Flight Instructor Course Handbook

Volume 3: The Multi-Engine CRI (ME) Course

Be-76 Duchess Edition

A Study Guide by Steve Pells **Optimised for iPad** Version 2.27 02Oct24

Flight Instructor Course Handbook

The following volumes are available:

Volume 1: FI Course
Volume 2: Single Engine CRI Course
Volume 3: Multi Engine CRI Course
Volume 4: Instrument Instructor & IRI Course
Volume 5: Night Instructor Course
Volume 6: FIC Preparation Course
Volume 7: MCCI Course
Volume 8: Aerobatics Instructor Course
Volume 9: CPL Instructor Guidance

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Abbreviations

(A)	Aeroplane	**IFR**	Instrument flight rules	**SE**	Single-engine or Senior Examiner
ACA	Asymmetric committal altitude	**IMCR**	UK IMC Rating	**SEP**	Single-engine piston
ACH	Asymmetric committal height	**IMC**	Instrument meteorological conditions	**SFI**	Synthetic flight instructor
AFM	Aeroplane flight manual	**IR**	Instrument rating	**STI**	Synthetic training instructor
AoC	Assessment of competence	**IRE**	Instrument rating examiner	**SPA**	Single pilot aeroplane
ATO	Approved training organisation	**IRI**	Instrument rating instructor	**SPIC**	Student pilot in command
CCC	Course completion certificate	**IRR**	IR renewal & revalidation examiner	**SSEA**	Simple single-engine aeroplane
CFI	Chief flying instructor	**IR(R)**	Instrument rating (Restricted)	**SSR**	Standard stall recovery
CPL	Commercial pilot's licence	**LAPL**	Light aircraft pilot's licence	**TEM**	Threat & error management
CRE	Class rating examiner	**MCCI**	Multi crew co-operation instructor	**TK**	Theoretical knowledge
CRI	Class rating instructor	**ME**	Multi-engine	**TMG**	Touring motor glider
CRM	Crew resource management	**MEP**	Multi-engine piston	**TOC**	Top of climb
CSU	Constant speed unit	**MI**	Mountain rating instructor	**TOD**	Top of descent
DTO	Designated training organisation	**MP**	Multi-pilot or Manifold pressure	**TRI**	Type rating instructor
EASA	European Union Aviation Safety Agency	**MPL**	Multi pilot licence	**Ts & Ps**	Temperatures and pressures
EFATO	Engine failure after take-off	**Nm**	Nautical mile	**V_{AT}**	Threshold speed
FCL	Flight crew licencing	**NPPL**	UK national private pilot's licence	**VFR**	Visual flight rules
FE	Flight examiner	**OEI**	One engine inoperative	**VMC**	Visual meteorological conditions
FFS	Full flight simulator	**P1**	Pilot in command	**Vmc**	Minimum control speed
FI	Flight instructor	**P1/s**	Pilot in command under supervision	**Vmca**	Minimum control speed in the air
FI (R)	Restricted Flight instructor	**PIC**	Pilot in command	**VP**	Variable pitch
FIC	Flight instructor course	**PICUS**	Pilot in command under supervision	**Vr**	Rotate Speed
FICI	Flight instructor course instructor	**PoH**	Pilot's operating handbook	**V_{REF}**	Final approach reference speed
FIE	Flight instructor examiner	**PPL**	Private pilot's licence	**VS**	Vertical speed
FNPT	Flight navigation procedures trainer	**PuT**	Pilot under training	**V_{S1}**	Stall speed in a specific configuration
FT	Follow through	**QXC**	Qualifying cross country (defunct)	**V_{S0}**	Stall speed in landing configuration
FTI	Flight test instructor	**ROC**	Rate of climb	**Vtoss**	Take of safety speed
G/A	Go-around	**ROD**	Rate of descent	**Vx**	Best angle of climb speed
(H)	Helicopter	**RTO**	Rejected take-off	**Vxse**	Best angle of climb speed single engine
HDG	Heading	**RW R/W**	Runway	**Vy**	Best rate of climb speed
HoT	Head of Training	**S&L**	Straight and level	**Vyse**	Best rate of climb speed single engine

Introduction

This document is designed to assist the trainee Instructor through his/her journey from qualified and proficient pilot, to a MEP (land) Class Rating Instructor, or an FI(A) with privileges to instruct on MEP (land) aeroplanes.

It contains lots of background imformation and suggested briefs and Air Exercises. It is by no means the only way of achieving the qualification.

In this document, for ease of writing, the generic student is referred to as 'he'. This is not meant to imply that women cannot be taught to fly! It is just a recognition that by far the majority of flying students are male. In this document, the word 'he' should be taken to mean any student pilot (or instructor or examiner) of any gender, or no gender, or gender-fluid.

Overview

The path from pilot to instructor is a journey. Long, and at times arduous, but worth the effort. Usually, before embarking on a journey, it is customary to know a bit about the destination.

In our case, the destination is a CRI or FI(i) add-on. Before getting there it is worth knowing a bit about what it is we are aiming for.

What follows is a discussion about the various types of instructor certificate and the courses to which they relate.

Since the UK left EASA on 31 December 2020, things have changed. Initially much remains the same other than terminology. However, over time, it is expected that the information in this guide will become out of date. It is hoped to keep it revised as much as possible.

Part 1: Instructor Certificates

Instructor Certificates

The Class Rating Instructor (CRI) Certificate

The Flight Instructor (FI) Certificate

Instructor Certificates

There are several diferent types of instructor certificate available. Subject to sucessful completion of an assessment of competence with a suitably qualified examiner, the CAA will issue an appropriate Flight Instructor Certificate. The various types are listed below:

CRI: **Class Rating Instructor** – Allows the holder to train pilots who already hold a licence, but does not permit ab-initio flight training.

It Allows the holder to conduct training towards the issue of a class rating, refresher training, checkouts and differences/familiarisation training. It also allows the holder to train a LAPL holder for upgrade to a PPL.

Most of the different instructional privileges can be added to the CRI certificate except Instrument privileges (for which he can obtain a standalone IRI) or FIC privileges (the ability to teach flight instructor courses). The CRI cannot train towards the issue of a night rating.

FI: **Flight Instructor** - Required for ab-initio training to LAPL or PPL standard and beyond.

The following will not be covered in this document.

IRI: **Instrument rating Instructor** – Allows the holder to instruct towards the issue of an EIR, IR or IR(R) in single engined aeroplanes unless the holder also has privileges to instruct for MEP. An IRI cannot instuct ab-initio students unless he also holds an FI certificate.

MCCI: **Multi Crew Co-Operation Instructor** – Allows the instructor to teach for multi crew operation in airliners, simulators etc

SFI: **Synthetic Flight Instructor:** Allows the holder to instruct in flight simulators for Single and Multi-Pilot aeroplanes.

STI: **Synthetic Training Instructor** - Allows the holder to instruct in flight simulators for the issue of a licence and for Single-Pilot aeroplanes.

TRI: **Type Rating Instructor** - Allows the holder to instruct towards the issue of a type rating for those aircraft which require one.

MI: **Mountain Rating Instructor** - Allows the holder to instruct towards the issue of a Mountain Rating

FTI: **Flight Test Instructor**

The Class Rating Instructor CRI (ME) Certificate

Once qualified, the instructor will be a CRI with privileges to instruct for the class or classes shown in section XII of the licence. Unlike an FI, the CRI is NOT initially restricted to instructing under the supervision of another instructor.

There are no FCL 945 privileges associated with a CRI (ME) since a multi-engine rating cannot be revalidated by experience.

XII	Ratings, certificates and privileges
Class/Type/IR	**Remarks and Restrictions**
IR(Restricted)	Restricted to the privileges of the Instrument Meteorological Conditions Rating specified in the United Kingdom Air Navigation Order
MEP (land)	SP
Night	No Remark
	No Further Entries
Instructors	**Remarks and Restrictions**
CRI	For/MEP (land)/SP
	No Further Entries
Examiners No Entries	

Validity

A CRI (A) certificate is valid for 36 months plus the remainder of the month of test.

