Item 17. **Overhaul magneto** and ignition harness. (Level 2)

Project 1A & 1B & 1C & 1D

Purpose: To acquaint the student with the proper procedures of overhauling Magnetos.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(6) Cessna 402C Service Manual and Parts Manuals
(7) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(8) Lycoming O-235 and O-540 Engine Service Manuals
(9) Continental T S I O-520 Service Manual

Equipment and Tools Needed:

(1) Lycoming O-320 Tear Down Engine
(2) Piper Comanche 250 (PA 24)
(3) Cessna 402C
(4) Piper Colt (PA 22-108)
(5) T-100 Overhaul Kit
(6) Bendix Magneto Internal E-gap Timing Kit
(7) Magneto Timing Box
(8) Mag Tester Model 200

Supplies and Materials Needed:

(1) None

Procedure:

Complete following procedure on the assigned project 1A & (1B or 1C or 1D)

(1) Remove assigned Magneto from the engine it is mounted on.
(2) Disassemble and inspect the magneto assigned in order to determine its airworthiness. Fill in all the requested information on page 3 for both assigned magnetos.
(3) On page 3, list all parts (individually by part number) which are normally replaced during overhaul and lay them out on the bench for the Instructor's inspection.
(4) On page 3, list all discrepancies found and recommend repairs. Each discrepancy found must be shown to and signed off by the Instructor. This is for all damage found on items not normally replaced.
(5) Research AD Notes and list them on page 3. Comply with the applicable ones as much as possible. Sign off all applicable ones as part of your Logbook entry *as if you complied with them* (whether you complied with them or not).
(6) Prepare for and take an Oral Check by the Instructor on Overhaul Procedures and Magneto Theory

with the magneto disassembled. Satisfactory completion of the Oral will be indicated by the Instructor initialing the blank: _____

(7) Reassemble the magneto using the Instructor-provided parts as required. The Instructor must verify and initial the following when accomplished correctly: Internal Timing blank: _____ Reassembly blank: _____

(8) On page 4, list the Test Procedure required after overhaul, install your magneto onto one of the Mag Testers and operationally test as per the manufacturer's Manual. The Instructor must verify correct operations by initialing below. Operations blank: _____

(9) Give the Slick magneto to the Instructor and proceed to Project 2. Take the Bendix magneto and proceed with it to Project 2.

(10) Complete a proper Maintenance Record entry for the above.

Project 1A Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Lycoming O-320 Tear Down Engine
(3) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual
(4) Lycoming Direct Drive Overhaul Manual

Project 1B Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Piper Comanche 250 (PA 24) or Cessna 402C or Piper Colt (PA 22-108) – as assigned in Project 1
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(5) Lycoming O-540 Engine Service Manuals

Project 1C Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(3) Cessna 402C Service Manual and Parts Manuals
(4) Continental T S I O-520 Service Manual

Project 1D Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(3) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(4) Lycoming Direct Drive Overhaul Manual

ASSIGNED MAGNETO INFORMATION:

MAKE	Champion Aerospace (Slick)	Teledyne Continental (Bendix)
MODEL		
PART #		
SERIAL #		
TYPE OF CAPACITOR		
E-GAP POSITION		
TYPE OF AUXILIARY STARTING SYSTEM		
RETARD ANGLE (IF APPLICABLE)		
POINT GAP: MAIN POINTS		
POINT GAP: RETARD POINTS (IF APPLICABLE		
COMING-IN SPEED		

2. OVERHAUL PARTS NORMALLY REPLACED:

3. DISCREPANCIES AND RECOMMENDED REPAIRS:

4. AD NOTES:

5. TESTING PROCEDURE:

Item 17. **Overhaul magneto** and ignition harness. (Level 2)

Project 2A & 2B & 2C & 2D & 2E

Purpose: To acquaint the student with the proper procedures of Magneto-to-Engine Timing.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(6) Cessna 402C Service Manual and Parts Manuals
(7) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(8) Lycoming O-235 and O-540 Engine Service Manuals
(9) Continental T S I O-520 Service Manual
(10) AeroTrain AE-30-320 Operation Manual
(11) AeroTrain AE-30-520 Operations Manual

Equipment and Tools Needed:

(1) Piper Comanche 250 (PA 24)
(2) Cessna 402C
(3) Piper Colt (PA 22-108)
(4) AeroTrain AE-30-320 Training Aid
(5) AeroTrain AE-30-520 Training Aid
(6) Magneto Timing Box

Supplies and Materials Needed:

(1) None

Procedure:

Complete following procedure on the assigned project (2A or 2B) & (2C or 2D or 2E as assigned in Project 1)

(1) Remove one of the Slick magnetos (as assigned) from the AS-30-320 or AE-30-520 Training Aid and have the Instructor verify its removal by initialing in the blank. _____
(2) Install the magneto and properly time it to the engine as per the manufacturer's instructions.
(3) Have the Instructor verify the correct timing by initialing in the blank._____

(4) Operate the engine and check the magneto and magneto switch for proper operations. The Instructor must initial in the blank when properly completed blank:_____

(5) Repeat Steps 2 – 4 for the assigned aircraft and Bendix magneto from Project 1.

