

SECTION 18**PO 370 – RECOGNIZE ASPECTS OF AIRCRAFT MANUFACTURING AND MAINTENANCE**

1. **Performance.** Recognize Aspects of Aircraft Manufacturing and Maintenance.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet will discuss aspects of aircraft manufacturing and maintenance, by:
 - a. identifying components of the pitot static system;
 - b. identifying aircraft manufacturers; and
 - c. describing routine aircraft inspection procedures.
4. **Remarks.** N/A.
5. **Complementary Material**
 - a. Complementary material associated with PO 370 is designed to enhance the cadet's knowledge of aircraft manufacturing and maintenance, to include:
 - (1) EO C370.01 (Identify Tasks required to Maintain Aircraft),
 - (2) EO C370.02 (Describe Materials Used in Aircraft Construction),
 - (3) EO C370.03 (Identify Basic Power Tools Used in Aircraft Manufacturing and Maintenance),
 - (4) EO C370.04 (Construct an Aluminium Model Biplane), and
 - (5) EO C370.05 (Tour an Aircraft Restoration Project).
 - b. Some complementary material offered in previous levels may be selected as complementary training in Proficiency Level Three, specifically:
 - (1) EO C270.01 (Participate in a Presentation Given by an Employee From the Aircraft Manufacturing or Maintenance Industry, A-CR-CCP-802/PG-001, Chapter 4, Section 15), and
 - (2) EO C270.03 (Tour an Aircraft Manufacturing or Maintenance Facility, A-CR-CCP-802/PG-001, Chapter 4, Section 15).
 - c. Complementary training associated with PO 370 is limited to a total of 12 periods conducted during sessions or on a supported day. Squadrons are not required to use all 12 periods.

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EO M370.01 – IDENTIFY COMPONENTS OF THE PITOT STATIC SYSTEM

1. **Performance.** Identify Components of the Pitot Static System.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify components of the pitot static system, to include:
 - a. parts, to include:
 - (1) static vents,
 - (2) static line,
 - (3) pitot pressure chamber, and
 - (4) pitot line; and
 - b. instruments, to include:
 - (1) air speed indicator,
 - (2) vertical speed indicator, and
 - (3) altimeter.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----|---|------------------------|--------|-----------------------|
| TP1 | Explain the pitot static system, to include: <ol style="list-style-type: none"> a. static vent, b. static line, c. pitot pressure chamber, d. pitot line, and e. operation of the pitot static system. | Interactive Lecture | 10 min | C3-116 (pp. 39–40) |
| TP2 | Explain instruments of the pitot static system, to include: <ol style="list-style-type: none"> a. airspeed indicator, b. vertical speed indicator, and c. altimeter. | Interactive Lecture | 15 min | C3-116 (pp. 40–45) |

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to review, clarify, emphasize, and summarize the pitot static system.
7. **References.** C3-116 (ISBN 0-9680390-5-7) MacDonald, A. F., & Peppler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO M370.02 – IDENTIFY AIRCRAFT MANUFACTURERS

1. **Performance.** Identify Aircraft Manufacturers.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify aircraft manufacturers, to include:
 - a. Cessna Aircraft Company,
 - b. Diamond Aircraft Industries,
 - c. Piper Aircraft, Inc.,
 - d. Viking Air,
 - e. Airbus, and
 - f. The Boeing Company.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----|---|---------------------|--------|--------------------------------------|
| TP1 | Discuss manufacturers of light aircraft, to include: <ol style="list-style-type: none"> a. Cessna Aircraft Company, b. Diamond Aircraft Industries, c. Piper Aircraft, Inc., and d. Viking Air. | Interactive Lecture | 15 min | C3-232 C3-233 C3-234 C3-235 |
| TP2 | Discuss manufacturers of heavy aircraft, to include: <ol style="list-style-type: none"> a. Airbus, and b. The Boeing Company. | Interactive Lecture | 5 min | C3-236 C3-237 |
| TP3 | Conduct an activity to allow the cadets to test their ability to identify aircraft manufacturers. | In-Class Activity | 5 min | |

