ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL THREE

INSTRUCTIONAL GUIDE

SECTION 3

EO M370.03 – DESCRIBE ROUTINE AIRCRAFT INSPECTION PROCEDURES

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-803/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Create a slide of Annex J.

Photocopy handout of Annex J for each cadet.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

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.

INTRODUCTION

REVIEW

IAW EO M370.01 (Identify Components of the Pitot Static System, Section 1), the cadet will review the purpose and importance of pitot tubes and static pressure vents.

OBJECTIVES

By the end of this lesson the cadet shall be expected to describe routine aircraft inspection procedures.

IMPORTANCE

It is important for cadets to be able to describe routine aircraft inspection procedures so they may appreciate the attention that must be given to safety in aviation.

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Teaching point 1 **Describe the Pilot's Inspection Prior to Flight**

Time: 10 min Method: Interactive Lecture

An aircraft operating in Canada is subject to inspections that allow the aircraft to operate safely. There are two main types of inspections:

1. inspections performed by the pilot prior to flight, and

2. inspections performed by a certified Aircraft Maintenance Engineer (AME) at designated intervals appropriate to the aircraft.



This inspection overview and all others described in this instructional guide are examples only. Always refer to and follow the recommendations of the manufacturer when carrying out any inspections and procedures. Individual models of aircraft may have special procedures and inspection guidelines that will vary from those described here.

PILOT'S INSPECTION PRIOR TO FLIGHT

Prior to every flight, a pilot completes a thorough inspection of the aircraft.

Overall Appearance of the Aircraft

The pilot stands a short distance away from the aircraft and observes the general overall appearance of the aircraft, looking for obvious defects. This is important because it may indicate large defects that could affect aerodynamics.

Before beginning the walk-around inspection, enter the cockpit and ensure that the aircraft is prepared for inspection, ensuring:

- battery and ignition switches are OFF,
- control locks are REMOVED, and
- landing gear switch is in the gear DOWN position.

Fuselage/Empennage

Inspection of the fuselage/empennage will include:

- baggage compartment: contents properly arranged and secured,
- static air pressure vents: free from obstructions,
- pitot tube: free from obstructions – cover REMOVED,
- conditions of the aircraft covering: missing or loose rivets, cracks, tears, etc.,
- anti-collision and navigation lights: condition,
- avionics antennas: cracks, oil or dirt, proper mounting and damage,
- wheel and tires: cuts, bruises, excessive wear, and proper inflation,
- oleo shock absorber and shock strut: proper inflation and cleanliness,
- wheel well and fairing: general condition and secure,
- limit and position switches: cleanliness and secure, and

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- ground safety lock: REMOVED.

Wings

Inspection of the wings will include:

- control surface locks: REMOVED,
- control surfaces: dents, cracks, excess play, condition of hinge pins and bolts,
- covering: missing or loose rivets, cracks, tears, etc,
- wing tip and navigation light: wing tip and light secure and undamaged,
- landing light: condition, cleanliness, secure, and
- stall warning vane: freedom of movement.

Prior to inspection, turn the master switch ON so that the stall warning signal can be checked when the vane is deflected.

Fuel

Inspection of the aircraft fuel systems will include:

- fuel quantity in tank: type and amount of fuel visually checked,
- fuel tank filler cap and fairing covers secure,
- fuel tank vents: clear of obstructions,
- drain valve: free of contaminants (drain fuel into a container to check), and
- drain cocks: operating properly without drips.

Engine/Propeller

Inspection of the engine/propeller will include:

- engine oil quantity: oil sump filled and filler cap and dipstick secured,
- general condition and evidence of fuel and oil leaks,
- cowling, access doors, and cowl flaps: condition checked and all secure,
- carburetor air filter: clean and secure,
- exhaust stacks: no cracks and studs tight,
- spark plugs: terminals secure and clean,
- engine mount: cracks and mounts secure,
- main fuel strainer: free of water or sediment (drain fuel into a container to check),
- cowling and baffle: seals snug and in place for proper engine cooling,
- propeller and spinner: security, oil leakage and condition. No deep nicks or scratches, and
- ground area under the propeller: free of loose stones, cinders, etc.

Instruments Check

Check all instruments for proper reading and, where applicable, fluid levels.

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Emergency Locator Transmitter (ELT)

Inspection of the ELT to ensure:

- it is mounted securely,
- tight connections,
- general condition (no corrosion),
- antenna secure,
- annual recertification completed and current,
- battery not time-expired, and
- ELT switch in ARMED position.

Seat Belts

Check that seat belts are secure and in good condition. Secure seat belts in unoccupied seats.

Doors and Windows

Close and secure doors, windows and canopy top.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. When does a pilot perform an inspection of the aircraft?

Q2. When does an AME perform an inspection of the aircraft?

Q3. What is an ELT?

ANTICIPATED ANSWERS

A1. Prior to flight.

A2. At designated intervals appropriate to the aircraft.

A3. Emergency Locator Transmitter.