Revalidation & Renewal

Remember, revalidation is the process of extension of privileges **BEFORE** expiry has occurred. If it occurs after the rating or certificate has already expired, it is known as renewal. If a rating or certificate expires, it remains on the licence until the next time re-issued by the CAA (say to add a new rating), at which time it transfers to the reverse of the licence.

Revalidation of the CRI Certificate

Within the 3 year validity period of the certificate, 2 out of the following 3 must be completed:

- Complete 10 hours flight instruction during the validity of the certificate. Hours flown as an examiner on flight tests counts as instructional hours for this purpose.
- Complete **Instructor Refresher Training** any time within the 3 year validity. Note this is different to an FI seminar. CRI Refresher training is training as determined by an ATO authorised to train for the CRI course. It could be flying and/or ground work at the discretion of the Head of Training. See note below.

1. Complete an assessment of competence with an FIE any time in the validity period of the certificate. In this case, following a successful outcome, and all other requirements having been completed, the FIE will sign the licence for another 3 years.
2. **Note:** An assessment of competence with an FIE is required at least every other revalidation.
3. The order in which the Instructor Refresher Training and the AoC are carried out does not matter, but the 2 must be completed within the validity of the CRI certificate.

Renewal of the CRI Certificate

If expired, both of the following must be completed to renew:

- Complete **Instructor Refresher Training** any time within the 3 year validity. Note this is different to an FI seminar. CRI Refresher training is training as determined by an ATO authorised to train for the CRI course. It could be flying and/or ground work at the discretion of the Head of Training. See note below.
- Complete an assessment of competence with an FIE. If the CRI certificate is on the front of the licence, following a successful outcome, and all other requirements having been completed, the FIE will sign the licence for another 3 years. If the certificate is on the reverse of the licence, then the licence must be re-issued from the CAA which will attract a fee.
- The order in which the Refresher Training and AoC are carried out does not matter, but the 2 must be completed within 12 months of each other.

Then the on-line form **SRG 2159** should be completed unless the instructor is enrolled in e-licensing in which case the details should be updated there.

From the Aircrew Regulations concerning CRI Refresher Training:

- *(a) Paragraph (c)(1) of FCL.940.CRI determine that an applicant for renewal of a CRI certificate shall complete refresher training as a CRI at an ATO or competent authority. Paragraph (a)(2) also establishes that an applicant for revalidation of the CRI certificate that has not completed a minimum amount of instruction hours (established in paragraph (a)(1)) during the validity period of the certificate shall undertake refresher training at an ATO or competent authority for the revalidation of the certificate.*
    - *The amount of refresher training needed should be determined on a case by case basis by the ATO or competent authority, taking into account the following factors:*
    - *(1) the experience of the applicant;*
    - *(2) whether the training is for revalidation or renewal;*
    - *(3) the amount of time elapsed since the last time the applicant has conducted training, in the case of revalidation, or since the certificate has lapsed, in the case of renewal. The amount of training needed to reach the desired level of competence should increase with the time elapsed.*
- *(b) Once the ATO or competent authority has determined the needs of the applicant, it should develop an individual training programme that should be based on the CRI training course and focus on the aspects where the applicant has shown the greatest needs.*
- *(c) After successful completion of the refresher training, as applicable, the ATO or competent authority, should, in accordance with point (b), issue the applicant with a training completion certificate or another document specified by the competent authority, which describes the evaluation of the factors listed in point (a)(1) (the experience of the applicant) and the training received, as well as a statement that the training was successfully completed. The training completion certificate should be presented to the examiner prior to the assessment of competence.*
- *Upon successful completion of the refresher training, as applicable, the ATO should submit the training completion certificate, or the other document specified by the competent authority, to the competent authority.*

Note: This page does not form part of the licence

Ratings previously held by holder
Licence Number GBR.FCL.AT.238384G.A
Last and first name of holder: BLOGGS, Jay Kay
Class/Type/IR
AVRORJ/BAe146
B777/787
B737 300-900
B737 100-200
A320
MEP (land)
Instructors
FI

The reverse of a licence showing previously held ratings.

UNITED KINGDOM
Civil Aviation Authority

XII - CERTIFICATE OF REVALIDATION

Name: J. K. Bloggs Licence No: 238512 G

Rating	Date of Rating Test	Date of IR Test	Valid Until	Examiner's Certificate Number	Examiner's Signature
FI (A)	N/A	N/A	30/9/2024	2626952	
IRI (A)	N/A	N/A	31/01/2024	2626952	

Cert. of ReVal_V3 August 17

If the pages in the licence become full, revalidations and renewals may be signed on an extra page as shown above. Make sure the examiner writes the name and licence number of the holder.

After completion of these items, on-line form **SRG 2159** should be completed.

The revalidation of an FI(A) certificate in a licence. CRI is similar →

XII - CERTIFICATE OF REVALIDATION

Rating Certificate Endorsement	Date of Rating Test	Date of IR Test	Valid Until	Examiner's Certificate Number	Examiner's Signature
MEP (land)/SP	13/04/2017	N/A	30/06/2018	CAA0005 Civil Aviation Authority	
IR-SP-ME class/SE	N/A	16/06/2017	30/06/2018	CAA0005 Civil Aviation Authority	
B777/787 IR/LV/PBN	3/9/2017	3/9/2017	30/9/2018	2466735	
SEP (LAND)	—	—	30/9/2020	3444668	
FI(A)	16/01/18	N/A	30/9/21	2149164	

Credit for Certificates Already Held

An instructor who holds any instructor certificate, eg, FI, IRI, TRI etc (SP or MP) and wishes to add another certificate, is exempted the requirement of the 25 hours Teaching & Learning module in the ground school. For example if an FI(A) wishes to teach for MEP, then he must do the CRI(ME) course but need not do the 25 hrs groundschool element. Just 5 hours flight training & 10 hours groundschool. In general, an FI certificate gives 5 hours flying credit and 25 hours groundschool credit.

The Flight Instructor FI(A) Certificate

Validity of the FI Certificate

An FI(A) certificate is valid for 36 months plus the remainder of the month of test.

Revalidation & Renewal of the FI Certificate

Remember, revalidation is the process of extension of privileges **BEFORE** expiry has occurred. If it occurs after the rating or certificate has already expired, it is known as renewal. If a rating or certificate expires, it remains on the licence until the next time re-issued by the CAA (say to add a new rating), at which time it transfers to the reverse of the licence.

Revalidation of the FI Certificate

Within the 3 year validity period of the certificate, 2 out of the following 3 must be completed:

- Complete 50 hours flight instruction. **Note:** If privileges for IR are included, then 10 hours instrument instruction must be completed in the final 12 months of validity. If only IR(R) instructional privileges are needed, then these 10 hours are not required. Hours flown as an examiner on flight tests counts as instructional hours for this purpose.
- Complete Instructor Refresher Training any time within the 3 year validity. This used to be called an in instructor seminar and is essentially the same – a 2 day course with multiple attendees collaborating on lectures and briefings as well as presentations and study groups.
- Complete an assessment of competence with an FIE in the final 12 months of validity. In this case, following a successful outcome, the FIE will sign the licence for another 3 years.
- **Note:** An assessment of competence with an FIE is required at least every other revalidation.
- The 2 can be completed in any order provided the AoC is within the final year of FI validity.

Renewal of the FI Certificate

If expired, both of the following must be completed within 12 months of each other to renew:

- Complete Instructor Refresher Training at an ATO. This used to be referred to an in instructor seminar and is essentially the same – a 2 day course with multiple attendees collaborating on lectures and briefings as well as presentations and study groups.
- Complete an assessment of competence with an FIE. If the FI certificate is on the front of the licence, and all other renewal actions have been completed, the examiner will sign for another 3 years. If the certificate is on the reverse of the licence, then the licence must be re-issued from the CAA which will attract a fee.

