Cape Cod Community College AMTS

Practical Project Guide for AMT 105 General Curriculum, Subject Item 11

Part 147, Appendix B, Subject C. Weight and Balance

Item 11. Weigh aircraft (Level 2)

# Project 1A & 1B

Purpose: To acquaint the student with the proper procedures for weighing an aircraft (Cessna Model 402C).

References:

(1) 14 CFR Federal Aviation Regulations for Aviation Maintenance Technicians, Aviation Maintenance Technician Handbook – General, Volume 1 (FAA-H-8083-30), Chapter 4
(2) Cessna 402C Maintenance Manual
(3) Pilots Operating Handbook 402C
(4) Pilots Operating Handbook Piper PA-24-250
(5) Jackson Aircraft Weighing System Instructions, Top of Jack Load (M2000-3-10 30000lb)

Equipment and Tools Needed:

(1) Cessna 402C
(2) Piper PA-24-250
(3) 8 Ton Long Ram Aircraft Jacks (quantity 3)
(4) Jackson Aircraft Weighing System Model M2000 Digital System
(5) 3.5-inch Top of the Ram Adapter (quantity 3)
(6) Spirit Level, Torque Wrench, (100 inch pounds), ½ inch socket
(7) Aircraft Jack Pads (quantity 2)

Supplies and Materials Needed:

(1) Airplane Weighing Form
(2) Calculator
(3) Pencil and Paper

Procedure:

**Complete the following procedure on project 1A or 1B**

(1) Preparation:

a) Establish the basic empty weight of the aircraft

(2) Weighing Equipment:

a) Install a load cell into the adapter on top of each jack and center jacks under each jack pad. Each load cell has a color that matches its electrical connector that matches the color on the digital indicator (red, yellow, blue). Connect load cells to the M2000 high speed 3 channel indicator. Plug in the unit power supply and turn on the unit. The unit is now on and displays all the available channels. Press the >0< function to zero all the load cell readings. The scale is now ready for use.

(3) Jacking and Leveling:

a) Have one student at each jack, a student at each leveling point with a spirit level, one student operating the digital indicator, one student filling out the weighing form and a student team leader making sure that jacking up and down is slow, level and safe. He/she will sure only the personnel necessary are around the aircraft during the jacking procedure. Students will start jacking under the direction of the team leader, once all three wheels have cleared the deck, the team leader will have the students with the spirit levels go to their assigned points on the aircraft and place their levels on the aircraft. Adjust fuselage jacks as required to level the airplane. Once level the team leader will signal to the student operating the digital indicator to read the cells. The student will select channel 1 (red cell) and read the weight, select channel 2 (blue cell) and read the weight, then select channel 3 (yellow cell). The student filling out the weighing form will check the total weight he/she has calculated against what the digital indicator when channel 4 (total weight) is selected.

(4) Lowering the Aircraft:

a) Under the direction of the team leader, the students will slowly and evenly lower the aircraft by turning the pressure relief valve counter clockwise. Students will turn off power to the digital indicator, remove the wire and load cells from the adapters and remove the adapters from the jacks. Return all items to their case and store jacks.

**Project 1A** Item 11. Weigh aircraft (Level 2)

References:

(1) 14 CFR Federal Aviation Regulations for Aviation Maintenance Technicians (2016 Edition), Aviation Maintenance Technician Handbook – General, Volume 1 (FAA-H-8083-30), Chapter 4
(2) Cessna 402C Maintenance Manual
(3) Pilots Operating Handbook 402C
(4) Jackson Aircraft Weighing System Instructions, Top of Jack Load (M2000-3-10 30000lb)

**Project 1B** Item 11. Weigh aircraft (Level 2)

References:

(1) 14 CFR Federal Aviation Regulations for Aviation Maintenance Technicians (2016 Edition), Aviation Maintenance Technician Handbook – General, Volume 1 (FAA-H-8083-30), Chapter 4
(2) Pilots Operating Handbook Piper PA-24-250
(3) Jackson Aircraft Weighing System Instructions, Top of Jack Load (M2000-3-10 30000lb)

Cape Cod Community College AMTS

Practical Project Guide for AMT 105 General Curriculum, Subject Item 12

Part 147, Appendix B, Subject C – Weight and Balance

Item 12. Perform weight and balance check computations and record data (Level 3)

# Project 2

Purpose: To have the student demonstrate the proper procedures to perform a complete weight and balance check on an aircraft (Cessna Model 402C).

References:

(1) 14 CFR Federal Aviation Regulations for Aviation Maintenance Technicians, Aviation Maintenance Technician Handbook – General, Volume 1 (FAA-H-8083-30), Chapter 4
(2) Pilots Operating Handbook for Model 402C Manual
(3) Weights of each jack point and total from weighing the airplane (Cessna 402C)

Equipment and Tools Needed:

(1) None

Supplies and Materials Needed:

(1) Airplane Weighing Forms (figures 6-1, 6-2, 6-3, and 6-4 of the Pilots Operating Handbook)
(2) Calculator
(3) Pencil and Paper

Procedure:

**Complete following procedure on project 2**

**Project 2** Item 12. Perform weight and balance check computations and record data (Level 3)

(1) Preparation:
    a. Make copies of figures 6-1 and 6-4 of the Pilot's Operating Handbook
(2) Basic Weight Computations:
    a. Enter the scale reading and tare from all three scales in the columns in the Airplane as Weighed Table. Compute and enter values for the Net Weight and Airplane Total as Weighed columns in figure 6-1.

b. Determine the Center of Gravity (CG) arm of the airplane using the formula presented in figure 6-1.
c. Enter the total net weight and CG arm in the Basic Empty Weight and Center of Gravity Table columns. Multiply the Weight (lbs.) entry times the CG Arm (inches) entry to determine Moments (inch pounds / 100) entry. Add Weight and Moment of unusable fuel. Total each of the three columns to determine basic empty weight, CG arm, and moment.

(3) Weight and Balance Record:

a. Record Basic Empty Weight, CG arm, and moment in the Weight and Balance Record (figure 6-4). Under Section B, Standard and Optional Equipment (page 6-28 and 6-29), find both 8th row seats (kits 11300 and 11400) and using the data supplied:

1. Remove them from the airplane on the Weight and Balance Record.
2. Find the Refreshment Center (kit 12800) and using the data supplied add this item to the Weight and Balance Record.
3. Calculate the new CG and Weight on the Weight and Balance Record.

(4) Weight and Balance Determination for Flight:

a. Take the Basic Empty weight, CG arm, and Moment from the latest entry shown on the Weight and Balance Record (figure 6-4) and using the data from figure 6-2 sheet 1:

1. Add a pilot who weighs 180 lbs. in seat 1, passengers in seat 3 weighs 200 lbs. in seat 4 weighs 170 lbs. and in seat 6 weighs 190 lbs.
2. Put 85 lbs. of luggage in the nose baggage compartment and take on a 150 gallons of fuel.
3. Calculate the new weight and CG and using figure 6-2, sheet 4, see if the airplane falls within limits for maximum takeoff weight and CG.

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