

TECHNICIAN LEVEL COURSES

T - 1	REPAIRING AND OVERHAULING OF STATIONARY ENGINES AND TRACTORS	
Duration: 6 weeks	Effective working days : 30	Total Unit : 60
Beneficiary :-	Technicians and Supervisor of Govt. Departments / Agencies, Private Operators, Ex -Service Men, Agril. Mechanic, ITI student etc.	

1. General: 4 Units

- 1.1 Market assessment for services: customs etc. criteria for layout of small and medium service centres.
- 1.2 Financial analysis, selection of tools and equipments.
- 1.3 Emerging pattern fo machinery use; routine and periodical maintenance jobs on tractors, power tillers, etc.
- 1.4 Safety in handling machines and equipments
- 1.5 Selection of tractors and implements based on farming conditions.
- 1.6 Study of fuel oil and lubricants, their handling and storage.

2. Farm Powers: 12 Units

- 2.1 Working principles of engine, study of various systems of engines. Air intake, fuel supply, lubrication, cooling & governing.
- 2.2 Dismantling of engine and detailed study of various components, measurement of clearances & tolerances reconditioning and adjustment of components.
- 2.3 Assembly of engine, operation, discussion on various troubles and remedy.

3. Tractor : 40 Units.

- 3.1 Study of different sub-assemblies, safe and correct procedure for dismantling and assembly. Use of special tools and measuring equipments used for maintenance and repair.
- 3.2 Engine dismantling and inspection of various parts, measurement of clearance, reconditioning, adjustment balancing, minimum permissible wear limits on different parts, fuel supply system dismantling and study of fuel feed pump, injector, governor, fuel filter and assembly. Engine assembly and trouble shooting.
- 3.3 Clutch – dismantling and study of clutch and its components, adjustment and assembly.
- 3.4 Transmission – Study of gear box, differential and final drive, adjustments of clearances and backlashes of various gears, assembly of gear box differential and final drive and their adjustments.
- 3.5 Brake & steering – dismantling and study of each system, their components, adjustment, repair and assembly.
- 3.6 Wheel equipment – care and maintenance, repair of tyre and tubes, fitting of cage wheels and adjusting track width for different farm operations.
- 3.7 Hydraulic system, principle of hydraulic system, components, draft and position control system, dismantling and study of system, adjustment of various valves, pressure setting, trouble shooting etc.
- 3.8 Diagnostic techniques to assess the condition of the engine through Dynamometer, compression pressure test gauge etc.
- 3.9 Guideline for stocking tractor spare parts.

4. Electrical System: 4 Units.

- 4.1 Dismantling and study of battery, dynamo / alternator, self starter, voltage and current regulator and lighting system.
- 4.2 Practice on use of voltmeter, ammeter, maggar, etc. Checking of circuit, diagnosis of burnt out motor, starter setting, setting for direction of rotation of motor. Electrical motors – service and maintenance of auto electrical equipments.

T - 2	REPAIR AND OVERHAULING OF POWER TILLER	
Duration: 2 weeks	Effective working days : 10	Total Unit : 20
Beneficiary :-	Technicians and Supervisor of Govt. Departments / Agencies, Private Operators, Ex -Service Men, Agril. Mechanic, ITI student etc.	

General: 4 units

- Scope of Power tiller in Indian Agriculture.
- Acquaintance with different make and models of Power tiller available in India.
- Familiarization with different tools and special tools required for major overhauling of Power tiller.
- Study of operator's manual, repair/maintenance manual and any other literature supplied by manufacturer.
- Study of different working systems of Power tiller.

Dismantling and Assembling of Engine: 6 units

- Study of different components of engine.
- Checking of clearance, tolerance of different components.
- Timing gear setting, tappet clearance setting, fuel timing adjustments, checking injector pressure, compression pressure etc.
- Inspection of engine head, head gasket and valve seat; valve lapping etc.
- Inspection and preparation of engine packing, tightening of bolts and nuts with specified torque.

Dismantling and Assembling of Clutch: 2 units

- Study of different components of clutch.
- Checking the condition of clutch plates/liners for wear, burning, smoothing etc. and decision about its replacement/repair.
- Assembling of clutch and its free play adjustment.

Dismantling and Assembling of Gear box and final drive: 4 units

- Study of different component of gearbox and final drive.
- Dismantling of gear box and final drive, checking the conditions of gears for any physical damage to their teeth, checking the backlash of the matting gears, condition of bearing, rubbing or heating due to wrong fitting.
- Assembling of gearbox and final drive and checking for its smooth functioning.

Dismantling and Assembling of Rotary drive and Chain case: 4 units

- Study of different component of rotary drive and chain case.
- Dismantling the chain case and checking the condition of chains, sprockets, chain tensioner etc.
- Assembling rotary drive and chain case and checking for its smooth functioning.
- Trouble shooting of engine, gearbox, final drive, rotary drive, chain case etc.

T - 5	REPAIR AND MAINTENANCE OF AUTO ELECTRICAL EQUIPMENTS AND BATTERY RE-CONDITIONING	
Duration: 3 weeks	Effective working days : 15	Total Unit : 30
Beneficiary :-	Technicians and Supervisor of Govt. Departments / Agencies, Private Operators, Ex -Service Men, Agril. Mechanic, ITI student etc.	

- 1. Fundamental of Electrical storage battery:** - Type, constructional details, voltage, amperage, constructional material, chemical reaction, capacity, electrolyte, effect of temperature on specific gravity and charging of battery.
- 2. Rebuilding of Battery:-** Diagnosis of dead battery, step wise dismantling of battery, inspection of components, requirement of material for rebuilding of a battery, step by step rebuilding of a battery, preparation of electrolyte and charging of battery.
- 3. Dynamo:-** Fundamentals, types, circuit diagram, constructional details, dismantling, checking and assembly, testing, maintenance and trouble shooting.
- 4. Armature Winding:** - Testing of commutator, insulation of slots, insulation of armature, hand winding, commutator connection, soldering, varnising, generator trouble shooting, armature inspection, short circuit, fault, leakage test, practice on commercial tractor vehicle armature.
- 5. Self Starter:-** Fundamentals, types and their circuit diagrams, constructional details, dismantling, study and assembly, care and maintenance, trouble shooting and testing.
- 6. Alternator:-** Fundamentals, types and their circuit diagrams, constructional details, dismantling, study and assembly, care and maintenance, trouble shooting and testing.
- 7. Voltage and Current regulator:-** Need for cutout, regulator, types and their application, circuit diagrams of different type of Regulators, checking and adjusting regulator, maintenance and care, trouble shooting.
- 8. Wiring:** -Wiring circuit of different tractors, location of faults and their remedies.
- 9. Lights :-** Front, back, side requirement of CMVR lighting, Parking, Plough, brake lights & indicators

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