5. **Time**
 - a. Introduction/Conclusion: 5 min
 - b. Interactive Lecture: 20 min
 - c. In-Class Activity: 5 min
 - d. Total: 30 min

6. **Substantiation**

- a. An interactive lecture was chosen for TPs 1 and 2 to orient the cadets to aircraft manufacturing companies give an overview of them, and to generate interest.
- b. An in-class activity was chosen for TP 3 as it is an interactive way to allow cadets to test their ability to identify aircraft manufacturers.

7. **References**

- a. C3-232 Cessna Aircraft Company. (2008). *Welcome to Cessna.com*. Retrieved February 8, 2008, from <http://cessna.com/>.
- b. C3-233 Diamond Aircraft Industries. (2008). *Diamond Aircraft*. Retrieved February 8, 2008, from <http://www.diamondair.com/mainpage.php>.
- c. C3-234 Piper Aircraft, Inc. (2008) *Piper: Freedom of Flight*. Retrieved February 8, 2008, from <http://www.newpiper.com/>.
- d. C3-235 Viking Air. (2008). *Viking*. Retrieved February 8, 2008, from <http://www.vikingair.com/>.
- e. C3-236 Airbus. (2008). *Airbus*. Retrieved February 8, 2008, from <http://www.airbus.com/en/>.
- f. C3-237 Boeing. (2008). *Boeing*. Retrieved February 8, 2008, from <http://www.boeing.com/>.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.

9. **Learning Aids.** N/A.

10. **Test Details.** N/A.

11. **Remarks.** The manufacturers and the aircraft included in this lesson were chosen because cadets frequently encounter these aircraft. Time limitations prevented more manufacturers and aircraft from being included.

EO M370.03 – DESCRIBE ROUTINE AIRCRAFT INSPECTION PROCEDURES

1. **Performance.** Describe Routine Aircraft Inspection Procedures.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall describe routine aircraft inspection procedures, to include:
 - a. the pilot's inspection prior to flight;
 - b. the cockpit check prior to flight; and
 - c. required inspection schedules.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----|---|---------------------|--------|----------------------|
| TP1 | Describe the pilot's inspection prior to flight, to include: <ol style="list-style-type: none"> a. overall appearance of the aircraft, b. fuselage/empennage, c. wings, d. fuel, e. engine/propeller, f. instruments check, g. Emergency Locator Transmitter (ELT), h. seat belts, and i. doors and windows. | Interactive Lecture | 10 min | C3-116 (pp. 281–283) |
| TP2 | Describe the pilot's cockpit check prior to flight, to include: <ol style="list-style-type: none"> a. a written checklist for the specific aircraft type, b. run-up of the engine(s), c. switches, d. flaps set for takeoff, and e. control surface operation. | Interactive Lecture | 10 min | C3-116 (p. 283) |

| TP | Description | Method | Time | Ref |
|-----|---|---------------------|-------|-----------------|
| TP3 | Discuss an aircraft's required inspections, to include: <ol style="list-style-type: none"> a. Certificate of Airworthiness (C of A), b. Annual Airworthiness Information Report (AAIR), and c. approved maintenance schedules. | Interactive Lecture | 5 min | C3-116 (p. 107) |

5. **Time**

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|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to orient the cadets to routine aircraft inspections, give an overview of them, and to generate interest.
7. **References.** C3-116 (ISBN 0-9680390-5-7) MacDonald, A. F., & Peppler, I. L. (2000). *From the Ground Up: Millennium Edition*. Ottawa, ON: Aviation Publishers Co. Limited.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** Handout of checklist main points.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO C370.01 – IDENTIFY TASKS REQUIRED TO MAINTAIN AIRCRAFT

