implementation Of Manuacture, Storage & Import Of Hazardous Chemicals Rules, 1989

• Functions Under Child Labour (Regulation & Abolition) Act, 1986

• Child Labour (Regulation & Abolition) Act, 1986
• Prevention Of Child Labour In Factories
Other Incidental Activities

- Safety Training Programmes For Educating Management, Supervisors, Workers, Students Etc.

- Boiler Training And Conducting Examinations For Trainees.
Other Incidental Activities

- Occupational And Industrial Hygiene Laboratory.
- Industrial Hygiene Programme For Monitoring Of Hazards In The Factories.
Other Incidental Activities

- Occupational Health Programme Through Occupational Health Laboratory For Factory Workers.
Other Incidental Activities

- Museum Demonstration Centre
- Safety, Health And Environment Education Through Safety Museum.
Other Incidental Activities

- Custodian Of Off Site Emergency Plan For North Goa And South Goa Districts.
- High Power Coordination Committee Members For Approval Of Site.
Department of Inspectorate of Factories & Boiler in the State of Goa have placed more stress on implementation of provisions relating to Occupational Safety Health and Environment, through the Institute of Safety, Occupational Health and Environment rather than enforcing punitive action.
• The Institute imparts training in Safety and First Aid and has conducted Post Graduate Academic Courses in Occupational Health and Pollution control namely Diploma in Industrial and Occupational Health and Post Graduate Diploma in Environmental Pollution Control Technology and these qualification have been prescribed as essential qualification for Factory Medical Officer and operation of Effluent treatment plants.
• In the field of Safety, health and environment the Inspectorate of Factories and Boilers has made tremendous strides and is the leading state in the country.

• The Institute of Safety, Occupational Health and Environment under Safety Training Centre of the Inspectorate of Factories and Boilers is unique in India.

• The training courses in safety, first-aid, fire-fighting for the management, supervisors and workers are well accepted by the industries and serve to reduce the accidents, render timely assistance and save lives.

• The students and lecturers of various colleges and polytechnics undergoing training courses have benefited through receiving inputs on Safety, health and Environment.
• To improve safety on roads while transporting hazardous chemicals, certificate training is held for the drivers in association with the R.T.O office of the State Directorate of Transport.
• The Institute receives regular batches of students from the nursing institutes from the neighbouring states of Karnataka and Maharashtra apart from local nursing students and medical students.
• The students are able to see the demonstration of Occupational Health and Industrial Hygiene equipments and see the functioning of the unique mobile Occupational Health and Industrial Hygiene Laboratories.
Students from Labour Institutes in Maharashtra and as far as from Chennai visit the safety centre to understand the implementation of Safety, Health and Environmental programmes in Goa. Part of the syllabus of maritime students is covered at the Institute. The introduction of the subject on environment in the colleges, higher secondary's and technical institutes as per the directives of the Supreme Court has led to the lecturers of these institutions referring extensively to the information centre.

The students from these institutes undergo training on environmental matters at the centre. A faculty member of our Institute is on the Board of studies on Environment at Goa University.
Types of Programmes conducted

1. 5 – day programme in First Aid
2. 3 – day programme on Safety for technical students
3. 3 – day training in Safety in Transportation of Hazardous goods by Road for tanker drivers
4. 2 – day programme on Occupational safety & Health for nursing students
5. 1 – day refresher course on Safety in Transportation of Hazardous Goods by Road for tanker drivers
Types of Programmes conducted

6. 1 – day training in Defensive Driving Skills for drivers in collab with ROT
7. 1 – day educational programme on Safety for college students
8. In plant programme on Safety & Fire Fighting (1 Or 2 day)
9. Programme on Emergency Preparedness (Community programmes)
10. Half day programme on CPR
11. Specially designed programmes to suit individual industry.
Types of Programmes conducted

12. Publicity programmes, including Safety Week.
13. 3 – Months Certificate Course on A.F.I.H. for MBBS Doctors affiliated to DGFASLI
14. 1 – day specialised on “OHSAS 18001-20007”
15. 1 – day special programme on Safety Audit & Statutory requirement in Pressure vessels & Lifting Machines.
16. Safety in Operation and maintenance of Boilers
17. Storage, Handling and Transportation of Hazardous chemicals
18. Legislations on Safety & Environment.
19. Noise and Ventilation
20. we are also celebrating “World Health day” on 5th June every year.
Occupational Health Laboratory

