BULLETIN 2002 - 19 **Date: September 16, 2002**

U.S. Department of Labor Employment and Training Administration Office of Apprenticeship Training, Employer and Labor Services (OATELS) Washington, D.C. 20210	Distribution: National Office All Field Tech SD+RD+SAC+; Lab.Com	Subject: New Apprenticeable Occupation- Powerplant Mechanic Code: 200
Symbols: DSNIP/FG		Action: Immediate

PURPOSE: To inform the Office of Apprenticeship Training, Employer and Labor Services (OATELS), Bureau of Apprenticeship and Training (BAT) Staff of a new apprenticeable occupation:

Powerplant Mechanic
RAIS Code: 1045
O*NET Code: 49-3011.02
Training Term: 3000 hours
Type of Training: Time - based

BACKGROUND: The United Services Military Apprenticeship Program (USMAP) initiated the apprenticeability request for this occupation.

Powerplant Mechanic will be added to the list of occupations recognized as apprenticeable by the Office of Apprenticeship Training, Employer and Labor Services when the list is reissued.

ACTION: BAT staff should review and retain a copy of this bulletin, including all attachments, as a source for developing apprenticeship standards and/or providing technical assistance.

Attachment

WORK PROCESS SCHEDULE
POWERPLANT MECHANIC
RAIS CODE: 1045 O*NET CODE: 49-3011.02

DESCRIPTION: Repairs and maintains the operating condition of aircraft engines. Replaces or repairs worn defective, or damaged components; disassembles and inspects engine parts for wear, warping, cracks, and leaks; reassembles engine and installs engine in aircraft; listens to operating engine to detect and diagnose malfunctions; tests engine operations; removes engine from aircraft using hoist or forklift trucks; reads and interprets manufacturer's maintenance manuals and service bulletins. Adjusts repairs or replaces electrical wiring system and aircraft accessories. Inspect, identify, remove and treat aircraft corrosion and perform aircraft cleaning. Inspect, check, service and repair propeller synchronizing.

SKILL AREAS **HOURS**

A. GENERAL TASKS.....1100

1. **BASIC ELECTRICITY (100)**
   Calculate and measure capacitance and inductance; calculate and measure electrical power; measure voltage, current, resistance, and continuity; determine the relationship of voltage, current, and resistance in electrical circuits; read and interpret aircraft electrical circuit diagrams, including solid state devices and logic functions; inspect and service batteries.

2. **AIRCRAFT DRAWINGS (100)**
   Use aircraft drawings, symbols, and system schematics; draw sketches of repairs and alterations; use blueprint information; use graphs and charts.

3. **WEIGHT AND BALANCE (20)**
   Weigh aircraft; perform complete weight-and-balance check and record data.

4. **FLUID LINES AND FITTINGS (25)**
   Fabricate and install rigid and flexible fluid lines and fittings.

5. **MATERIALS AND PROCESSES (50)**
   Identify and select appropriate non-destructive testing methods; perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections; perform basic heat-treating processes; identify and select aircraft hardware and materials; inspect and check welds; perform precision measurements.

6. **GROUND OPERATION AND SERVICING (150)**
   Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards; identify and select fuels.

7. **CLEANING AND CORROSION CONTROL (145)**
   Identify and select cleaning materials, inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning.

8. **MATHEMATICS (75)**
   Extract roots and raise numbers to a given power; determine areas and volumes of various geometrical shapes; solve ratio, proportion, and percentage problems; perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.

9. **MAINTENANCE FORMS AND RECORDS (125)**
   Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records; complete required maintenance forms, records, and inspection reports.

10. **BASIC PHYSICS (70)**
    Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.

11. **MAINTENANCE PUBLICATIONS (70)**
    Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturer'' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory materials, read technical data.

12. **MECHANIC PRIVILEGES AND LIMITATIONS (70)**
    Exercise mechanic privileges within the limitations prescribed by FAR 65.

13. **AVIATION SAFETY (100)**
    Fuels, lubricants, or hydraulic fluids; flammable cements, rosins, sealants, paints and thinners; fluids under pressure; compressed gasses, including oxygen; batteries; aviation ordnance and pyrotechnics; electrical and electronic circuits; operating radio transmitters and radar systems; hazardous noise sources.