1. **Performance.** Identify Tasks Required to Maintain Aircraft.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify tasks required to maintain aircraft, to include:
 - a. maintenance, and
 - b. elementary work.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----|---|---------------------|--------|--|
| TP1 | Discuss aircraft maintenance work, to include: <ol style="list-style-type: none"> a. maintenance certification, and b. examples of maintenance requiring certification. | Interactive Lecture | 10 min | C3-096 (pp. 345–347) |
| TP2 | Discuss elementary work, to include: <ol style="list-style-type: none"> a. specific tasks designated as elementary work, and b. recording elementary work. | Interactive Lecture | 15 min | C3-096 (pp. 345–347) C3-210 C3-211 |

5. **Time**
 - a. Introduction/Conclusion: 5 min
 - b. Interactive Lecture: 25 min
 - c. Total: 30 min
6. **Substantiation.** An interactive lecture was chosen for this lesson to review, clarify, emphasize and summarize the tasks required to maintain aircraft.
7. **References**
 - a. C3-096 (ISBN 1715-7382) Transport Canada. (2006). *Aeronautical Information Manual*. Ottawa, ON: Her Majesty the Queen in Right of Canada.
 - b. C3-210 (ISBN 0-660-62327-7) Transport Canada. (2003). *Aircraft Journey Log*. Ottawa, ON: Her Majesty the Queen in Right of Canada.
 - c. C3-211 (ISBN 0-660-19017-6) Transport Canada. (2005). *Airframe Log*. Ottawa, ON.

8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** Handouts of Record of Maintenance and Elementary Work.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO C370.02 – DESCRIBE MATERIALS USED IN AIRCRAFT CONSTRUCTION

1. **Performance.** Describe Materials Used in Aircraft Construction.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall describe materials used in aircraft construction, to include:
 - a. wood,
 - b. fabric,
 - c. composites, and
 - d. metals.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----------|---|---------------------|-------------|---------------------------|
| TP1 | Describe wood and fabric used in aircraft construction, to include: <ol style="list-style-type: none"> a. species of wood, b. assessment of wood, c. organic fabric, and d. inorganic fabric. | Interactive Lecture | 5 min | C3-136 (pp. 3-1 to 3-16) |
| TP2 | Describe composites used in aircraft construction, to include: <ol style="list-style-type: none"> a. fibreglass, b. aramid, c. carbon/graphite, and d. ceramic. | Interactive Lecture | 15 min | C3-136 (pp. 3-22 to 3-27) |
| TP3 | Describe metals used in aircraft construction, to include: <ol style="list-style-type: none"> a. aluminum, b. Alclad®, c. magnesium, d. titanium, and e. stainless steel. | Interactive Lecture | 5 min | C3-136 (pp. 2-1 to 2-15) |

5. **Time**

- | | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 25 min |
| c. Total: | 30 min |

6. **Substantiation.** An interactive lecture was chosen for this lesson to review, clarify, emphasize and summarize materials used in aircraft construction.
7. **References.** C3-136 (ISBN 0-88487-207-6) Sanderson Training Systems. (2001). *A&P Technician Airframe Textbook*. Englewood, CO: Jeppesen Sanderson Inc.
8. **Training Aids.** Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO C370.03 – IDENTIFY BASIC POWER TOOLS USED IN AIRCRAFT MANUFACTURING AND MAINTENANCE