Then the on-line form **SRG 2159** should be completed.

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Ratings previously held by holder
Licence Number GBR.FCL.AT.238384G.A
Last and first name of holder: BLOGGS, Jay Kay
Class/Type/IR
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B737 300-900
B737 100-200
A320
MEP (land)
Instructors
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XII - CERTIFICATE OF REVALIDATION

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IR-SP-ME class/SE	N/A	16/06/2017	30/06/2018	CAA0005 Civil Aviation Authority	
B777/787 IR/LV/PBN	3/9/2017	3/9/2017	30/9/2018	2466735	
SEP (LAND)	—	—	30/9/2020	3444660	
FI(A)	16/01/18	N/A	30/9/21	2149164	

The revalidation of an FI(A) certificate in a licence. →

Credit for Certificates Already Held

An instructor who holds any certificate, eg, FI, IRI, TRI etc (SP or MP) and wishes to add another certificate, is exempted the requirement of the 25 hours Teaching & Learning module in the ground school. For example if an FI(R) wishes to teach for MEP, then he must do the CRI (ME) course but need not do the 25 hrs groundschool element. Just 5 hours flight training & 10 hours groundschool. In general, an FI certificate gives 5 hours flying credit and 25 hours groundschool credit.

Flight Instructor (FI) Privileges

The basic privilege of an FI is to teach ab-initio students for the issue of a licence. Not all instructors are authorised to teach all subects (eg CPL, Multi-engine). Flight instructor privileges are shown on the licence in Section XII and are explained in FCL.905. In essence, there is a letter in brackets after the FI designation, and each letter denotes a different privelege.

In November 2019, the designation of flight instructor priveleges was amended. In order to determine the kinds of instruction an instructor may carry out requires reference to CAP 1854, which is summarised below.

Licences Issued Up to 10Nov19

a: PPL, SPL, BPL and LAPL in the appropriate aircraft category.
b: Class and type ratings for single-pilot, single-engine aircraft, except for single-pilot high performance complex aeroplanes.
c: Type ratings for single or multi-pilot airship.
d: CPL in the appropriate aircraft category.
e: The Night Rating
f: Aircraft Towing or Aerobatic Rating
g: IR or EIR in the appropriate aircraft category.
h: Single pilot, multi-engine class or type ratings except for single-pilot high performance complex aeroplanes.
i: Training for FI, IRI, CRI, STI or MI.
j: MPL.

Licences Issued After 11Nov19

a: PPL, SPL, BPL and LAPL in the appropriate aircraft category
b: Class and type ratings for single-pilot, single-engine aircraft, except for single-pilot high performance complex aeroplanes
c: Class and type ratings for single-pilot aeroplanes, except for single-pilot high-performance complex aeroplanes, in multi-pilot operations, provided that FIs meet certain conditions.
d: Type ratings for single or multi-pilot airship.
e: CPL in the appropriate aircraft category.
f: The Night Rating
g: Aircraft Towing or Aerobatic Rating
h: IR or EIR in the appropriate aircraft category.
i: Single pilot, multi-engine class or type ratings except for single-pilot high performance complex aeroplanes.
j: Training for FI, IRI, CRI, STI or MI.
k: Training for the MPL

Eventually, all licences will be updated to the new system, but until that time, it is important to check the date of licence issue.

Below is an example of a licence issued on 23Aug19:

XII	Ratings, certificates and privileges
Class/Type/IR	**Remarks & Restrictions**
Instrument	PBN
Night	Nil
SEP (Sea)	Nil
B777/787	Nil
MEP (Land)	SP
SEP (Land)	Nil
IR(Restricted)	Restricted to the privileges of the Instrument Meteorological Conditions Rating specified in the United Kingdom Air Navigation Order
No Further Entries	
Instructors	**Remarks & Restrictions**
FI	FCL.905.FI applies as in (a)/(b)/(d)/(e)(g)/(h)/FCL.945
IRI	FCL.905.IRI(a) applies
No Further Entries	
Examiners	
See Certificate Number GBR.238514G	

I	State of Issue **United Kingdom**
III	Licence Number **GBR.FCL.AT.12345G.A**
IV	Last and first name of holder Bloggs, Jonathan
IVa	Date of Birth 01/04/1979
XIV	Place of Birth Gatwick, UK
V	Address of holder 1 Aeroplane Road Hangertown **United Kingdom**
VI	Nationality **British**
VII	Signature of holder J Bloggs
VIII	Issuing competent authority **UK Civil Aviation Authority**
X	Signature of issuing officer and date 23/08/2019
XI	Seal or stamp of issuing authority

So, looking at the first table, the instructor privileges can be worked out. (Note: the yellow arrows are not on the licence but provided for clarity)

As this licence was issued before 11 Nov 19, this instructor may instruct towards the issue of PPL & LAPL, SEP Class rating, CPL, Night Rating, IR/EIR & MEP Class rating.

Stand-alone & Add-on Privileges:

The privileges shown by the letters in brackets can also be used to add-on instructional privileges. For example an FI who wants to teach for the MEP rating can either apply, train and be assesed for a standalone CRI (ME) certificate to be held in addition to his FI, or can apply, train and be assesed for the letter (i) as an add-on.

Part 2: Instructor Courses

The Multi-Engine Instructor Course/The ME Class Rating Instructor CRI (A) Course
A Typical CRI Course

The Multi-Engine (ME) Class Rating Instructor CRI (A) Course

There are 2 ways to become a multi-engine instructor. Either you can add it on to an existing FI certificate, or obtain a standalone CRI certificate on ME aeroplanes with no other instructor certificates held.

For a standalone CRI ME certificate:

Pre-Entry Requirements

The applicant for a CRI certificate must have 30 hours PIC on ME (SP) aeroplanes and 500 hours total time on aeroplanes. The student may start the CRI course holding fewer hours than this, but must have the full requirement on application to the CAA.

ME CRI COURSE PRE-ENTRY CHECKLIST		
Hold relevant current ME class/type rating?	Expiry:	
Hold current Medical Certificate?	Expiry:	
500 hours Total Time on aeroplanes?	TT(A):	
30 hours PIC on Relevant ME class prior to application for CRI certificate?	ME(A):	

Course Details

Flight Training: The ME CRI standlone instructor course consists of a minimum of 10 hours dual instruction (some may be carried out in an approved simulator). The training will be carried out by a suitably qualified FICI at an ATO.
Ground Training: There is a requirement for 35 hours of ground tuition including 25 hours 'teaching & learning' and 10 hours technical training.
Assessment: There will be an assessment of competence with an FIE at the end, which will consist of a long briefing, short briefing for an ME lesson (usually Asymmetric 1 or 2). That lesson will then be taught in the air as well as EFATO, asymmetric circuits and asymmetric go-around which must also be taught.

NOTE: It is possible to combine an IRI & CRI (ME) on one course, which then requires 10 hours instrument flight, 5 hours ME flight and 45 hours groundschool (or 20 hours if exempt the Teaching & Learning module by virtue of other instructor certificates held).

For an add-on to an unrestricted FI certificate:

Pre-Entry Requirements

The applicant must have be an unrestricted FI certificate and 30 hours PIC on Multi-engine (ME) (SP) aeroplanes. The student may start the CRI course holding fewer hours than this, but must have the full requirement on application to the CAA.

FI (ME) COURSE PRE-ENTRY CHECKLIST		
Hold unrestricted FI Certificate?	Expiry:	
Hold relevant current ME class/type rating?	Expiry:	
Hold current Medical Certificate?	Expiry:	
500 hours Total Time on aeroplanes?	TT(A):	
30 hours PIC on Relevant ME class prior to application for CRI certificate?	ME(A):	

Course Details

Flight Training: The ME instructor course consists of a minimum of 5 hours dual instruction (2 may be carried out in an approved simulator). The training will be carried out by a suitably qualified FICI (flight Instructor Course Instructor) at an ATO.
Ground Training: There is a requirement for 10 hours technical training.
Assessment: There will be an assessment of competence with a suitably qualified Flight Instructor Examiner (FIE) at the end, which will consist of a long briefing, short briefing for an ME lesson. That lesson will then be taught in the air as well as asymmetric circuits and asymmetric go-around which must also be taught.

