Organization of ITI's and scope of the mechanic diesel trade

Objectives: At the end of this lesson you shall be able to

state brief introduction about Industrial Training Institutes (ITI)

• state about the organized structure of the Institute.

Brief Introduction of Industrial Training Institute (ITIs)

Industrial Training Institute plays a vital role in economy of the country, especially interms of providing skilled manpower.

The Directorate General of Training (DGT) comes under Ministry of Skill Development and Entrepreneurship (MSDE) offers a range of vocational training trades in different sectors based on economy /labour market. The vocational training programmes are delivered under the aegis of National Council of Vocational Training (NCVT). Craftsmen Training scheme (CTS) and Apprenticeship Training Scheme (ATS) and two pioneer programmes of NCVT for Propagatory Vocational Training.

Total number of ITIs in India as on April 2016 is about 13105 (Govt. it is 2293 + 10812 Private affiliated ITIs). They are giving training about 132 trades including Engineering and Non-engineering trades with the duration of 1 or 2 years. The minimum eligibility for admission in ITIs 8th, 10th and 12th pass with respect to the trades and admission process will be held in every year in July.

From 2013, semester pattern was introduced with 6 months/Semester and revised the syllabus for each semester. Then in 2014, they introduced and implemented "Sector Mentor council (SMC)" re-revised syllabus under 11 sectors of about 87 trades.

At the end of each semester, All India Trade Test (AITT) will be conducted in every July and January, with OMR answer sheet pattern and multiple choice type questions.

After passing, National trade certificates (NTC), will be issued by DGT which is authorized and recognized internationally. In 2017, for some trades they have introduced and implemented National Skill Qualification Frame work (NSQF) with Level 4.

After finishing instructional training with 'NTC' certificate, they have to undergo Apprenticeship training (ATS) for one or two year with respect to trades under the Apprentice ACT 1961, in various government and private establishments with stipend. At the end of the Apprenticeship training, All India Apprentice Test will be conducted and apprentice certificate will be issued. They can get job opportunities in private or government establishment in India/Abroad or they can start small scale industries in manufacturing or in service sector with subsidiary government loan.

Organizational Structure of ITIs

The head of the institute is the Principal /DDT/HDT under him one vice-principal (VP). then Training Officers (TO), Group Instructors (GI) who are the management and supervisory staff. Then deputy training officer (DTO) Assistant Training Officers (ATO)/junior training officer (JTO) technical assistants are under Training officers for each trade and for Workshop calculations, Engineering Drawing, Employability skills etc. Administrative office staff superintendent, UDC, LDC, office assistant, employees. Hostel Superintendent (H.S.) physical Education Trainer (PET), Library incharge, Pharmacist, store keeper etc. will be under the one umbrellas of the institute.

Scope of the mechanic diesel trade

Objectives: At the end of this lesson you shall be able to

- · importance and scope of the diesel mechanic trade training
- general discipline in the institute.

Scope of the diesel mechanic trade training : Mechanic diesel trade under craftsmen training scheme (CTS) is one of the most popular trade delivered nation wide through the network of ITI. This trade one year (2 semester) duration.

- Identify the various types of tools equipment, raw materials, spares used in mechanic diesel trade,
- Practice to measuring, fitting, welding, sheet metal works, mechanical and electrical and hydraulic system fault diagnosis and rectification
- Practice to indent and repairing various type of diesel engines,

Carrier Progress Pathways: Can join the apprenticeship training in different types of industries and often National Apprenticeship Certificate (NAC)

Can join Craftsman Instructor Training Scheme (CITS) to become an instructor in ITIs

Job Opportunities

- Mechanic diesel can join in central and state government establishments, like railway, airport, marine, military, joins as a service technician in dealer of agricultural machinery minining, trucks, bus, car, stationary engines, compressors, diesel generators, construction equipments, etc.
- employment. opportunities in overseas.

Self-employment opportunities

- Service centre in rural and urban areas.
- Maintenance contractor
- Manufacturer of sub-assembly
- · Dealership/agency for automobile spare parts
- Own repair shop or garrage.

General discipline in the institute : Always be polite, courteous while in institue

Do not arguments with others, on matters of related to your training or with the office while seeking clarifications

Do not bring bad name to your institute by your improper habitude.

Do not waste your precious time in gossips with your friends and on activities other than training.

Do not be late to the theory practical and other classes.

Do not unnecessarily interfere in other's activities.

Do very attentive and listen to the lecture carefully during the theory classes and practical demonstration given by the training staff.

