

SYLLABUS OF TRAINING

Initial Issue Of a Multi-Engine Airplane Rating.

Introduction

Aim:

This document describes in detail the course of flight and ground training which applicants seeking their first multi-engine rating should undertake. The syllabus is also applicable to subsequent endorsements.

Course Objective:

The objective of the course is to give the applicant a sound theoretical knowledge of multi-engine aircraft operation and to teach the candidate the skills necessary for the safe and competent operation of such aircraft.

Course Structure:

The course is comprise of five hours of ground training in the form of lectures and briefings. Seven hours of flight training for those adding a class rating to their certificate. Twelve hours of flight training for those applying for an initial commercial certificate.

Instruction:

Flight instruction shall be conducted by an authorized multi-engine instructor. The ground instruction is most desirably given by the same MEI.

Ground Training

The ground training for the multi-engine course is comprised of a total of five hours of ground lectures/briefings on subjects associated with the operation of the multi-engine airplane, including elements which are related to the type of airplane to be used on the course. The ground training should be integrated with flight training so that the maximum benefit is gained from time spent in the air.

The Outline Syllabus is as Follows:

L1 – Principles of Multi-Engine Flight	1Hr
L2 – Vmc and Safety Speed	1Hr
L3 – Effect of Engine Failure on Systems & Performance	1Hr
L4 – Aircraft Systems	1.5Hrs
L5 – Weight & Performance	1.5Hrs

L1 – Principles of Multi-Engine Flight

Aim:

To give the candidate a sound knowledge of the aerodynamic principles involved in multi-engine flight in normal and asymmetric conditions.

Briefing Contents:

- * The multi-engine environment:
 - Rationale for two engines
 - Configurations of multi-engine airplane
- * The multi-engine problem:
 - Engine failure situation, leading to:
 - Asymmetry
 - Control capability reduction
 - Performance reduction
- * Aerodynamics of asymmetry
 - Thrust
 - Offset thrust line
 - Asymmetric blade effect

- Drag
 - Offset drag line
 - Failed engine drag
 - Total drag
- Lift
 - Asymmetry
 - Slipstream effect
- Unbalanced flight
 - Effect of yaw
 - sideslip
- * Controllability in asymmetric flight
 - Rudder, aileron and elevator
 - Effectiveness
 - Limitations
 - Balanced/Unbalanced flight
 - Effect of bank/sideslip
 - Effect on controls
 - Trimming

L2 – Vmc and Safety Speed

Aim:

To ensure the applicant has a full understanding of the principles and factors affecting Vmc and safety speed.

Briefing:

- * Vmc
 - Definition
 - Derivation
 - Factors affecting:
 - Power
 - Weight/CG
 - Altitude
 - Drag (undercarriage, flaps, propeller)
 - Critical engine
 - Pilot handling:
 - Skill
 - Reaction time
 - Effect of bank
- * Best rate of climb single engine (Vyse)
 - Definition
 - Derivation

L3 – Effect of Engine Failure on Systems and Performance

Aim:

To give the applicant a sound knowledge of the effects on performance in flight caused by one inoperative engine.

Briefing Content:

- * Effect on systems:
 - Electric
 - Fuel
- * Effect on power:
 - Excess power available
 - Optimum speed
- * Zero thrust:

- Definition
- Purpose

L4 – Aircraft Systems

Aim:

To give the applicant a thorough understanding of the aircraft systems.

Briefing Content:

- * Airplane systems
 - Fuel
 - Electrical
 - Gear
 - Braking
 - Engines
 - Propeller
- * Limitations
 - Airframe
 - Speeds

L5 – Weight & Performance

Aim:

To familiarize the applicant with weight and performance calculations.

Briefing Content:

- * Revision of principles of weight and performance calculations, use of Graphs and tables.
- * Practice calculations for the aircraft, using flight manual data:
 - Accelerate/Stop distance
 - Take off
 - Climb out (to include, as appropriate the one engine inoperative Case.)

Flight Training

The flight training for the issuance of an initial commercial multi-engine certificate consists of twelve hours of dual flight instruction in a multi-engine aircraft. For those applying for a private or commercial multi-engine class add-on, the flight portion consist of seven hours of flight training.