NOTE: For Multi-Engine aeroplanes that are operated as multi-crew, a type rating will be required, and to instruct on them a TRI certificate will be required.

A Typical CRI (ME) Course

Course Objective

The objective of the course is to train an ME pilot with more than 500 hours and with at least 30 hours as PIC on the applicable class of multi-engine aeroplane, to the level of proficiency necessary for the issue of a CRI (A) rating for multi engine aeroplanes.

The trainee will be guided to the required level of skill & technical knowledge (TK) and develop instructional techniques needed in order to instruct for any single pilot, multi-engine aeroplane class or type rating for which the applicant is qualified.

A succesful candidate must have good knowledge of the ME course entry requirements, the training syllabus (ground and air), the skill test and proficiency check formats and the ME class/type rating privileges.

Privileges and Conditions

On successful completion of the CRI Course and the Assessment of Competence (AoC) with a suitably qualified FIE, an applicant will be issued with the rating for an CRI (ME) or given the add-on FI(i).
In accordance with FCL.905 CRI The privileges of a CRI (ME) are to instruct for:

- the issue, revalidation or renewal of a class or type rating for single-pilot aeroplanes (except for single-pilot high performance complex aeroplanes) when the privileges sought by the applicant are to fly in single-pilot operations. The privileges of a CRI are restricted to the class or type of aeroplane in which the instructor assessment of competence was taken.

Course Description

The course is to consist of a minimum of:

(a) 5 hours dual flying instruction in an ME aeroplane (10 for a standalone CRI (ME) with no other Instructor certificate).
(b) Teaching & Learning 25 hrs (unless exempt by virtue of holding another instructor certificate).
(c) 10 hrs Technical Training including revision of Theoretical Knowledge (TK), the preparation of lesson plans and the development of class room instructional skills related to ME aeroplanes.

It should be noted that CPL theoretical knowledge is not a pre-entry requirement for this course, and additional theoretical knowledge training may be needed, depending upon the experience level of the candidate. The purpose of this course is **NOT** to teach TK. Before beginning the course, a trainee instructor is expected to re-familarise themselves with the necessary material.

Pre –Entry Requirements

Before being permitted to begin an approved course of training for a CRI ME (SPA) rating, an applicant shall have prior to commencing the course:

a. 500 hours as pilot of an aeroplane.
b. A valid ME type/class rating
c. Logged 30 hours as PIC (or PICUS/SPIC) on an applicable ME aeroplane.

Medical Requirements

An applicant for a FCL CRI(A) shall hold a valid Medical Certificate appropriate to the licence held and privileges being exercised. (Full details are in Part MED).

Training Programme

The co-ordination of the ground and flight training is a necessary and important part of any pilot or instructor course. Care must be exercised to ensure that flying training periods are compatible with the student instructor's level of ground training.
The following sections outline the theoretical knowledge training and the flight training:

Theoretical Knowledge Training (TK)

The ground training consists of all instruction given for the purpose of the course by an appointed competent person and includes classroom lectures, tutorials, long briefings and directed private study. The subjects covered during the course will include Teaching and Learning (unless exempt) and relevant theoretical knowledge subjects from the ME aeroplane syllabus.

Definitions

Long briefing: A detailed explanation and discussion conducted by an instructor and covering the major theoretical considerations of an air exercise. The normal length should be approximately 40-50 minutes and it may be given either as a tutorial to an individual student or as an informal lecture to two or more students. Allow time for questions.

Pre-flight briefing: The briefing normally includes a statement of the aim and a discussion of Threat & Error Management (TEM). An explanation is then given of the air exercises which are to be taught by the instructor and practised by the student during the flight. It should include how the flight will be conducted with regard to who is to fly the aeroplane. The nature of the lesson will govern the order in which the constituent parts are to be taught. The four basic components of the briefing will be:

1. The aim
2. Threat & Error Management (TEM)
3. Principles of flight (if required, briefest reference only)
4. The air exercise(s) what, and why and how and by whom

Post-flight Review:
A few minutes devoted by instructor immediately after a specific flight lesson to consolidate the major points made during the flight. It should clarify any queries the student instructor might have, and indicate progress made by the student, using praise and fault analysis as necessary. The content of the next lesson should then be outlined.

Theoretical Subjects:
The subject material is normally covered by formal classroom lectures in conjunction with directed study.

Flight Training and Flight Instruction

Introduction

Selected air exercises from the ME syllabus are used with priority given to the asymmetric exercises, but with extra items designed to cover the needs of the CRI. Instructors will be taught/reminded how to construct flight lesson plans so as to make the best use of each flight lesson.

Planning of flight lesson

The preparation of lesson plans is an essential pre-requisite of good instruction and the student instructor will be given supervised practice in the planning and practical application of flight lesson plans.

General Considerations

The student instructor will complete flight training to practise the principles of multi-engine instruction.
During this training the student instructor will normally occupy the right hand seat. Some pilots will never have flown an aircraft from the right hand seat, so the first flight exercise will give him the opportunity to practice take-offs, landings and other exercises from that seat.
Threat & Error management (TEM) is a vital ingredient of all flight operations. Therefore, in the air exercises, the relevant aspects of TEM will be stressed at the appropriate stage of flight.

Course Completion

After the course, the ATO shall complete an Instructor Course Completion Certificate **CAA 5018**. The candidate shall then demonstrate to a suitably qualified FIE (ie one who holds a qualification for ME), a level of competence in instructional techniques appropriate to the privileges of a CRI (SPA/ME).

Who is the CRI (ME) likely to be Teaching?

Upon sucessful completion of the course, the CRI is likely to be instructing a pilot who falls into one of the following categories:

- A qualified single-engine pilot who wishes to expand his ability to include multi-engine aeroplanes.
- A qualified and current ME pilot (PPL or above) who wants to carry out differences/familiarisation training or a club checkout.
- A qualified and current ME pilot (PPL or above) who wants some training or practice before a proficiency check with an examiner.
- A qualified pilot whose ME rating has recently expired. He requires refresher training before taking a proficiency check. He will need a course completion certificate **SRG 1107**.
- A qualified and current airline pilot whose ME rating is long expired (or even was never held). He requires training to the standard before taking a proficiency or skill test. He will need a course completion certificate **SRG 1107**.

Where is the CRI (ME) likely to be Teaching?

Upon sucessful completion of the course, the CRI could be teaching either within an ATO, or outside of one.

- Certain instruction **MUST** be carried out at an ATO, such as:
  Training for initial issue of a class rating. **Refresher training for an expired MEP rating** (regardless of the length of expiry)**.**
- Other instruction may be conducted outside an ATO, such as:
  Differences & Familarisation training **Recency, coaching & confidence building.**

Section 1: Ground Non-Technical Training

Non aircraft-technical subjects to be studied are:

A: TEACHING & LEARNING (Unless Exempt)

1. Characteristics of Instructors

Instructor Attitude	Instructor Appearance	Qualities of a good instructor	Qualities of a poor instructor

2. Characteristics of Students

Students as Individuals	Types of Students	Emotional Differences	Rates of Learning

3. The Learning Process

Motivation Perception and Understanding	Memory and its application Habits and Transfer	Obstacles to Learning Incentives to Learning	Learning Methods Rates of Learning

4. The Teaching Process

Elements of effective teaching Planning of instructional activity	Teaching Methods Teaching from the 'Known to the unknown'	Use of Lesson plans

5. Training Philosophies

Value of a structured course of training	Importance of a planned syllabus	Integration of TK and flight instruction

6. Techniques of Applied Instruction

(a) Theoretical Knowledge - Classroom instruction techniques:	**(b) Flight - Airborne instruction techniques**
Use of training aids – models, whiteboard, instruments Group lectures Individual briefings Student participation/discussion	The flight/cockpit environment Techniques of applied airborne instruction In-flight TEM, judgement & decision making Post-flight TEM, judgement & decision making