- The occupational health laboratory is the only one of its kind in the country under the State Government carries out pre-employment and regular medical checkups at the factory site through the uniquely designed medical Occupational Health van. The medical check up includes medical history, anthropometric measurements, spirometry, clinical investigations, audiometry tests, vision testing, chest X-ray and biological analysis. The data is stored as soft copies and hard copies and are made available to the workers.
Occupational Health Laboratory

- Pre-Employment Medical Examination
- Periodic Medical Examination
- Preplacement Medical Examination
Occupational Health Laboratory

- Anthropometry
  - Body Mass index
- Clinical Examination
- Otological Examination
- Examination of Hernial Sites
- Audiometry
- ECG
Occupational Health Laboratory

- Titmus Vision Test
  - Near Vision
  - Far Vision
  - Color Vision
  - Stereoscopic Vision
  - Perimetry
Occupational Health Laboratory

- **Spirometry**
  - Tidal Volume
  - Forced Vital Capacity
  - FEV
Occupational Health Laboratory

- X ray Chest
Laboratory Examination
Facilities of Mobile Industrial Hygiene Laboratory

Mobile Industrial Hygiene Laboratory
Research studies from the available data is carried out and two of the medical Inspectors of Factories and Boilers were awarded ‘Young Scientist Awards’ at the National Conference of Indian Association of Occupational Health.
Industrial Hygiene Laboratory

- In the last two years, the Industrial Hygiene Laboratory has commenced a programme of conducting industrial hygiene surveys at the factories with a view to improving the work conditions at the workplace. The laboratory has capacity for monitoring toxic gases, dusts, heat stress, noise level, illumination and other stress factors experience by workmen.
Goa is the only state where industrial hygiene surveys are carried out regularly by the Inspectorate of Factories and Boilers. More than 100 surveys have been carried out in the last three years in various types of factories. At present a study on the hazards of steel units is being done to improve the safety, health and environment conditions in the steel industry.

All the steel units manufacturing ingots, steel rolling, cast iron manufacturers, pig iron and allied works has been covered by the industrial hygiene laboratory.
The Laboratory is recognized as an Environmental Reference Laboratory under the Environment Protection Act.
Analytical tests are being carried out in the laboratory:

- Physical
- Chemical
- Radioactive
- Microbiological
- Any other (Please specify)
- Sound level Measurement
- Heat, Ventilation, Explosive gases
A. Physical Tests:

- Colour
- Conductivity
- Pil
- Suspended solids
- Settleable solids
- Sludge Volume Index
- Total solids
- Temperature
- Turbidity
- Velocity of flow
B. Chemical Tests

- Acidity
- Alkalinity
- Aluminium
- Ammonical Nitrogen
- Arsenic
- Barium
- Beryllium
- Boron
- Bromide
- Carbon dioxide
- Cadmium

- Chemical Oxygen Demand (COD)
- Bio-chemical Oxygen Demand (BOD)
- Chloride
- Residual Chlorine
- Calcium (Titrimetric)
- Chromium (Colorimetric)
- Copper
- Cyanide
- Dissolved Oxygen
- Fluoride (Colorimetric without distillation)
- Hardness (Titrimetric)
- Iodine
- Iron (Colorimetric)
- Lead (Colorimetric)
- Manganese
- Magnesium
- Mercury
- Nickel
- Nitrite – Nitrogen
- Nitrate – Nitrogen
- Oil and Grease (Simple extraction)
- Pesticides and Insecticides
- Phosphate
- Phenols
- Potassium
- Selenium
- Silica
- Silver
- Sodium
- Strontium
- Sulfite
- Sulphate (Turbidity metric)
- Tannin and Lignin
- Tin
- Urea Nitrogen
- Zinc (Colorimetric)
C. Radioactive Tests

- Gross Alpha and Gross beta Radioactivity
D Microbiological Tests:

- Faecal Coliform
- Total Coliform
- Faecal Streptococci
- E. Coli
- Total Plate count
- Cell Count (Plankton)
- Benthos (Mud organisms)
- Chlorophyll
E. Toxicological Tests

1. Pathway into the Environment

2. Concentrations:
   - Loss/Persistence
   - Concentrations
   - Human Intake
3 Environmental Fate tests:

- Biodegradation/ Biotransformation
- Photodegradation
- Hydrolysis
- Sorption
- Evaporation
- Oxidation
- Model Ecosystem Studies
4. Environmental Fate
5. Chemobiokinetics

- Absorption
- Distribution Bio concentration Factor
- Metabolism
- Extraction
6 Mammalian Toxicity
7 Special Toxicity Studies

- Biochemical Interactions
- Carcinogenicity
- Mutagenicity
- Neurotoxicity
- Behaviour
- Sensitization