(6) Complete a Maintenance Record entry for the operational checks.

Project 2A Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5

(2) AeroTrain AE-30-320 Training Aid

(3) AeroTrain AE-30-320 Operation Manual

(4) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual

(5) Lycoming Direct Drive Overhaul Manual

Project 2B Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapter 2 & Volume 2 Chapters 6 & 10

(2) AeroTrain AE-30-520 Training Aid

(3) AeroTrain AE-30-520 Operations Manual

(4) Continental T S I O-520 Engine Service Manual

Project 2C Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5

(2) Piper Comanche 250 (PA 24) or Cessna 402C or Piper Colt (PA 22-108) – as assigned in Project 1

(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual

(4) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog

(5) Lycoming O-540 Engine Service Manuals

Project 2D Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5

(2) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual

(3) Cessna 402C Service Manual and Parts Manuals

(4) Continental T S I O-520 Service Manual

Project 2E Item 17. **Overhaul magneto** and ignition harness. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5

(2) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual

(3) Piper Colt PA 22-108 Flight Manual and Parts Catalog

(4) Lycoming Direct Drive Overhaul Manual

Item 17. **Overhaul** magneto and **ignition harness**. (Level 2)

Project 3A & 3B & 3C

Purpose: To acquaint the student with the proper procedures of overhauling an Ignition Harness.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(6) Cessna 402C Service Manual and Parts Manuals
(7) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(8) Lycoming O-235 and O-540 Engine Service Manuals
(9) Continental T S I O-520 Service Manual

Equipment and Tools Needed:

(1) Piper Comanche 250 (PA 24)
(2) Cessna 402C
(3) Piper Colt (PA 22-108)
(4) Magneto Timing Box
(5) Ignition Lead High Tension Tester

Supplies and Materials Needed:

(1) Ignition Harness Hardware Kit

Procedure:

Complete following procedure on the assigned project 3A or 3B or 3C

(1) Inspect the assigned Ignition Harness and list all discrepancies noted.
(2) Replace an Ignition Lead as assigned by the Instructor. Have the Instructor verify proper replacement by initialing in the blank._____
(3) Test the repaired Harness with the High Tension Tester for both Continuity and Grounds. Show the Instructor how to use the Tester. Have the Instructor verify proper operation of the Tester by initialing in the blank. _____
(4) Complete a Maintenance Record entry for the above.

Project 3A Item 17. **Overhaul** magneto and **ignition harness**. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Piper Comanche 250 (PA 24)
(3) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(4) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(5) Lycoming Direct Drive Overhaul Manual

Project 3B Item 17. **Overhaul** magneto and **ignition harness**. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Cessna 402C
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Cessna 402C Service Manual and Parts Manuals
(5) Continental T S I O-520 Service Manual

Project 3C Item 17. **Overhaul** magneto and **ignition harness**. (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Piper Colt (PA 22-108)
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(6) Lycoming O-235 Engine Service Manuals

Item 18. **Inspect, service, troubleshoot, and repair reciprocating** and turbine **engine ignition systems and components.** (Level 2)

Project 4A & 4B &4C

Purpose: To acquaint the student with the proper procedures of inspecting, servicing, troubleshooting, and repairing reciprocating engine ignition systems and components.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Champion Aerospace (Slick) 4200/6200 or 4300/6300 Maintenance & Overhaul Manual
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(6) Cessna 402C Service Manual and Parts Manuals
(7) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(8) Lycoming O-235 and O-540 Engine Service Manuals
(9) Continental T S I O-520 Service Manual
(10) Spark Plug Cleaner/Tester Instruction Manual

Equipment and Tools Needed:

(1) Piper Comanche 250 (PA 24)
(2) Cessna 402C
(3) Piper Colt (PA 22-108)
(4) Spark Plug Cleaner/Tester
(5) Torque wrench with Spark Plug socket

Supplies and Materials Needed:

(1) Anti-seize thread lubricant

Procedure:

Complete following procedure on the assigned project 4A or 4B or 4C

(1) Inspect the assigned Ignition System and list all discrepancies noted.
(2) Repair the Instructor assigned discrepancy.
(3) Remove two spark plugs. By observation and analysis of the firing end of the Plugs, determine if the cylinder is suffering from any mechanical or combustion anomalies. Show the Plugs to the Instructor and explain any findings.
(4) Clean, gap, and test the Plugs using the Spark Plug Cleaner/Tester as per the Instruction Manual.
(5) Show the Instructor the repaired Spark Plugs and have him/her verify proper procedures by initialing in the blank. _____
(6) Reinstall the Spark Plugs in the engine.
(7) Complete a Maintenance Record entry for the above.

(8) Complete the Troubleshooting Chart below and on page 3.