7. Student Evaluating & Testing

a) Assessment of student performance:	**(b) Analysis of student errors:**
The function of progress tests Recall of knowledge Translation of knowledge into understanding Development of understanding into actions The need to evaluate rate of progress	Establish the reason for errors Tackle major faults first, minor faults second Avoidance of over criticism The need for clear concise communication Rating & grading

8. Training Programme Development

Lesson planning Preparation	Explanation and demonstration Student participation and practice	Evaluation

9. Human Performance and Limitations Relevant to Flight Instruction

Physiological factors Human information processing	Behavioural attitudes Development of judgement and decision making	TEM

10. Hazards Involved in Simulating Systems Failures & Malfunctions During Flight

Selection of a safe altitude Importance of 'touch drills'	Situational awareness Adherence to correct procedures

B: 1. TRAINING ADMINISTRATION

Flight/TK instruction records Pilot Logbooks Flight & ground curriculum	Study material Official forms **SRG 1107**, **1157**, **3108** Flight authorisation papers	Aircraft/Owner's Manuals/PoH Aircraft documents The PPL requirements

C:1. RESPONSIBILITIES OF THE CRI

Personal standards Standardisation of training Authorisation and supervision of student flying Preparation for skill tests/proficiency checks	Training effectiveness - examination & fault analysis Development of student responsibilities The need for continuity training Revalidation/renewal of rating

D: REGULATORY REQUIREMENTS

1. AMC FCL.930 CRI - General Requirements

Basic authority to act as a flight crew member Acceptance of licences, ratings authorisations, approvals or certificates Validity of licences and ratings Medical fitness	Decrease in medical fitness Crediting of flight time State of licence issue Pilot Logbooks

2. FCL Subpart H -Type and Class ratings

Division of class ratings. Differences/Familarisation training in MEP a/c Circumstances in which type or class ratings are required	Validity, revalidation and renewal Class Rating Skill Test & Proficiency Check Content

3. FCL Subpart J - Instructor Certificates

CRI (ME) Requirements	Period of validity	CRI (ME) Revalidation & renewal

Section 2: Theoretical Knowledge (TK)

The following serve as a reminder of the theoretical knowledge expected of the trainee instructor:

LIMITATIONS & EMERGENCY PROCEDURES: See AFM/PoH for type.
MASS AND BALANCE Knowledge of limitations and calculation methods, forward/aft limitations of C of G, normal and utility operation, mass & centre of gravity calculations, aeroplane manual mass and balance sheet. Use of AFM/PoH.
PERFORMANCE **Take-off:** TORA & TODA, Study of AFM/PoH charts. Take-off & initial climb, effects of mass, wind & density altitude, effects of ground surface & gradient, use of flaps. The WAT Limitations, Accelerate/Stop Distance Considerations. Part-OPS (Subpart H), AICs. **In flight:** Study of AFM/PoH charts. Relationship between power reqd & pwr available, performance diagram, maximum rate & maximum angle of climb, range & endurance, effects of configuration, weight, temp & altitude, reduction of performance during climbing turns, gliding, icing, rain. En-Route Ceiling (All Engines), En-Route Range/Endurance (All Engines). **Landing:** Study of AFM/PoH charts. Effects of mass, wind, density alt & app speed, use of flaps, ground surface and gradient, go around, Asymmetric go-around, Asymmetric Committal Height. Asymmetric Landing Run. **Asymmetric:** Effect on power curves - especially on excess power available, Power available for climbing and manoeuvring, Single Engine Ceiling, Cruising Range & Endurance (OEI). Acceleration & Deceleration with Asymmetric Power, Zero Thrust - Definition and Purpose, Determining Zero Thrust for the particular Aircraft Type.
AIRCRAFT SYSTEMS **Airframe:** Load Factors, Landing Gear & Flap: Limiting Speeds, Manoeuvring Speeds, Rough Air Speed (Va/Vno), Maximum Speeds. **Fuel System:** Fuel tanks and supply lines, venting system, mechanical and electrical pumps, gravity feed, tank selection, system management. **Engines:** RPM & Manifold Pressure, Temperatures and Pressures. **Propellers:** Propeller nomenclature, conversion of engine power to thrust, design & construction of fixed pitch propeller, forces acting on propeller blade, variation of RPM with change of airspeed, thrust efficiency with change of speed, design and construction of variable pitch propeller, constant speed unit operation, effect of blade pitch changes, windmilling effect. Feathering: General Principles & Purpose of Feathering/Unfeathering mechanism & limitations (eg Min RPM). **Landing Gear & Brakes:** Normal operation of landing gear & brakes, Non-Normal operation of landing gear & brakes. **Other Systems:** Oil System, Oil Grade & Specification, Ignition System, Mixture Control System, Cabin Heating & Ventilation Systems, Pitot/Static System: Pressure Instruments, Vacuum System: Gyroscopic Instruments & Limitations, Electrical System including Gyroscopic Instruments as applicable, Flying Controls - Including Flaps, Control Locks, Hydraulic System, De-icing system, Pressurisation & Oxygen System (as applicable), Auto Pilot System, Turbo Charging System, Other Systems Particular to Type.

GENERAL FLIGHT SAFETY

Aeroplane: Seat & rudder pedal adjustment and security, harness and seat belts, refuelling precautions flammable goods/pressurised containers, emergency equipment and its use, fire extinguisher: engine/cabin fires, de-icing systems, survival equipment: life jackets, life rafts, carbon monoxide poisoning & detection.

Operational: Wake turbulence, aquaplaning, windshear.

Passenger & crew briefings: emergency exits, evacuation from the aeroplane, forced landings, gear-up landing, ditching.

AIR LEGISLATION

Pre flight action by commander of aircraft, The Air Navigation (general) Regulations, Air OPS, Part CAT, Part NCO. AICs.

Note: Although some mass & performance calculations are applicable to Public Transport flights only, pilots should be aware of the requirements in order that they may elect to operate at the greater level of safety provided by the observance of these regulations. Eg 1.25 & 1.33/1.43.

ASYMMETRIC FLIGHT

The problems: Asymmetry, Control, Performance.

The Forces & Couples

- Thrust: Offset thrust line & asymmetric blade effect
- Drag: Offset drag line & failed engine drag. Total drag increase
- Lift: Asymmetry, uneven propeller slipstream effect
- Side forces: Effect of yaw in level & turning flight. Thrust & rudder side force couples - moment arms. Slip towards failed engine.

Control In Asymmetric Power Flight

- Use, Misuse and Limits of Rudder, Aileron & Elevator
- Effect of Bank/Sideslip, Balance - Fin stall possibility, Fin Structural Strength Limits
- Decrease of the available effective displacement of Aileron & Rudder
- Effect of IAS/Thrust relationship
- Effect of Residual Unbalanced Forces - Footload & Trimming
- Asymmetric Committal Height (ACH).

Minimum Control & Safety Speeds

- Definition, Derivation and Factors affecting Vmc (Minimum Control Speed)
- Effect of Power, Effect of Weight and Centre of Gravity Position, Effect of Altitude, Effect of Landing Gear, Flap and Engine Cowl Flaps, Effect of Turbulence/Gusts, Effect of Pilot Reaction, Effect of Bank towards the Live Engine, Effect of Drag, Effect of Feathering, Effect of the Critical Engine
- Definition & Derivation of V2 (Take-off Safety Speed), Other relevant V speeds.

Section – 3: Flight Training & Flight Instruction

Introduction

Selected air exercises from the multi-engine aeroplane syllabus are used with a priority given to circuits and asymmetric flight. Also, fundamentally important is the need to ensure full aircraft familiarisation with a new type of aircraft.
Instructors will be taught how to construct flight lesson plans so as to make the best use of each flight lesson.