1. **Performance.** Identify Basic Power Tools Used in Aircraft Manufacturing and Maintenance.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required
 - b. Denied: N/A.
 - c. Environmental: Classroom or training area large enough to accommodate the entire group.
3. **Standard.** The cadet shall identify basic power tools used in aircraft manufacturing and maintenance, to include:
 - a. power hand tools,
 - b. shop equipment, and
 - c. fastening tools.
4. **Teaching Points**

| TP | Description | Method | Time | Ref |
|-----|---|------------------------|-------|---------------------------------|
| TP1 | Describe the characteristics and methods of application for power hand tools used with aircraft, to include: <ol style="list-style-type: none"> a. drill, b. reciprocating saw, and c. sander. | Interactive Lecture | 5 min | C3-136 (pp. 2-19 to 2-24) |

| TP | Description | Method | Time | Ref |
|-----|---|---------------------|--------|---------------------------|
| TP2 | Describe the characteristics and methods of application for shop equipment used with aircraft, to include: a. forming tools, to include: (1) bar folding machine, (2) cornice brake, and (3) slip roll former; b. compound curve tools, to include: (1) mechanical compound curve tools, and (2) manual compound curve tools; and c. cutting tools, to include: (1) squaring shear, (2) scroll shear, (3) band saw, (4) drill press, (5) lathe, and (6) rotary punch press. | Interactive Lecture | 5 min | C3-136 (pp. 2-22 to 2-61) |
| TP3 | Describe the characteristics and methods of application for fastening tools and associated fasteners used with aircraft, to include: a. rivet gun, b. rivet cutter, c. bucking bar, d. squeezer, and e. rivet. | Interactive Lecture | 5 min | C3-137 (pp. 8-1 to 8-38) |
| TP4 | Conduct a tool identification activity. | In-Class Activity | 10 min | |

5. Time

| | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 5 min |
| b. Interactive Lecture: | 15 min |
| c. In-Class Activity: | 10 min |
| d. Total: | 30 min |

6. Substantiation

- a. An interactive lecture was chosen for TPs 1–3 to identify basic power tools used in aircraft manufacturing and maintenance and to give an overview of them.

- b. An in-class activity was chosen for TP 4 as it is an interactive way to confirm the cadets' comprehension of the material.

7. **References**

- a. C3-136 (ISBN 0-88487-205-6) Sanderson Training Systems. (2001). *A&P Technician Airframe Textbook*. Englewood, CO: Jeppesen Sanderson Inc.
- b. C3-137 (ISBN 0-88487-203-3) Sanderson Training Systems. (2000). *A&P Technician General Textbook*. Englewood, CO: Jeppesen Sanderson Inc.

8. **Training Aids**

- a. Presentation aids (eg, whiteboard/flip chart/OHP/multimedia projector) appropriate for the classroom/training area
- b. Handout of pictures of shop tools with and without titles.

9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** N/A.

EO C370.04 – CONSTRUCT AN ALUMINUM MODEL BIPLANE

1. **Performance.** Construct an Aluminum Model Biplane.
2. **Conditions**
 - a. Given:
 - (1) Instructions for constructing an aluminum model biplane,
 - (2) Templates for constructing aluminum model biplane parts,
 - (3) Mechanic's gloves,
 - (4) Materials for constructing an aluminum model biplane, to include:
 - (a) aluminum cans (36 per cadet),
 - (b) softwood 20 mm thick (fence boards),
 - (c) bottle caps (10 per cadet),
 - (d) corrugated cardboard,
 - (e) tape (masking),
 - (f) glue (two-part epoxy),
 - (g) poster board (thin cardboard not corrugated),
 - (h) Mylar,
 - (i) copper-coated welding rod or music wire (1/16 inch and 3/32 inch),
 - (j) cap nuts or toothpaste tube caps,
 - (k) bolts (3-1/2 inch 10-24 c/w nuts),
 - (l) bolts (2-1/2 inch 10-24 c/w nuts), and
 - (m) wire clip (speed nut);
 - (5) Tools for constructing an aluminum model biplane, to include:
 - (a) ball-peen hammer,
 - (b) pliers,
 - (c) flat screwdriver,
 - (d) rasp,
 - (e) hand stapler,
 - (f) staple gun,
 - (g) push-pin,
 - (h) hot glue gun,
 - (i) awl,
 - (j) wire cutters,

- (k) box knife,
- (l) scissors,
- (m) ruler,
- (n) felt-tipped pen,
- (o) needle-nose pliers,
- (p) adjustable wrench,
- (q) electric hand drill, and
- (r) hole saw bits (2-3/4 inch and 1-7/8 inch);

- (6) Supervision, and
- (7) Assistance as required.