B. POWERPLANT THEORY AND MAINTENANCE.....600

1. **RECIPROCATING ENGINES (100)**
   Inspect and repair a radial engine; overhaul reciprocating engine; inspect, check, service, and repair reciprocating engines and engine installations; install, troubleshoot, and remove reciprocating engine.

2. **TURBINE ENGINES (250)**
   Overhaul turbine engine; inspect, check, service, and repair turbine engines and turbine engine installations; install, troubleshoot, and remove turbine engines.

3. **ENGINE INSPECTION (250)**
   Perform powerplant conformity and airworthiness inspections.

C. POWERPLANT SYSTEMS AND COMPONENTS 1300

1. **ENGINE INSTRUMENT SYSTEMS (100)**
   Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems; inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and R.P.M indicating systems.

2. **ENGINE FIRE PROTECTION SYSTEMS (100)**
   Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.

3. **ENGINE ELECTRICAL SYSTEMS (100)**
   Repair engine electrical system components; install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.

4. **LUBRICATING SYSTEMS (100)**
   Identify and select lubricants; repair engine lubrication system components; inspect, check, service, troubleshoot, and repair engine lubrication systems.

5. **IGNITION AND STARTING SYSTEMS (100)**
   Overhaul magneto and ignition harness; inspect service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components; inspect service, troubleshoot, and repair turbine engine electrical starting systems; inspect, service, and troubleshoot turbine engine pneumatic starting systems.

6. **FUEL METERING SYSTEM (100)**
   Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls; overhaul carburetor; repair engine fuel metering system components; inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.

7. **ENGINE FUEL SYSTEMS (100)**
   Repair engine fuel system components; inspect, check, service, troubleshoot, and repair engine fuel systems.

8. **INDUCTION AND ENGINE AIRFLOW SYSTEMS (100)**
   Inspect, check, troubleshoot, service, and repair engine ice and rain control systems; inspect, check, troubleshoot, service, and repair heat exchangers, supercharger and turbine engine airflow and temperature control systems; inspect, check, service, and repair carburetor air intake and induction manifolds.

9. **ENGINE COOLING SYSTEMS (100)**
   Repair engine cooling system components; inspect, check, troubleshoot, service, and repair engine-cooling systems.

10. **ENGINE EXHAUST SYSTEM COMPONENTS (100)**
    Repair engine exhaust system components; inspect, check, troubleshoot, service, and repair engine exhaust systems; troubleshoot and repair engine thrust reverser systems and related components.

11. PROPELLERS (100)

Inspect, check, service, and repair propeller synchronizing and ice control systems; identify and select propeller lubricants; balance propellers; repair propeller control systems components; inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers and propeller governing systems; install, troubleshoot, and remove propellers; repair aluminum alloy propeller blades.

12. UNDUCTED FANS (100)

Inspect and troubleshoot unducted fan systems and components.

13. AUXILIARY POWER UNITS (100)

Inspect, check, service and troubleshoot turbine-driven auxiliary power units.

TOTAL HOURS.....3000

RELATED INSTRUCTION OUTLINE FOR
POWERPLANT MECHANIC
O*NET CODE: 49-3011.02 RAIS CODE: 1045

Instruction **Approximate Hours/Lab**

1. **Aviation Machinists Mate Common Core/Hazardous Material 8/0**
   Discuss Rules, Regulation and Standard Operating Procedures (SOP) for the Aviation Machinists Mate Common Core. For your Safety Information on Hazardous Material, Material Safety Sheets and Hazardous Materials you may come in contact with.

2. **Physics & Theory 10/0**
   Provides the basic foundation in Physics most applicable to Aviation. This lesson will give you the terms and laws of physics, aircraft sections, and the theory and factors affecting flight.

3. **Introduction to Composite Materials 3/0**
   You will learn about composite materials, composite structures and structure names, composite materials used on naval aircraft, personnel hazards, and safety precautions associated with composite materials. An understanding of this information is essential to prevent loss of personnel or damage to equipment.