- Interacting Agents
- Primary Irritation
- Immunotoxicity
- Reproduction
- Teratogenicity
8. Effects on Organisms in the Environment

- Aquatic Toxicity
- Terrestrial Toxicity
1. Ventilation measurements
2. Explosive gases detection
3. Heat stress measurements
4. Sampling and analysis of ambient air
5. Sampling and analysis of work environment for tests and toxicity
LIST OF EQUIPMENTS

- Autoclave
- Aquarium for bioassay & aerators
- Ammonia distillation assembly
- Arsenic estimation assembly (Gutzeit generator)
- Balance (One weighing up to 10 mg. & other weighing up to 0.01 mg)
- BOD Incubator
- Bacteriological Incubator
- Bottom sampler
- Centrifuge
- Colony Counter (Electronic)
- Colour Comparator
- Current meter
- COD Digestion Assembly
- Cyanide distillation Assembly
- Deep Freezer
- Depth Sampler
- Electronic Colony Counter
- Filtration Pumps (Vacuum)
- Fluoride distillation assembly
- Flocculator (Jar testing apparatus)
LIST OF EQUIPMENTS

- Flow meter (air, water)
- Flask shaker
- Fuming chamber
- Gas Analysis apparatus
- Heating Mantle
- Hot Plate (different sizes)
- Inoculation chamber
- Inoculation hood
- Kjeldahl Nitrogen Assembly
- Magnetic Stirrer with hot plate
- Millipore filtration assembly
- Muffle furnace
- Oven (hot air)
- Refrigerator (big size)
- Rotary shaker
- Semi – Micro nitrogen assembly
- Stop watch
- Thermometer (different ranges)
- Soxhlet extraction assembly
- Vacuum filtration pump
LIST OF EQUIPMENTS

- Water current meter
- Water deionizer
- Water distillation assembly (nano pure system)
- Water distillation assembly (ordinary)
- Water bath
- Microscope (ordinary)
- Microscope (Research)
- Microscope (Planktonic inverted)
- Any other (Please specify)
- Personal air Sampler
- High Volume air samplers
- Dragger apparatus
- Kata & Globe thermometer
- Explosimeter
- Velometer
- Hand held anemometer
- Stack sampler
- Micro meteorological Station
# LIST OF INSTRUMENTS

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LIST OF INSTRUMENTS

- Binocular Microscope
- Conductivity Meter
- Colorimeter
- Dissection Microscope
- Dissolved Oxygen meter
- Flame Photometer
- Gas Liquid Chromatograph
- Mercury Analyzer
- Micro Analytical Balance

- Portable Water Analysis Kit (for DO, Temperature, Conductivity, Redox, Potential)
- PH Meter with combined glass-calomel electrode (Portable and table models)
- Polarograph
- Spectrocolorimeter
- Spectrophotometer (Ultra Violet, Visible & Infra-Red)
LIST OF INSTRUMENTS

• Specific Ion Meter with micro – processor with the following ion selective electrode:–
  • Ammonia
  • Iodide
  • Sulphate
  • Cyanide
  • Nitrate
  • Nitrate
  • Fluoride
  • Redox
LIST OF INSTRUMENTS

- Specific Ion Meter (Ordinary)
- Stereoscopic Microscope
- Total Organic Carbon Analyzer
- Turbidity Meter

- Visible Spectrophotometer
- BOD – Respirometer
- Any other, please specify or attach the list
- Sound level meter with frequency analysis
- Exhaust gas analyzer (IR0
• To reinforce the effectiveness of the training programme, the institute under the Inspectorate of Factories and Boilers has a full fledged safety museum for education on Safety, Occupational health and Environment. Various types of machine guards, safety devices, fire-fighting equipments, personal protective equipment are demonstrated and explained therein. This is the only safety museum under the aegis of state government in the country.
Boiler Section

• The Boiler section conducts Boiler Engineers Exams, 1st Class Boiler attendant exams, 11nd class Boiler attendant exams and Boiler attendant courses through the Board of Technical Education.

