

FLIGHT ON ASSYMETRIC POWER

1. The failure of one engine in a conventional twin engine aircraft will result in:
 - a) A reduction in total lift and drag.
 - b) An asymmetry of thrust and a reduction in drag.
 - c) An asymmetry of thrust and drag and a reduction in total lift.
 - d) No change in the basic forces provided sufficient airspeed is maintained.

2. The *primary* factor affecting a pilot's ability to control a twin engine aircraft following the failure of one engine is:
 - a) Altitude.
 - b) Aircraft configuration.
 - c) Airspeed.
 - d) The position of the centre of gravity.

3. Which of the following responses is correct?
 - a) The term 'critical engine' is used to describe the engine which if failed will lead to the largest yawing moment for a given set of conditions.
 - b) The closer the engines are placed to the aircraft's centre-line the greater will be the yawing moment from the operating engine when flying on asymmetric power.
 - c) The term 'critical engine' will only apply to a conventional twin engine aircraft if it has propellers which rotate in opposite directions.
 - d) None of the above responses is correct.

4. If one engine fails during flight the aircraft will immediately:
 - a) Yaw towards the direction of the failed engine if climbing power is being used.
 - b) Roll in the direction of the failed engine.
 - c) Yaw towards the direction of the operating engine if less than climbing power is being used.
 - d) Both responses (a) and (b) are correct.

5. If the 'critical engine' fails:
- a) The aircraft will be unable to maintain altitude.
 - b) The yawing moment will be greater than if the opposite engine had failed.
 - c) The power of the operating engine will need to be reduced if directional control is to be maintained.
 - d) All the above responses are correct.
6. In relation to the residual side forces produced as a result of single engined flight, which of the following responses is correct:
- a) If rudder is used to prevent yaw the side forces will be eliminated.
 - b) If sufficient rudder deflection is being used to maintain a constant direction, the side forces will be balanced out and the aircraft's longitudinal axis will be aligned exactly along the line of flight.
 - c) Although the use of rudder may result in the side forces being balanced out, it will not be possible to centre the ball of the balance indicator.
 - d) At normal cruising airspeeds the side forces can be balanced out, but the aircraft's longitudinal axis will be slightly offset from the line of flight.
7. If an engine fails in a conventional twin engined aircraft, the windmilling drag from the propeller of the inoperative engine:
- a) Will cause a significant increase in the total drag.
 - b) Will be extremely small and have no effect upon the aircraft's performance.
 - c) Will tend to offset the yaw produced from the thrust of the operating engine.
 - d) Both responses (b) and (c) are correct.

8. Use of bank towards the operating engine during single engined flight will assist directional control when the aircraft is flying at a low airspeed. In this situation:
- a) The ball of the balance indicator will be in the centre although a slight yaw will be taking place.
 - b) The higher the airspeed the greater will be the required angle of bank.
 - c) The ball of the balance indicator will be in the centre although a small sideslip will be present.
 - d) The greater the angle of bank, the further will be the ball from its central position.
9. If the right engine is inoperative and cruising airspeed is being maintained:
- a) It will be easier to control a turn to the left.
 - b) It will be easier to control a turn to the right.
 - c) Control of turns in either direction will be the same.
 - d) All the above responses are incorrect.
10. In relation to controlling the aircraft during asymmetric flight at single engine cruising speed, which of the following responses is correct?
- a) The pilot should be careful to avoid a situation where directional control is obtained through the use of too much aileron and insufficient rudder.
 - b) The rudder should be used to prevent yaw, in conjunction with the minimum amount of aileron deflection to keep the wings laterally level.
 - c) For a fixed power setting the elevators should be used to control airspeed.
 - d) All the above responses are correct.
11. The effective force obtained from the use of rudder:
- a) Is not affected by the position of the centre of gravity provided it is within its permitted range.
 - b) Is reduced with a forward movement of the centre of gravity.
 - c) Is increased with a rearward movement of the centre of gravity.
 - d) Is reduced with a rearward movement of the centre of gravity.