Give respect to your trainer and all other training staff, office staff and co-trainees.

Be interested in all the training activities.

Do not make noise or be playful while undergoing training.

Keep the institute premises neat and clean avoid poluting the environment.

Do not take away any material from the institute which does not belong to you.

Always attend the institute well dressed and good physical appearance.

Be regular to attend the training without fail and avoid absent from the theory or practical classes for simple reasons.

Prepare well before writing a test/examination.

Avoid any malpractice during the test/examination.

Write your theory and practical records regularly and submit them on time for correction

Take care of your safety as well as other's safety while doing the practicals.

Knowledge of personal safety and safety precautions in handling diesel machines.

Objectives: At the end of this lesson you shall be able to

- state the is personal protective equipment and its purpose
- name the two categories of personal protective equipment
- list the most common type of personal protective equipment
- list the conditions for selection of personal protective equipment
- state the safety precaution in handling diesel machines.

Personal Protective Equipment (PPE)

Devices, equipment, clothing are used by the employees, as a last resort, to protect against hazards in the workplace. The primary approach in any safety effort is that the hazard to the workmen should be eliminated or controlled by engineering methods rather than protecting the workmen through the use of personal protective equipment (PPE). Engineering methods could include design change, substitution, ventilation, mechanical handling, automation, etc. In situations where it is not possible to introduce any effective engineering methods for controlling hazards, the workmen shall use appropriate types of PPE.

As changing times have modernized the workplace, government and advocacy groups have brought more safety standards to all sorts of work environments. The Factories Act, 1948 and several other labour legislations 1996 have provisions for effective use of appropriate types of PPE.

Ways to ensure workplace safety and use personal protective equipment (PPE) effectively.

- Workers to get up-to-date safety information from the regulatory agencies that workplace safety in their specific area.
- To use all available text resources that may be in work area and for applicable safety information on how to use PPE best.
- When it comes to the most common types of personal protective equipment, like goggles, gloves or bodysuits, these items are much less effective if they are not worn at all times, or whenever a specific danger exists in a work process. Using PPE consistent will help to avoid some common kinds of industrial accidents.
- Personal protective gear is not always enough to protect workers against workplace dangers. Knowing more about the overall context of your work activity can help to fully protect from anything that might threaten health and safety on the job.
- Inspection of gear thoroughly to make sure that it has the standard of quality and adequately protect the user should be continuously carried out.

Categories of PPEs

Depending upon the nature of hazard, the PPE is broadly divided into the following two categories:

- 1 **Non-respiratory:** Those used for protection against injury from outside the body, i.e. for protecting the head, eye, face, hand, arm, foot, leg and other body parts
- 2 **Respiratory:** Those used for protection from harm due to inhalation of contaminated air.

They are to meet the applicable BIS (Bureau of Indian Standards) standards for different types of PPE.

The guidelines on 'Personal Protective Equipment' is issued to facilitate the plant management in maintaining an effective programme with respect to protection of persons against hazards, which cannot be eliminated or controlled by engineering methods listed in table1.

Та	bl	e1

No.	Title	
PPE1	Helmet	
PPE2	Safety footwear	
PPE3	Respiratory protective equipment	
PPE4	Arms and hands protection	
PPE5	Eyes and face protection	
PPE6	Protective clothing and coverall	
PPE7	Ears protection	
PPE8	Safety belt and harnesses	

Common type of personal protective equipments and their uses and hazards are as follows:

Types of protection	Hazards	PPE to be used
Head protection (Fig 1)	 Falling objects Striking against objects Spatter 	Helmets
Foot protection (Fig 2)	 Hot spatter Falling objects Working wet area 	Leather leg guards Safety shoes Gum boots
Nose (Fig 3)	 Dust particles Fumes/ gases/ vapours 	Nose mask
Hand protecion (Fig 4)	 Heat burn due to direct contact Blows sparks moderate heat Electric shock 	Hand gloves
Eye protection (Fig 5, Fig 6)	 Flying dust particles UV rays, IR rays heat and High amount of visible radiation 	Goggles Face shield Hand shield Head shield
Face Protection (Fig 6, Fig 7)	 Spark generated during Welding, grinding Welding spatter striking Face protection from UV rays 	Face shield Head shield with or without ear muff Helmets with welders screen for welders
Ear protection (Fig 7)	1. High noise level	Ear plug Ear muff
Body protection (Fig 8, Fig 9)	1. Hot particles	Leather aprons





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Quality of PPE's

PPE must meet the following criteria with regard to its quality-provide absolute and full protection against possible hazard and PPE's be so designed and manufactured out of materials that it can withstand the hazards against which it is intended to be used.

