EO M231.03 – DESCRIBE THE TYPES OF DRAG THAT ACT UPON AN AIRCRAFT

1. **Performance**: Describe the Types of Drag That Act Upon an Aircraft

2. **Conditions**:

   a. Given:

      (1) Supervision; and

      (2) Assistance as required.

   b. Denied: N/A.

   c. Environmental: Suitable classroom facilities or training area large enough to accommodate the entire group.

3. **Standard**: In accordance with specified references, the cadet shall describe the types of drag that act upon an aircraft, to include:

   a. parasite drag; and

   b. induced drag.

4. **Teaching Points**:

TP	Description	Method	Time	Refs
TP1	Explain that drag is an important and useful force which allows a pilot to control the aircraft's flight. Introduce the two types of drag: a. parasite drag; and b. induced drag.	Interactive Lecture	5 min	C3-116 (p. 23)
TP2	Define the components of parasite drag, including: a. form drag; and b. skin friction.	Interactive Lecture	5 min	C3-116 (p. 23)
TP3	Demonstrate form drag.	In-Class Activity	15 min	C3-092 (p. 14)
TP4	Explain that induced drag results from aircraft parts which actively produce lift, such as wings and that both drag and lift increase with angle of attack.	Interactive Lecture	10 min	C3-116 (p. 23)
TP5	Conduct an activity to demonstrate induced drag.	In-Class Activity	20 min	C3-116 (p. 23)

5. **Time**:

   a. Introduction / Conclusion: 5 min

   b. Interactive Lecture: 20 min

   c. In-Class Activity: 35 min

   d. Total: 60 min

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6. **Substantiation**:

   a. An interactive lecture was chosen for TP1, TP2 and TP4 to introduce the subject of drag and give an overview of it.

   b. An in-class activity was chosen for TP3 and TP5 as it is an interactive way to provoke thought and stimulate interest among cadets.

7. **References**:

   a. C3-017 (ISBN 1-895569-23-0) Schmidt, N. (1998). *Fabulous Paper Gliders.* New York, NY: Sterling Publishing.

   b. C3-058 (ISBN 1-4027-3034-9) Schmidt, N. (2005). *Paper Creations Paper Airplanes.* New York, NY. Sterling Publishing.

   c. C3-092 (ISBN 0-7460-0978-)X Edom, H., Butterfield, M., Heddle, R. and Unwin, M. (1992). *The Usborne Book of Science Activities: Volume Two.* Tulsa OK: EDC Publishing.

   d. C3-116 A-CR-CCP-263/PT-001 (ISBN 0-9680390-5-7) MacDonald, A. F. and Peppler, I. L. (2000). *From the Ground Up: Millennium Edition.* Ottawa, ON: Aviation Publishers Co. Limited.

8. **Training Aids**:

   a. Presentation aids (e.g. whiteboard/flipchart/OHP) appropriate for the classroom/training area; and

   b. Model of a light fixed-wing aircraft with wing struts, fixed gear and control surface detail.

9. **Learning Aids**:

   a. 8.5 x 11 paper;

   b. Bristol board; and

   c. Tape.

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

11. **Remarks**: It is recommended that the two periods required for this EO be scheduled consecutively.

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