Planning of flight lessons

The preparation of lesson plans is an essential pre-requisite of good instruction and the student instructor will be given supervised practice in the planning and practical application of flight lesson plans.

General Considerations

The student instructor will complete flight training to practise the principles of basic instruction at PPL(A) level and above. During this training the student instructor shall normally occupy the right hand seat.
TEM is a vital ingredient of all flight operations. Therefore, in the following air exercises the relevant aspects of TEM will be stressed at the appropriate time during each flight and afterwards.

INSTRUCTIONAL METHODS

Pre and Post-Flight Briefings.

In order to extract the maximum benefit from the training flights trainee instructors should be briefed fully on the requirements of the flight before flying. After landing students are then to be debriefed on their performance and, be given constructive criticism on any failings observed.

(a) The technical theoretical-knowledge (TK) instruction should be at least 10 hours of training to include the revision of TK, preparation of lesson plans, integration of TEM, and development of classroom instructional skills to enable the CRI to teach the TK syllabus.

(b) The type or class rating theoretical syllabus should be used to develop the CRI teaching skills in relation to the type or class technical course syllabus. The course instructor should deliver example lectures from the applicable type or class technical syllabus. The candidate instructor should prepare and deliver lectures on topics that are selected by the course instructor from the type/class rating course and the generic topics listed further below:

Aerodynamics of Asymmetric Flight	**Asymmetric Blade Effect**	**Engine failure during cruise**	**Engine Failure on Take-Off**
The fully-feathering propeller	**ME Fuel Systems** (Type Specific)	**ME Performance Considerations**	

(c) The 10 hours of technical theoretical-knowledge instruction should develop the applicant's ability to teach a student the knowledge and understanding that are required for the relevant air exercises for either SE or ME aeroplanes, depending on the privileges sought by the candidate.

(d) If CRI privileges for both SE and ME aeroplanes are sought, the applicant should complete 10 hours of technical theoretical-knowledge instruction related to SE and ME aeroplanes each.

Air Exercises

SYLLABUS OF CRI (ME) LONG BRIEFINGS

Part I - Normal 2-Engined Flight

Similar to the SE CRI.

Part II – Asymmetric Flight

Applicable to all Light Multi Engined (piston) aeroplanes.

Objectives

Objectives & aims should be stated at the appropriate time during the course.

Threat & Error Management (TEM)

All Air exercises - Special emphasis must be placed on:

- Circumstances in which actual feathering for practice may be done. Instructor/Student co-operation to prevent misunderstandings especially during feathering/unfeathering practice and during asymmetric power circuits. This must include positive agreement as to which engine is being shut down/re-started and identifying each control by naming the engine it is going to effect.
- Possibility of overworking the "Live Engine"
- Considerations if feathered engine is reluctant to unfeather (eg Seneca II or III).
- Use of Checklist

Flight with Asymmetric Power

Introduction to Asymmetric Flight:

•Feathering the Propeller - Method of operation, •Unfeathering the Propeller, •Effects on Aircraft Handling at Cruising Speed, •Introduction to Effect on Aeroplane Performance, •Finding the Zero Thrust Setting , •Comparison of Foot Load when Feathered & when Zero Thrust set.

Effects and Recognition of Engine Failure in Level Flight

•The Forces and the Effects of Yaw, •Types of failure - Sudden or Gradual - Complete or Partial, •Yaw, Direction and further effects of Yaw, •Visual and Flight Instrument indications.

Methods of Control & Identification of Failed Engine

•The Couples and Residual Out of Balance Forces - Resultant Flight Attitude, •Use of Rudder to Counteract Yaw, •Use of Aileron - Dangers of Misuse, •Use of Elevator to Maintain Level Flight, •Use of Power to maintain a Safe Air Speed, •Supplementary control of Yaw - Simultaneous Increase in Speed & Reduction in Power, •"Dead/Idle Leg" = "Dead/Idle Engine ", •Use of Engine Instruments for Identification: -Fuel Pressure/Flow Meters, RPM Gauge response. Effect of CSU at Lower & Higher Speeds. Temperature Gauges. •Confirmation of Identification - Use of Throttles, •Visual & Flight Instrument Indications.

Effect & Recognition of engine failure in turns - Methods of Control & Identification

•Side Forces & Effects of Yaw, •Effect of " Inside " Engine Failure - More pronounced effect, •Effect of " Outside" Engine Failure - Less pronounced effect, •Possibility of confusion in Identification: Use of Correct Rudder - Return to Lateral Level Flight if necessary, •Visual & Flight Instrument Indications.

Effect of Varying Speed and Power

•Speed/Thrust relationship, •At Normal Cruising Speed and Cruising Power, •At Low Safe Speed and Climb Power, •High Speed Decent and Low Power - Possible failure to notice Asymmetry, •Minimum Control Speeds, •ASI Colour Coding - Red Radial Line.

Minimum Control Speeds

Technique for assessing minimum control speeds and dangers involved when the Minimum Control Speed and the Stalling Speed are very close.

•Establish a Minimum Control Speed for each asymmetrically disposed engine to establish Critical Engine (if applicable)

•Effect on Minimum Control Speeds of :- Bank, Zero Thrust Setting, Take-Off configuration (Landing Gear Down & Take-Off Flap Set), Take-Off configuration (Landing Gear Up & Take-Off Flap Set).

Feathering and Unfeathering

Minimum Heights for practicing Feathering/Unfeathering Drills

•Engine Handling - Precautions: Overheating, Icing Conditions, Priming, Warm Up

•Method of Simulating Engine Failure: Reference to Aircraft Engine Manual & Service Instructions and Bulletins.

ENGINE FAILURE PROCEDURE (S)

Once the maintenance of control has been achieved, the order in which the procedures are carried out will be determined by the phase of operation and the aircraft type.

Flight Phase:

(a) In Cruising Flight.

(b) Critical phase such as immediately after take-off or during the approach to landing or during a go around.

Aircraft Type

Variations will inevitably occur in the order of certain drills and checks due to differences between aircraft types and perhaps between different models of the same type. The Flight/Owner's Manual/Pilot's Operating Handbook must be consulted to establish the exact order of these procedures.

For example, one manual may call for the raising of flaps and landing gear prior to feathering, whilst another may recommend feathering as a first step. The reason for the latter procedure could be due to the fact that some engines cannot be feathered if the RPM drops below a certain figure.

Again, in some aircraft, the raising of the landing gear may create more drag during retraction due to the transient position of the landing gear doors and as a result this action would be best left until feathering has been accomplished and propeller drag reduced.

Therefore, the order in which the drills and checks are shown in this syllabus under IMMEDIATE and SUBSEQUENT actions must be used as a general guide only and the exact order or procedure must be determined by reference to the Flight / Owner's Manual or Pilot's Operating Handbook for the specific aircraft type being used on the course.

However, when failure occurs with full flap extended as for a go-around situation, the removal of the "Drag Flap" should normally considered as important as "Feathering" in order that adequate control and at least level flight can be maintained.

<u>In Flight Engine Failure</u>

In cruise or other flight phases not including Take-Off or Landing.

Immediate Actions (Phase 1):

•Maintaining Control, including Airspeed & use of Power, •Recognition of Asymmetric Condition, •Identification & Confirmation of Failed Engine, Dead/Idle Leg = Dead/Idle Engine, Closing of Throttle for Confirmation, •Cause & Fire Check - (typical reasons for failure and methods of rectification), •Feathering Decision & Procedure: -Reduction of other Drag, Need for Quick Reactions, Dangers of Hasty Reactions, Trimming.

Subsequent Actions (Phase 2):

•Live Engine - Temperatures, Pressures and Power, •Remaining Services - Electrical Load (assess and reduce as necessary), •Effect on power source of: Air Driven Instruments, Landing Gear, Flaps & Other Services, •Final Trimming.

Flight Continuation Considerations (Phase 3)

•ATC and Weather, •Terrain Clearance, Single Engine Ceiling, Range & Endurance, Single Engine Cruise Speed - Decision to Divert or Continue. •Fuel Management - Best use of remaining fuel, •Dangers of re-starting Damaged Engine, •Action if unable to Maintain Altitude (effect of altitude on power available), •Effects on Performance.