The Outline Syllabus is as Follows:

- F1** – Initial Type Conversion
- F2** – General Handling & Pattern Work
- F3** – Introduction to Asymmetric Flight
- F4** – Critical & Safety Speed
- F5** – Asymmetric Performance & Pattern Work
- F6** – Instrument Flying
- F7** – Cross-Country

F1 – Initial Type Conversion

Aim:

To familiarize the applicant with the handling characteristics of the aircraft in normal flight.

Air Exercise:

- * Pre-flight preparation and aircraft inspection
- * Start-up and Taxiing
 - Cockpit familiarization
 - Checklist procedures

- Engine start
- Engine fire on the ground
- Taxiing
 - Use of brakes
 - Use of throttles
- * Takeoff and climb
 - Checklist procedures
 - Normal Takeoff/crosswind takeoff
 - After takeoff checks
 - Normal climb, climbing turns
- * Cruise
 - Level off
 - Use of trim
 - Effect of landing gear, flaps
 - Normal turns
 - Cruise checks
- * Steep Turns
- * Vmc Demo
- * In Flight emergencies
- * Demonstration normal pattern
 - Checklist procedures
 - Approach
 - Normal landing

F2 – General Handling & Pattern Work

Aim:

To revise airplane and engine handling and practice pattern work.

Air Exercise:

- * Start up and taxi
- * Normal takeoff and climb
- * Stalling:
 - Checks
 - Clean configuration – power off
 - Approach configuration – power off
 - Approach configuration – power on
- * Circuit procedures – Both engine operative
 - Normal configuration
 - No flap approach and landing
 - Go around
- * Landing gear emergency procedures

F3 – Introduction to Asymmetric Flight

Aim:

To teach the applicant basic airplane handling in the event of engine failure.

Air Exercise:

- * Performance climb
- * Single engine flight
 - Demonstrate full feathering drill (engine shutdown)
 - Checklist procedures
 - Airplane handling with one engine inoperative:
 - Trim position for balance flight
 - Flight controls positions for balance flight
 - Demonstrate fuel cross-feed
 - Demonstrate unfeather drill (airstart)

- Checklist procedures
- * Simulated engine failure
 - Effect of engine failure
 - Visual
 - Instrument
 - Performance
 - Control after engine failure
 - Yaw
 - Roll
 - Pitch
 - Identification of failed engine
 - Dead foot – dead engine
 - instrument indications
 - Engine failure in turns
 - Identification
 - Control
- * -Practice Handling in asymmetric flight
- * Simulated single engine instrument approach

F4 – Critical and Safety Speed

Aim:

To investigate the significance of critical speed and takeoff safety speed.

Air Exercise:

- * Engine failure during takeoff
 - Rejected takeoff
 - Single engine climb
- * Demonstrate asymmetric pattern work, go around and landing

F5 – Asymmetric Performance & Pattern Work

Aim:

To teach the applicant to handle an engine failure after takeoff and carry out an asymmetric circuit, go around and landing.

Air Exercise:

- * Takeoff brief
- * Engine failure after takeoff
- * Asymmetric circuit:
 - Power settings and speed
 - Use of flap & gear operation
 - Normal
 - Emergency
 - Visual committal height
 - consideration
 - Go around
 - Decision
 - Actions
 - Landing

F6 – Instrument Flying

Aim:

To teach the applicant instrument flight on a multi-engine airplane in normal and asymmetric conditions.

Air Exercise:

- * Normal flight
 - Straight and level
 - Climbing and descending
 - Turning
 - Recovery from unusual attitudes
- * Asymmetric flight
 - Engine failure, identification and control
 - Straight and level
 - Climbing and descending
 - Turning
 - Effects of flap and gear
- * Asymmetric instrument approach and circle to land.

F7 – Cross-Country Flights (for those applying for an initial commercial certificate)

Aim:

To complete one day and one night vfr cross-country flight.

Air Exercise:

- * As per FAR 61.129(b)(iii) one day vfr cross-country
 - Straight line
 - Two Hours
 - 100 nautical miles
- * As per FAR 61.129(b)(iv) one night vfr cross-country
 - Straight line
 - Two Hours
 - 100 nautical miles

This document has been prepared for O&S Aviation LLC,

By:

Oscar Espinoza

ATP,CFI,CFI-I,MEI