4. **Hydro Mechanical Theory 3/0**
   Jet engine maintenance personnel must have an understanding of Hydro mechanical system operation, which will be used in the fuel and lubrication systems of aircraft engines. This lesson will cover the basics needed as to understand components, operation, and safety requirements.

5. **Propulsion Theory 8/0**
   Provide you with information on the development of gas turbines, and the terms used in the development of thrust.

6. **Gas-Turbine Engine types and Designations 3/0**
   As an aircraft mechanic you are required to know the different types and designation of engines used in military aircraft. You are required to learn and identify the types of engines and the designation numbering system used on engines.

7. **Gas-Turbine Engines 13/0**
   The purpose is to provide you with information on the location, designation, and purpose of the different sections and component of the gas-turbine engine.

8. **Basic Electricity 8/0**
   The purpose of this information is to familiarize you with the forms of electricity, how it is produced and the terms and symbols used in basic electricity, the electrical diagrams used, what electromagnetic

interference (EMI) is, and the electrical test equipment used when dealing with electricity.

9. **Aircraft and Engine Electrical System 6/0**
   This information is to familiarize you with the aircraft and engine electrical systems, components, the purpose, and how they function. Safety as always is very important when working with electricity.

10. **Engine Electrical System 6/0**
    To provide you with information about engine lubrication system of a jet engine, the types of components used in the lubrication system, types of lubricants, system servicing and proper disposal procedures. An understanding of this information is essential to prevent loss of personnel or damage to equipment.

11. **Aircraft Fuel System 4/0**
    To provide you with information on the aircraft fuel system, the types of aviation fuels used the components and their use during fueling, and the methods used in fueling of aircraft.

12. **Engine Fuel System 4/0**
    To provide you with information on the engine fuel systems and its components, requirements and purposes. This information will enable you to better understand how the system operates by tracing the path of flow through the system and through each component.

13. **Technical Publications Library 8/0**
    Provides information about the types of technical publications used throughout Naval/Marine Corps aviation, the formats in which publications are found, numbering systems used, meaning of the warnings/cautions/notes listed in publications, and the quality assurance programs dealing with technical publications.

14. **Aviation Tools/Hardware 8/14**
    To familiarize you with the tool control program as it is utilized throughout Naval/Marine Corps aviation. Identify the use of different types of common and precision tools, and hardware while performing maintenance on aircraft and engines.

15. **Introduction to Corrosion 16/0**
    To provide information on the corrosion control program, the theory of corrosion, and materials and procedures for the prevention and repair of corrosion damage to equipment.

16. **Naval Aviation Maintenance Program 14/14**
    To provide information about the program that establishes the policies and procedures used throughout Naval/Marine Corps aviation. The inspection/requirements used to maintain aircraft and powerplants in an operational status, the organizations within maintenance departments that maintain the equipment in an operational status and procedures to document aviation maintenance.

17. **Helicopter Powerplants/System Familiarization 31/33**
    Provides students with information on helicopter, terms and definitions, and the principle structural units of a helicopter. Flight controls and their location, powerplants, power transmission system, rotary wing systems inspection/troubleshooting, and aircraft cleaning/lubrication. Student performs general and specialized maintenance on Helicopter engines utilizing the appropriate technical manuals while observing safety, FOD prevention and tool control. Documents action taken on VIDS/MAF work order.

18. Turbojet Powerplants/Systems Familiarization..... 31/33

Provides students with information on the types, components, systems, and operation of gas-turbine engines. You will perform general and specialized maintenance on jet engines utilizing the appropriate technical manuals while observing safety, FOD prevention and tool control. Documents action taken on VIDS/MAF work order.

19. Turboprop Powerplants/Systems Familiarization..... 24/40

Provides the student with the characteristics, and uses of the T-56 turboprop powerplant, the torque meter assembly, reduction gear assembly, engine oil system, bleed air system, propeller terminology and components, power control rigging and adjustment. You will perform general and specialized maintenance on Turboprop engines utilizing the appropriate technical manuals while observing safety, FOD prevention and tool control. Documents action taken on VIDS/MAF work order.

TOTAL HOURS 208/134