Effect on Power Available & Power Required

Effects of various Airframe Configurations & Propeller Settings

•Use of Flight/Owner's Manual/Pilot's Operating Handbook.

Cruising, Climbing (ASI Colour Coding - Blue Line)

Descending, Turning, Live Engine Limitations

•Approach - Control and Performance.

Engine Failure During Take-Off

•Below Vmca or Unstick Speed.

Accelerate/Stop considerations - Prior use of Aircraft Manual Data if available

•Above Vmca or Unstick Speed and Below Safety Speed. Immediate re-landing or use of remaining power to achieve a Forced Landing.

Considerations:

•Degree of Engine Failure, •Speed at the time, •Weight, Altitude, Temperature (Performance), •Configuration, •Length of Runway Remaining, •Position of any obstacles ahead.

Engine Failure After Take-Off: Simulated at a safe minimum height and at or above Take-Off Safety Speed. Considerations:

•Need to Maintain Control, •Use of Available Power, •Achieving Best Single Engine Climb Speed, •Weight, Altitude, Temperature (Performance), •Effect of prevailing conditions & circumstances.

Speed & Heading Control:

•Height, Speed, Power relationship - Need for Minimum Possible Drag, •Establishing Positive Climb at Best Single Engine Rate of Climb Speed, •Effect of availability of Systems Power for Flap & Landing Gear operation, •Rapid Clean Up.

Immediate Actions:

•Maintaining Control including Airspeed & Use of Power, •Recognition of Asymmetric Condition, •Identification and Confirmation of Failed Engine, •Feathering and Removal of Drag (procedure for type), •Establishing Best Single Engine Climb Speed, •Trimming.

Subsequent Actions: Whilst carrying out an Asymmetric Power Climb to the Downwind position at Single Engine Best Rate of Climb Speed:

•Cause & Fire Check, •Live Engine Handling Considerations, •Remaining Services, •ATC Liaison, •Fuel Management (if applicable).

Note: Procedures applicable to Aircraft type & Flight Situation.

Circuit Approach & Landing on Asymmetric Power

•Definition & Use of Asymmetric Committal Height, •Use of Standard Pattern & Normal Procedures, •Action if Unable to Maintain Circuit Height, •Speed & Power settings required, •Decision to Land or Go Around at ACH: Factors to be considered, •Use of Flap after reaching ACH: Factors to be considered, •Undershooting - Importance of maintaining Correct Air Speed (above Vmca), •Action if Baulked after passing ACH.

Asymmetric/One Engine Inoperative (OEI) Go-around (Missed Approach)

Note: The speed at which the decision is made to commit the aeroplane to a landing or to go-around should normally be the Best Single Engine Rate of Climb Speed and in any case, not less than Safety Speed. The height should be such that a slow response by the pilot will still allow the aeroplane to be cleaned up, accelerated to Best Single Engine Climb Speed and be established in a climb with ample height still available. On no account should Instrument Decision Height and the associated procedures be confused with the Asymmetric Committal Height and its slightly different procedure.

Engine Failure During an All Engines Approach or Missed Approach

Use of Asymmetric Committal Height

•Speed Considerations, •Speed & Heading Control, Wings Level, Decision to attempt Landing, •Go-around or Force Land (as required)

Significant Factors

•Significance of Take-Off Safety Speed: Effect of Landing Gear, Flap, Take-Off Trim Setting, Systems for operating Landing Gear and Flaps.

•Effect of Weight, Altitude & Temperature (Performance), •Significance of Best Single Engine Climb Speed

•Acceleration to Best Single Engine Climb Speed & establishing Positive Climb

- Relationship of Single Engine Climb Speed to Normal Climb Speed
- Action if Unable to Climb

•Significance of Asymmetric Committal Height (Decision Height & Speed), •Height needed to establish positive climb whilst maintaining adequate speed for control & removal of drag, •Action if Baulked below ACH.

Air Exercises

The flight training syllabus for CRI ME training courses should last at least 5 hours for existing instructors or 10 hours for new instructors.

The following exercises are suggested and include ground briefing and air exercises.

CRI ME EXERCISE 1:	**Assessment of trainee instructor's skill.** A brief circuit detail to ensure knowledge & handling ability.
CRI ME EXERCISE 2:	**Asymmetric 1.** Full engine shutdown and restart at altitude. Recognition, control & identification of failure.
CRI ME EXERCISE 3:	**Asymmetric 1b.** Engine failure in the cruise procedure and asymmetric performance.
CRI ME EXERCISE 4:	**Asymmetric 2.** Critical Speeds demo, introduction to EFATO.
CRI ME EXERCISE 5:	**Asymmetric Circuits.** EFATO, Asymmetric go-around and landing.
CRI ME EXERCISE 6:	**All Engines Operating Famil.** Normal procedures: stalling, steep turns, circuits.
CRI ME EXERCISE 7:	**The Mock ME Skill or Proficiency Check (Optional)**

It is appreciated that it may not be possible to cover all of this material in the time available for flight training.

FI (i) & CRI (ME) FLIGHT TRAINING AIR EXERCISES

Lesson 1: Assessment of Trainee Instructor's Asymmetric Handling (Duration: 30 minutes)

General:

The ME instructor is expected to be able to demonstrate a very high standard of flying, particulary when it comes to asymmetric operation and emergency drills. For this reason it is often a good idea to begin the course by assessing the trainee instructor's ability in this area before continuing. The trainee instructor will fly from the right hand seat which may be the first time they have done this.

Exercise 1: Start-up and Take-off:
Assess the trainee instructor as they prepare the aircraft, taxi, power checks and take-off.
Exercise 2: EFATO:
At a suiltable height, cover the throttle quadrant and close a throttle. Assess the trainee instructor's handling of the failure and any feathering drills. Note any speed or heading loss.
Exercise 3: Simulated Asymmetric Circuit:
Assess the trainee instructor's handling of the aircraft during a circuit and final approach to Asymmetric Committal Height.
Exercise 4: Simulated Asymmetric Go-around:
Assess the trainee instructor's handling of the aircraft during a simulated asymmetric go-around. Note any speed or heading loss.
Exercise 5: Simulated Asymmetric Circuit and Landing:
Assess the trainee instructor's handling of the aircraft during a further simulated asymmetric circuit to land. On approach, after passing ACH/ACA, ask the student what he would do if an aircraft lined up in fron on the runway. The answer can be interesting.

If there is any doubt about the trainee instructor's ability to handle the aircraft correctly and safely during this exercise, then retraining should be carried out before proceeding further with the course.

CRI (ME) FLIGHT TRAINING AIR EXERCISES - PART 2 (Duration: Min. 4 hours)

Exercise 23: ASYMMETRIC FLIGHT

Note: There is a minimum of 5 hours of flying for an CRI (ME) instructor course (although 10 hours may be needed without an FI certicate). This is not really enough to cover all the lessons required. Therefore, it is recommended that the syllabus starts with the asymmetric part and if any time remains, that 2-engined lessons are covered.