12. Which of the following responses most correctly defines the conditions under which V_{mca} is established?
- a) Full take-off power on the operating engine.
The rearmost allowable centre of gravity.
The flaps in the take-off position.
A minimum rate of climb of 100 fpm.
The landing gear retracted.
The propeller of the inoperative engine windmilling in the fine pitch position.
 - b) Full take-off power on the critical engine.
The flaps set in the take-off position.
The landing gear extended.
The propeller of the inoperative engine windmilling in fine pitch.
A calculated 'mean' position of the centre of gravity.
 - c) Full take-off power on the operating engine.
The rearmost allowable centre of gravity.
The flaps in the take-off position.
The landing gear extended.
The propeller of the inoperative engine in the fine pitch position.
 - d) Full take-off power on the operating engine.
The rearmost allowable centre of gravity.
The landing gear retracted.
The propeller of the inoperative engine windmilling in the fine pitch position.
Flaps set in the take-off position.
13. In the case of an aircraft with normally aspirated engines:
- a) The indicated V_{mc} will increase as altitude is gained.
 - b) The indicated V_{mc} will decrease as altitude is gained.
 - c) The indicated V_{mc} will remain the same regardless of altitude.
 - d) None of the above responses is correct.

14. Assuming the left engine fails during cruising flight, which of the following responses is correct:
- a) You will need to apply pressure on the left rudder pedal to maintain directional control. The ailerons should then be held in the neutral position.
 - b) You will need to apply pressure on the left rudder pedal and raise the right aileron to maintain directional control.
 - c) You will need to apply pressure on the right rudder pedal and raise the right aileron
 - d) Pressure will have to be applied to the right rudder pedal and the ailerons should be used to keep the wings laterally level.
15. If the left engine fails during cruising flight and no corrective action is taken, the aircraft will:
- a) Yaw and roll to the left, followed by a spiral descent.
 - b) Yaw and roll to the right, followed by a spiral descent.
 - c) Maintain its original heading for a few seconds and then yaw and roll to the right.
 - d) All the above responses are incorrect.
16. If during cruising flight the right engine partially fails and the pilot closes the left throttle whilst attempting to maintain a constant direction, he will need to use:
- a) Additional left rudder.
 - b) Less right rudder.
 - c) Less left rudder.
 - d) More right rudder.
17. Which of the following responses is correct:
- a) If the left engine fails during a level turn, the aircraft will yaw and roll to the left and rapidly enter a spiral descent.
 - b) If an engine fails during a descent at low power in turbulent weather conditions, it may be difficult to immediately detect that engine failure has occurred.
 - c) Following an engine failure, the most pronounced yaw will occur during climbing flight at low airspeed and maximum power.
 - d) All the above responses are correct.

18. What is the best course of action if an engine fails during take-off and before V_{mca} is achieved?
- a) Maintain direction, reduce drag to a minimum and continue to accelerate to V_2 .
 - b) Immediately close both throttles and abandon the take-off.
 - c) Maintain directional control and attempt to remedy the failure.
 - d) Reduce power on the operating engine and if sufficient runway remains continue until V_2 is achieved, following which lift off can be made and V_{yse} obtained.
19. If an engine fails when the aircraft is in flight at an airspeed below V_{mc} , the first action apart from attempting to maintain direction with the rudder should be:
- a) Immediately increase the power to maximum.
 - b) Open both throttles to the full power position.
 - c) Partially close both throttles whilst lowering the aircraft's nose to gain airspeed as quickly as possible.
 - d) Leave both throttles open and feather the propeller of the failed engine.
20. Positive confirmation of which engine has failed should be established by:
- a) The engine instrument readings.
 - b) The direction of heading change.
 - c) Gradually closing the throttle of the engine suspected of failing.
 - d) Bringing one rpm lever fully back
21. In relation to the use of bank to assist directional control during single engined flight, which of the following responses is correct?
- a) The use of bank will only be necessary when the airspeed is high and the operating engine is developing more than 75% power.
 - b) Bank will be required if the airspeed is above V_{yse} and moderate power is being used on the operating engine.
 - c) Bank, applied towards the operating engine, should be used when the airspeed is low and high power is being used.
 - d) The use of bank towards the operating engine is unlikely to be required when the airspeed is low and high power is being developed from the operating engine.

22. In the event of one engine failing during flight, your first action should be to:
- a) Maintain directional and lateral control.
 - b) Identify the failed engine.
 - c) Reduce drag to a minimum.
 - d) Determine the cause of failure.

ANSWERS

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| 1.a | 17.d |
| 2.c | 18.b |
| 3.a | 19.b |
| 4.d | 20.c |
| 5.b | 21.c |
| 6.d | 22.a |
| 7.a | |
| 8.b | |
| 9.b | |
| 10.c | |
| 11.b | |
| 12 d | |
| 13.b | |
| 14.c | |
| 15.a | |
| 16.c | |