Selection of PPE's requires certain conditions

- Nature and severity of the hazard
- Type of contaminant, its concentration and location of contaminated area with respect to the source of respirable air
- Expected activity of workmen and duration of work, comfort of workmen when using PPE
- · Operating characteristics and limitations of PPE
- Easy of maintenance and cleaning and
- Conformity to Indian/ International standards and availability of test certificate.

Proper use of PPEs

Having selected the proper type of PPE, it is essential that the workmen wears it. Often the workmen avoids using PPE. The following factors influence the solution to this problem.

- The extent to which the workmen understands the necessity of using PPE
- The ease and comfort with which PPE can be worn with least interference in normal work procedures
- The available economic, social and disciplinary sanctions which can be used to influence the attitude of the workmen
- The best solution to this problem is to make 'wearing of PPE' mandatory for every employee.
- In other places, education and supervision need to be intensified. When a group of workmen are issued PPE for the first time.

Safety precaution in handling diesel machine:

- Diesel mechanic must know the safety rules first and then practice to handling diesel machine as well as we known, when accident starts means safety rules are not followed during the handling of diesel machine. So safety precautions are always based on good sense.
- The following precautions are to be observed to keep a diesel mechanic/personal accident free.

General safety:

• Do not spill the fuel and lubricant on work place, the spills may cause for the risk of slipping.

- Keep all flammable material away from the diesel machine.
- Always keep clean hand and tools while work on machine
- Keep the diesel machines operating area free from any form of fire.
- Safety operation of diesel machine:
- Don't operate the machine with loose engine mounting
- Don't operate the machine without lubricant
- Don't spill diesel during fill in to the fuel tank
- Keep the empty diesel /lubricant can away from the machine.
- Ensure stationary engine exhaust gas outlet should be far away from work place otherwise it will be harm full to human health
- Use preheat before start the diesel engine
- Use safe guard around rotating part of the engine
- Maintains the coolant and lubricant level in the engine.
- Always keep engine in an upright places for easy handling and safety.
- use specified grade lubricant and coolant in an engine

safety of rubber hose and pipes:

- Inspect the rubber hose periodically and replace the damaged parts
- Inspect the fuel leaks in fuel system and rectify the leakages
- Inspect the exhaust gas leaks and rectify the leakages
- Check the engine performance if any air lock in fuel system, bleed the fuel system.
- Safety of engine operation:
- Check the coolant circulation and pressure cap function
- Check the oil pressure
- Check the tappet noise and rectify the noise/adjust the defective tappet
- Check the abnormal noise in the engine
- Check leakages of lubricant and coolant in the engine and rectify the leakages.
- Ensure free air circulation in engine operating place

Concept of house keeping & 5S method

Objectives: At the end of this lesson you shall be able to

- elements of house keeping and cleanliness at work place
- state the concept of 5'S' techniques.

Concept of house keeping

House keeping is the systematic process of making home/ work place neat and clean. House keeper is responsible for administering housekeeping maintenance and for assuring that every thing is in order and he is responsible for systematic administration of activities that provide segregation, storage, transfer, processing treatment and disposal of solid waste (which is collected during cleaning)

Scope of house keeping maintenance

The scope of work hieghly depend on where the house keeping activity is performed in general, maintains clean liness and orderliness, Furnishes the room, office, workplace, house keeping supervisor assisted by an assistant house keeper.

- eye appeal
- safety
- maintenance

Elements of housekeeping and cleanliness at workplace

The major elements which are normally included in the housekeeping and cleanliness practices at the workplace are described below.

- Dust and dirt removal: Working in dusty and dirty area is unhygienic as well as unhealthy for the employees since there can be respiratory type irritations. Also, If dust and dirt are allowed to accumulate on surfaces, there is a potential for a slip hazard. Hence, regular sweeping the workplace for the removal of dust and dirt is an essential housekeeping and cleanliness practice. Further, compressed air is not to be used for removing dust or dirt off employees or equipment. Compressed air can caused dirt and dust paticles to be embedded under the skin or in the eye.
- Employees facilities: Adequate employees facilities such as drinking water, wash rooms, toilet blocks, and rest rooms etc. are to be provided for the employees at the workplace so that employees can use them when there is a need. Cleanliness at the place of these facilities is an important aspect of the facilities.
- Flooring: Floors are to be cleaned regularly and immediately if liquids or other materials are spilled. Poor floor conditions are a leading cause of accidents

in the workplace. Area such as entranceways which cannot be cleaned continously are to have mats or some type of anti-slip flooring. It is also important to replace worn, ripped or damaged flooring that poses a trip hazard.