Teaching point 2 **Describe the Pilot's Cockpit Check Prior to Flight**

Time: 10 min Method: Interactive Lecture

PILOT'S COCKPIT CHECK PRIOR TO FLIGHT

A systematic and careful cockpit check will be carried out prior to flight. It is extremely important to carry out a thorough pre-flight inspection. Small clues indicating a malfunctioning or damaged component may easily be missed in a hurried pre-flight check. Be vigilant after maintenance, painting or a modification job has been performed on the airplane. It is possible for components to be reinstalled incorrectly.

Written Checklist for the Specific Aircraft Type

The cockpit check will be made deliberately without haste using a written checklist. A definite sequence will be followed, moving clockwise around the cockpit. Each control will be touched and named aloud. Always work from a written checklist, not a memorized list, no matter how small the aircraft.

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Show the cadets the slide of Figure 17J-1.

There are many checklists relating to the various phases in the operation of an aircraft: pre-flight, before starting engines, before taxiing, engine run-up, before takeoff, takeoff and climb, cruise, descent, before landing, aborted landing, after landing and after shutdown, as well as checklists relating to emergency situations. Larger aircraft use them all. Whenever checklists are required for an aircraft, they must be used during all phases of the aircraft's operation to which they apply.

Run-Up of the Engine(s)

Position the aircraft into the wind when running up the engine(s) for engine cooling. Open and close the throttle slowly while checking operation, to include:

- oil pressure and temperature,
- RPM at full throttle,
- magneto operation,
- instruments, to include:
  - voltmeter,
  - ammeter,
  - manifold pressure gauge,
  - fuel pressure gauge,
  - tachometer,
  - vacuum, and
  - other instruments as shown on the written checklist;
- carburetor heat,
- fuel mixture control,
- idling speed,
- working engine temperature, and
- other parameters as shown on the written checklist.

Switches

Check switch positions for takeoff as per written checklist (eg, magneto ON, generator ON, anti-collision beacon ON, navigation lights ON, etc).

Flaps Set for Takeoff

Adjust the flaps to the takeoff position when ready for takeoff.

Control Surface Operation

Check freedom of all controls, to include:

- ailerons,

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- elevators, and
- rudders.

While moving the control column and rudder pedals, check that the control surfaces are responding in the proper direction of travel. This check is particularly important if the aircraft has undergone maintenance.

ACTIVITY

Time: 5 min

OBJECTIVE

The objective of this activity is to allow the cadets to experience completing a pilot checklist.

RESOURCES

Photocopies of Annex J for each cadet.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Give each cadet a photocopy of Figure 17J-1.
2. Divide the cadets into pairs.
3. Have one cadet, acting as pilot in command (PIC), call out the checklist steps for Pre-flight Inspection Cockpit.
4. Have the second cadet, acting as co-pilot, repeat commands and act out the procedure in any manner that the PIC deems appropriate.
5. Have the cadets trade roles and have the new PIC call out the checklist steps for Before Takeoff.
6. Have the new co-pilot repeat commands and act out the procedure.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is used to guide a cockpit check?

Q2. Why is it important to be vigilant after maintenance, painting or a modification job has been performed on the airplane?

Q3. Why position the aircraft into the wind when running up the engine(s)?

ANTICIPATED ANSWERS

A1. A written checklist.

A2. It is possible for components to be reinstalled incorrectly.

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A3. For engine cooling.

Teaching point 3 **Discuss an Aircraft's Required Inspections**

Time: 5 min Method: Interactive Lecture

AN AIRCRAFT'S REQUIRED INSPECTIONS

Certificate of Airworthiness (C of A)

A Transport Canada (TC) C of A can be issued for an aircraft, which fully complies with all standards of airworthiness certification (for its applicable type).



TC regulations require that an aircraft carry its C of A on every flight.

Annual Airworthiness Information Report (AAIR)

The owner of a Canadian aircraft, other than an ultralight aeroplane, must submit an AAIR using the prescribed report form. The aircraft owner will complete the annual report by entering all data required and signing the certification to vouch that the information supplied is correct.

Approved Maintenance Schedules

All Canadian aircraft, other than ultralight or hang gliders, shall be maintained in accordance with an approved maintenance schedule, approved by the Minister of Transport, which meets the Aircraft Equipment and Maintenance Standard.

Approved maintenance schedules shall:

- be based upon data obtained from an approved maintenance review board (MRB) report; or
- where no current MRB report exists, be based upon data obtained from:
  - the current recommendations of the aircraft manufacturer,
  - a maintenance schedule approved by the Minister for use by another operator, or
  - any other data acceptable to the Minister.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. When can a C of A be issued?

Q2. How often must an AAIR be submitted?

Q3. Who approves a maintenance schedule?

ANTICIPATED ANSWERS

A1. When an aircraft fully complies with all standards of airworthiness certification (for its applicable type).

A2. Annually.

A3. The Minister of Transport.

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END OF LESSON CONFIRMATION

QUESTIONS

Q1. When does a pilot perform an inspection of the aircraft?

Q2. What is used to guide a cockpit check?

Q3. What requires an aircraft to carry its C of A on every flight?

ANTICIPATED ANSWERS

A1. Prior to flight.

A2. A written checklist.

A3. TC regulations.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Safety in aviation requires attention to detail and it can only be successful through careful planning and preparation.

INSTRUCTOR NOTES/REMARKS

N/A.

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.

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