• A Boiler museum is planned to be added for more effective studies as well as to permit those facing problems in operating boilers to enhance their knowledge.
Library & Information Centre
Library & Information Centre

- Library and Information Centre of Inspectorate of Factories & Boilers, Institute of Safety, Occupational Health and Environment is located at the hostel building. Presently it stocks about 5000 books and films (Cds) on various specialized subjects like Industrial Safety, Occupational Health, Pollution Control, Fire Fighting, Boiler Engineering, Disaster & Risk Management, Chemical Safety
Presently the ISOHE library is in the Hostel Wing with one hall for reference and circulation with sitting capacity of about 30 students. Circulation of books to students, staff and Reference services, etc. are some of the services provided by the library.
Computer Centre
Computerization

- All Staff From LDC to Officer level have been provided with latest PIV systems.
- Entire Department is connected with LAN.
- Entire Department is being computerizes and implementation of Software specially developed for the office by Dept. of IT is under trial and will be implemented in a months time along with Web Site
- Broad Band Facility is available in the dept.
• The office of the Chief Inspector of Factories and Boilers is the custodian of the Off-site Emergency Plans for North and South Goa prepared by the District Collector. Major accident hazard units in the state have been identified and route maps for transporting of hazardous goods have been identified. The road maps are distributed to various agencies implementing the off-site plan.

• To improve safety on roads while transporting hazardous chemicals, certificate training is held for drivers in the association with the RTO Office of the State Directorate of Transport. The institute receives regular batches of drivers carrying hazardous goods by road and also for other drivers driving private vehicles or transport vehicles.
• The NGO, Green Triangle Society a body of professionals in Safety, Health and Environment has been a pillar of strength to the government for improving Safety, Health and Environment at workplace. Since the aims of the Green Triangle Society overlap that of the Inspectorate of Factories and Boilers, there is a synergistic action in the field of safety, health and environment in the state of Goa. The annual conference hosted by DGFASLI, I.F&B, & G.T.S is an opportunity for the professionals in safety, health and environment from throughout the country to come together and exchange ideas and views and update knowledge of the recent development taking place in their field of interest.
• Till date 6 Conferences have been organised.
Mock Drill
Mock Drill
FATAL / NON FATAL ACCIDENTS
FROM 1995 TO 2004

Number of Accidents


Non-fatal
Fatal

Inspectorate of Factories And Boilers, Government of Goa
MAN-DAYS WORKED

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MAN-DAYS LOST

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Inspectorate of Factories And Boilers, Government of Goa
MEN AND WOMEN EMPLOYED IN FACTORIES
FROM 1995 TO 2004

Inspectorate of Factories And Boilers, Government of Goa
TRAINING STATISTICS FOR THE LAST TEN YEARS
FROM 1995 TO 2004

Inspectorate of Factories And Boilers, Government of Goa
BUDGET ESTIMATE FOR THE DEPARTMENT FOR THE YEAR 2005-2006:

- DEMAND NO.59 (PLAN EXPENDITURE)
- MAJOR HEAD 2230- LABOUR AND EMPLOYMENT.
  - 01 – LABOUR,
  - 102 – WORKING CONDITION AND SAFETY.
- 02 – STRENGTHENING OF INSPECTOATE OF FACTORIES AND BOILERS (PLAN)
  - 01 – SALARIES 37.00 LAKHS
  - 07 – OFFICE EXPENSES 3.50 LAKHS.
  - 08 – P.O.L. 2.00 LAKHS.
- 23 - MAINTENANCE WORK 1.55 LAKHS
- 56 – MACHINERY AND EQUIPMENTS 3.00 LAKHS.
- 57 – MATERIALS AND SUPPIES 4.00 LAKHS.
MAJOR HEAD 2230
LABOUR AND EMPLOYMENT.

• 01 – LABOUR,
• 102 – WORKING CONDITION AND SAFETY.
• 01 – STRENGTHENING OF INSPECTOATE OF FACTORIES AND BOILERS (NON-PLAN)
• 01 – SALARIES 51.00 LAKHS
• 07 – OFFICE EXPENSES 4.00 LAKHS.
• 08 – P.O.L. 1.50 LAKHS
• 57 – MATERIALS AND SUPPIES 2.50 LAKHS.
MAJOR HEAD 2230 - LABOUR AND EMPLOYMENT

- 01 – LABOUR,
- 277 – EDUCATION.
- 01 – INSTITUTE OF SAFETY OCCUPATIONAL HEALTH AND ENVIRONMENT. (PLAN)
- 07 – OFFICE EXPENSES 2.36 LAKHS.
- 56 – MACHINERY AND EQUIPMENTS 2.00 LAKHS.
- 57 – MATERIALS AND SUPPLIES 1.50 LAKHS.
SUB MAJOR HEAD, MAJOR HEAD AND DETAILED HEAD

• CAPITAL
• 4202 – CAPITAL OUTLAY ON EDUCATION SPORTS, ART
• AND CULTURE 10.00 LAKHS.
Thank you