- **Lighting:** Adequate lighting reduces the potential for accidents. It is to be ensured that inoperative light fixtures are repaired and dirty light fixtures are cleaned regularly so that the light intensity levels are maintained at the workplace.
- Aisles and stairways: Aisles and stairways are to be kept clear and not to be used for storage. Warning signs and mirrors can improve sight lines in blind corners and help prevent accidents. It is also important to maintain adequate lighting in stairways. Further stairways need to have railings preferably round railings for adequate grip.
- **Spill control:** The best method to control spills is to prevent them from happening. Regular cleaning and maintenance on machines and equipment is an essential practice. Also, the use of drip pans where spills might occur is a good preventative measure. When spills do occur, it is important to clean them up immediately. When cleaning a spill, it is required to use the proper cleaning agents or absorbent materials. It is also to be ensured that the waste products are disposed of properly.
- Waste disposal: The regular collection of the waste materials contribute to good housekeeping and cleanliness practices. It also makes it possible to separate materials that can be recycled from those going to waste disposal facilities. Allowing material to build up on the floor wastes time and energy since additional time is required for cleaning it up. Placing containers for wastes near the place where the waste is produced encourages orderly waste disposal and makes collection easier. All recyclable wastes after their collection are to be transferred to their designated places so that the waste materials can be dispatched to the point of use or sold.
- **Tools and equipment:** Tools and equipment are required to be inspected prior to their use. Damaged or worn tools are to be taken out of service immediately. Tools are to be cleaned and returned to their storage place after use.

- Maintenance: One of the most important elements of good housekeeping and cleanliness practices is the maintenance of the equipment and the buildings housing them. This means keeping buildings, equipment and machinery in safe and efficient working condition. When a workplace looks neglected means there are broken windows, defective plumbing, broken floor surfaces and dirty walls etc. These conditions can cause accidents and affect work practices. It is important to have a replacement program for replacing or fixing broken and damaged items as quickly as possible.
- Storage: Proper storage of materials is essential in a good housekeeping and cleanliness practice. All storage areas need to be clearly marked. Flammable, combustible, toxic and other hazardous materials are to be stored in approved containers in designated areas which are appropriate for the different hazards that they pose. The stored materials are not to be obstruct aisles, stairs, exits, fire equipment, emergency eyewash fountains, emergency showers, or first aid stations. Also it is important that all containers be labeled properly. If materials are being stored correctly, then the incidents of strain injuries, chemical exposures and fires get reduced drastically.
- **Clutter control:** Cluttered workplaces typically happen because of poor housekeeping practices. This type of workplace can lead to a number of issues which include ergonomic as well as injuries. It is important to develop practices where items like tools, chemicals, cords, and containers are returned to their appropriate storage location when not in use. Clutter is not only unattractive but, in a work area, it is also a serious threat to safety. Danger to the employees increases if the established exit routes and doors are blocked. For this reason, as well as to prevent slips and trips, assorted waste materials need to be disposed of promptly in the appropriate waste containers. Aisles are to be kept clear of obstructions for obvious reasons.
- Individual workspace: Individual workspace need to be kept neat, cleared of everything not needed for work. Many workplace injuries occur right in the employee's workspace. This space is often overlooked when conducting general housekeeping and cleanliness inspections. It is necessary to make a checklistwhich is to be used by the employees to evalute their workspace.

It can be said that a clean work area demonstrate the pride employees have with the job and the culture of safety at the workplace.

5 Steps (5s) - Concept (Fig 1)

5s is a people-oriented and practice-oriented approach. 5s expects every one to participate in it. It becomes a basic for continuous improvement in the organisation.

The terms (5s) 5 steps are

Step 1: SEIRI (Sorting out)

Step 2: SEITON (Systematic arrangement)

Step 3: SEISO (Shine cleanliness)

Step 4: SEIKTSU (Stanardization)

Step 5: SHITSURE (Self discipline)

Fig 1 shows the 5s concept wheel.

The list describes how to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items and sustaining the new order.



Benefits of 5s

- Work place becomes clear and better organised.
- Working in working place becomes easier.
- Reduction in cost.
- People tend to be more disciplined.
- Delay is avoided.
- Less absenteeism.
- Better use of floor space.
- Less accidents.
- High productivity with quality etc.