Project 4A Item 18. **Inspect, service, troubleshoot, and repair reciprocating** and turbine **engine ignition systems and components.** (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Piper Comanche 250 (PA 24)
(3) Piper Comanche 250 (PA-24) Service Manual and Parts Catalog
(4) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(5) Lycoming Direct Drive Overhaul Manual

Project 4B Item 18. **Inspect, service, troubleshoot, and repair reciprocating** and turbine **engine ignition systems and components.** (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Cessna 402C
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Cessna 402C Service Manual and Parts Manuals
(5) Continental T S I O-520 Service Manual

Project 4C Item 18. **Inspect, service, troubleshoot, and repair reciprocating** and turbine **engine ignition systems and components.** (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Piper Colt (PA 22-108)
(3) Teledyne Continental (Bendix) X42002 S-20/S200 Service Manual
(4) Lycoming Direct Drive Overhaul Manual
(5) Piper Colt PA 22-108 Flight Manual and Parts Catalog
(6) Lycoming O-235 Engine Service Manuals

TROUBLESHOOTING CHART:

PROBLEM	PROBABLE CAUSE(S)	CHECK PROCEDURE	REPAIR
Spark Plug fails to spark in Tester			
Ticking noise in radio			
Oil on Spark Plug firing end			
Engine runs on one Magneto only (engine dies when switched to other magneto)			
Excessive Magneto RPM drop during Operational Check but smooth running (not rough and missing)			
Magneto Contact Points burned			
Engine runs rough and misses when switched to one magneto			

Item 18. **Inspect, service, troubleshoot, and repair** reciprocating and **turbine engine ignition systems and components.** (Level 2)

Project 5A & 5B

Purpose: To acquaint the student with the proper procedures of inspecting, servicing, troubleshooting, and repairing turbine engine ignition systems and components.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) International Aero Engines V-2500 Installation and Operations Manual
(3) Pratt & Whitney PT6A-20 Maintenance Manual

Equipment and Tools Needed:

(1) Pratt & Whitney PT6A-20
(2) International Aero Engines V-2500-A1

Supplies and Materials Needed:

(1) None

Procedure:

Complete following procedure on the assigned project 5A or 5B

(1) Inspect the assigned Ignition System and list all discrepancies noted.
(2) Repair the Instructor assigned discrepancy.
(3) Remove one igniter and inspect as per the manufacturer's information.
(4) Reinstall the Igniter Plug in the engine.
(5) Complete a Maintenance Record entry for the above.
(6) Complete the Troubleshooting Chart below and on page 3.

Project 5A Item 18. **Inspect, service, troubleshoot, and repair** reciprocating and **turbine engine ignition systems and components.** (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Pratt & Whitney PT6A-20
(3) Pratt & Whitney PT6A-20 Maintenance Manual

Project 5B Item 18. **Inspect, service, troubleshoot, and repair** reciprocating and **turbine engine ignition systems and components.** (Level 2)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5

(2) International Aero Engines V-2500-A1

(3) International Aero Engines V-2500 Installation and Operations Manual

TROUBLESHOOTING CHART:

PROBLEM	**PROBABLE CAUSE**	**CHECK PROCEDURE**	**REPAIR**
No igniter spark with the system turned on	1.		
	2.		
	3.		
	4.		
Long interval between sparks			
Weak or low-intensity spark			

Cape Cod Community College AMTS

Practical Project Guide for AMT 265 Powerplant Curriculum, Subject Items 17 – 19b

Part 147, Appendix D, Part 2, Subject E – Ignition & Starting Systems

Item19.a. Inspect, service, troubleshoot, and repair turbine engine electrical starting systems. (Level 3)

Project 6

Purpose: To acquaint the student with the proper procedures of inspecting, servicing, troubleshooting, and repairing turbine electrical starting systems.

References:

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) International Aero Engines V-2500 Installation and Operations Manual
(3) Pratt & Whitney PT6A-20 Maintenance Manual

Equipment and Tools Needed:

(1) Pratt & Whitney PT6A-20
(2) International Aero Engines V-2500-A1

Supplies and Materials Needed:

(1) None

Procedure:

Complete following procedure on the assigned project 6

(1) Inspect the assigned Starter and list all discrepancies noted.
(2) Repair the Instructor assigned discrepancy.
(3) Complete a Maintenance Record entry for the above.
(4) Complete the Troubleshooting Chart below and on page 2.

Project 6 Item19.a. Inspect, service, troubleshoot, and repair turbine engine electrical starting systems. (Level 3)

(1) 14 CFR, Federal Aviation Regulations for Aviation Maintenance Technicians (Current Edition), Aviation Maintenance Technician Handbook – Powerplant, Volume 1 (FAA-H-8083-32) Chapters 4 & 5
(2) Pratt & Whitney PT6A-20
(3) Pratt & Whitney PT6A-20 Maintenance Manual

TROUBLESHOOTING CHART:

PROBLEM	PROBABLE CAUSE	CHECK PROCEDURE	REPAIR
STARTER-GENERATOR			
Engine does not rotate when the starter is turned on with a Battery start	a.		
	b.		
	c.		
	d.		
Engine does not rotate when the starter is turned on with an External Power start			
Hung start occurs			
AIR TURBINE STARTER			
Engine does not rotate when the start switch is closed	a.		
	b.		
	c.		
Starter does not rotate to normal cutoff speed	a.		
	b.		
	c.		
Metal particles found magnetic drain plug			

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