- b. Denied: N/A.
- c. Environmental: Classroom or training area large enough to accommodate the entire group.

3. **Standard.** The cadet shall construct an aluminum model biplane.

4. **Teaching Points**

- a. Explain and prepare for mass production of aluminum model biplane parts.
- b. Demonstrate, explain and have the cadets manufacture the parts for aluminum model biplanes.
- c. Demonstrate, explain and have the cadets construct an aluminum model biplane.

5. **Time**

- | | |
|-----------------------------|---------|
| a. Introduction/Conclusion: | 20 min |
| b. Practical Activity: | 340 min |
| c. Total: | 360 min |

6. **Substantiation.** A practical activity was chosen for this lesson as it is an interactive way to introduce cadets to aluminum model biplane construction in a safe, controlled environment. This activity contributes to the development of these skills and knowledge in a fun and challenging setting.

7. **References**

- a. C3-146 Mathis, D. P. (2005). *Step by Step Construction Plans: Classic Biplane*. Helena, MT: B.C. Air Originals.
- b. C3-160 Mathis, D. P. (2007). *Building the B.C. Air Originals Biplane*. Helena, MT: B.C. Air Originals.

8. **Training Aids**

- a. Mechanic's gloves,
- b. Plans for constructing an aluminum model biplane,
- c. Templates for constructing an aluminum model biplane,
- d. Materials for constructing an aluminum model biplane (see paragraph 2.a.), and

- e. Tools for constructing an aluminum model biplane (see paragraph 2.a.).
 - f. C3-146 Mathis, D. P. *Step by Step Construction Plans: Classic Biplane*, Air Originals
9. **Learning Aids.** See paragraph 8.
10. **Test Details.** N/A.
11. **Remarks**
- a. Templates, models and spare parts should be preserved for future training years.
 - b. Scheduling this lesson as a weekend activity will reduce preparation and cleanup.
 - c. Before beginning the instruction of this EO the instructor shall be familiar with the aluminum model biplane assembly techniques shown at references C3-146 and C3-160.
 - d. This lesson may be conducted over a number of separate sessions.

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EO C370.05 – TOUR AN AIRCRAFT RESTORATION PROJECT

1. **Performance.** Tour an Aircraft Restoration Project.
2. **Conditions**
 - a. Given:
 - (1) Supervision, and
 - (2) Assistance as required.
 - b. Denied: N/A.
 - c. Environmental: The squadron Commanding Officer will determine the conditions suitable for this training.
3. **Standard.** The cadet shall tour an aircraft restoration project to identify aspects of:
 - a. the aircraft type being restored,
 - b. the history of the particular aircraft being restored, and
 - c. the work that is necessary for restoration.
4. **Teaching Points.** The tour guide is asked to:
 - a. identify aspects of the aircraft type that is being restored, to include:
 - (1) the manufacturer,
 - (2) purpose,
 - (3) history, and
 - (4) performance capabilities;
 - b. identify details of the particular aircraft being restored, to include:
 - (1) history, and
 - (2) restoration work that is being undertaken; and
 - c. facilitate a question and answer period.
5. **Time**

| | |
|-----------------------------|--------|
| a. Introduction/Conclusion: | 10 min |
| b. Field Trip: | 80 min |
| c. Total: | 90 min |
6. **Substantiation.** A field trip was chosen for this lesson as it will reinforce the knowledge of material taught in EO M230.02 (Describe the Main Components of an Airplane) through observation of a restoration project in a real-life setting.
7. **References.** N/A.

8. **Training Aids.** N/A.
9. **Learning Aids.** N/A.
10. **Test Details.** N/A.
11. **Remarks.** There is no instructional guide for this EO.