Lesson 2: Asymmetric Part 1 - Recognition & Control (Duration: 60-90 minutes)

1: Engine Feathering Drill (Fully feathered where permitted):
Teaching the full shutdown of an engine using the feathering drill.
2: Flight with Asymmetric Power:
Teaching the effects of aircraft handling on one engine at cruising speed. S&L and turns.
Introduction to the effects on aeroplane performance (e.g. cruising speed & rate of climb).
Noting the rudder trim position to assist in finding the Zero Thrust Setting later.
3: Engine in-flight Restart Drill:
Teaching the unfeathering or restart drill to restore the failed engine.
4: Effects & Recognition of Engine Failure in Level Flight (Cruising flight):
Teaching of the identification of yaw, direction of yaw and further effects of yaw (ie roll) in a visual scenario by looking outside.
Teaching of the identification of yaw, direction of yaw and further effects of yaw in an instrument scenario by looking at the instruments.
5: Control & Identification of a Failed Engine (Cruising Flight)
Teaching the use of rudder to counteract yaw, aileron to maintain wings level, and elevator to maintain level flight.
Use of engine power to maintain a safe airspeed.
Identification of the failed engine using “Dead/Idle Leg” = “Dead/Idle Engine”
Variations in value of engine instruments for identification of the failed engine.
Confirmation of identification - Use of throttle, visual & flight instrument Indications.
6: Effects & Recognition of Engine Failure in Turns - Methods of Control & Identification
Teaching of the Effect of “Inside ” engine failure.
Teaching the effect of “Outside ” engine failure.
Possibility of confusion in identification.
Use of correct rudder & return to wings level flight prior to any drills.
7: Effect of Varying Speed and Power on Rudder Requirement
Effect of varying speed at constant power on the rudder requirement.
Effect of varying power at constant speed on the rudder requirement.
8: Effect of Engine Failure in Descent:
High speed descent with low power (Possible failure to notice the asymmetry).

Lesson 3: Asymmetric 1b - Engine Failure Procedure In The Cruise Procedure (Duration 1 hour)

Teaching of the Engine Failure in the Cruise Procedure

1: Teaching of the Immediate Actions (Phase 1):
Control of flight path.
Control of airspeed and use of power (and removal of drag).
Identification and confirmation of the failed engine.
Cause of the engine failure & fire check.
Feathering decision & actions.
2: Teaching of the Subsequent Actions (Phase 2):
Teaching how to secure the failed engine.
Teaching how to protect the live engine.
3: Teaching of Flight Continuation Actions (Phase 3):
Re-plan the flight - consideration of diversion etc.
ATC Liaison.
Fuel Management and crossfeed considerations.
Passenger considerations.

LESSON 4: Asymmetric 2 - Minimum Control Speeds & Introduction to EFATO (Duration: 1 hour)

Minimum Control Speeds

1: Show the effect of reducing airspeed until directional control is lost.

***Warning**: The recovery must be initiated immediately directional control is lost with full rudder applied or when a safe margin above the stall remains (e.g. when the stall warner operates) for the particular aeroplane configuration & flight conditions. On no account should the aeroplane be allowed to decelerate to a lower airspeed. This demonstration is not to be practiced by genuine ME students, but the CRI student needs to be able to safely carry out this demonstration.*

2: Teaching of a method of finding the minimum control speed on each engine to establish the critical engine if applicable.

3: Teaching the effect on minimum control speed of:
Critical engine (if applicable),
Zero thrust setting vs idle thrust.

Engine Failure in the Take-off Configuration:

4: Teaching the engine failure below TOSS: Full rudder will be insufficient to maintain control of direction.
Recovery - lower nose and reduce power of live engine, loss of height, but wings level for landing ahead.

5: Teaching the engine failure at or above TOSS: Directional control possible, full power maintained on live engine. No loss of height.
Conclusion: achieve TOSS ASAP.

6: Repeat EFATO again with "Immediate Actions" (as below) and continue with "Subsequent Actions" including single engine climb.

Engine Failure After Take-Off

Note: To be initiated at a safe height (min 500 ft) and at not less than TOSS.

7: Teaching of the Immediate Actions (Phase 1): Control of flightpath, airspeed and use of power, recognition of asymmetric condition, identification & confirmation of the failed engine, feathering & reduction of drag (procedure for type), trim. Fire check.

8: Teaching of the Subsequent Actions (Phase 2 & 3 if time permits): Whilst carrying out an asymmetric climb at Vyse:
Cause, securing of failed engine, live engine handling considerations, ATC liaison.

9: Teaching of the Engine Failure During Take-Off Run: (Briefing only)
During the Take-Off run and below Vmca & Above Vmca and below Take-Off Safety Speed.

LESSON 5: Simulated Asymmetric Circuits (Duration 1 hour)

Teaching of the Asymmetric Circuit, Approach & Landing

1: Teaching of the engine Failure After Take-Off (EFATO)

Note: *To be initiated at a safe ht (min 500 ft) and at not less than Vtoss.*

2: Teaching of the Immediate Actions: Control of Airspeed and use of Power, Recognition of Asymmetric Condition, Identification & Confirmation of Failed Engine, Feathering & Reduction of Drag (procedure for type), Fire Check. Trim.

3: Teaching of the Subsequent Actions (Whilst carrying out an asymmetric climb to the Downwind position at Vyse.

Securing of failed engine.
Live Engine Handling Considerations,
ATC Liaison,
Fuel Management,
Passenger considerations.

4: Teaching of the Asymmetric Circuit:

Downwind & Base Legs - Use of standard pattern normal procedures.
Landing Gear & Flap Lowering considerations,
Live Engine Handling,
Airspeed & Power Settings,
Asymmetric Committal Height Drill,
Control of Airspeed & Descent Rate,
Flap Consideration.

5: Teaching of the Asymmetric Go-around:

Speed & Heading Control - Height/Speed/Power relationship,
Establishing Positive Rate of Climb, Need for Minimum Possible Drag & Levelling Wings if necessary,
Best Single Engine Climb Speed,
Effect of availability of Power, for Flap & Landing Gear Retraction.

6: Teaching of the Engine Failure During an All Engines Approach or Missed Approach

Note: *To be started at not less than Asymmetric Committal Height and not more than Part Flap Selected.*

Speed & Heading Control - Wings Level.
Decision - Attempt Landing, Go Around or Force Land.
Establishing Positive Climb - Need for Minimum Possible Drag, Best Single Engine Climb Speed.

LESSON 6: All Engines 1: Familiarisation (Duration: 1 hour – if time permits)

1: Aircraft Familiarisation
Teaching of External Features, Cockpit Layout, Aircraft Systems, Check Lists, Drills, Controls.
1E: Emergency Drills
Teaching Actions in the event of Fire, in the Air & on the Ground, Engine, Cabin, Electrical, Systems Failure (as applicable to type), Escape Drills - Location & Use of Emergency Equipment & Exits.
2: Preparation For and Action After Flight
Teaching of Flight Authorisation & Aircraft Acceptance, Technical Log, Weight & Balance and Performance, External Checks, Internal Checks, Adjustment of Harnesses and Rudder Pedals, Starting, Radio Nav/Coms check, Altimeter Checks & Setting Procedures, Power Checks, Running Down & Switching Off Engines, Completion of Authorisation Sheet & Aircraft Serviceability Documents.
4: Effects of Controls (as applicable to type)
Teaching the Effects of Flying & Trimming Controls, Effects & Selection of Power, Manifold Pressure/RPM and Synchronisation, Operation of propeller, including effects of Fine Pitch Stops, Effect of Flaps (Limiting Speeds, Position Indicators), Effect of Landing Gear (Limiting Speeds, Position Indicators, Cycling Time), Operation of Mixture Controls - Fuel Flow Meters, Exhaust Gas Analyser, Operation of Carburettor Heat Controls – Carb. Temp Gauge or Alternate Air, Operation of Cowl Flaps - Position Indicators, Operation of Cabin Heat/Ventilation System, Operation of Pressurisation System, Operation of Anti/De-Icing systems, Operation of Autopilot, Operation of Turbocharger
5: Taxying
Teaching of Checks Before Taxying - Starting & Stopping - Control of Speed (Effects of Inertia/Aircraft Weight & Additional Size), Control of Direction & Turning, Turning in Confined Spaces, Leaving the Parking Area (Use of Power, Brakes and Nosewheel, individually and in combination), Freedom of Rudder Movement, Instrument Checks
5E: Emergencies
Teaching of Brake Failure/Steering Failure.
6: Straight & Level
Teaching of S&L at Normal Cruising Power, At Selected Airspeeds - Power Selection Requirements, In Different Aircraft Configurations - Flaps, Landing Gear, Performance Considerations - Range & Endurance (Attitude & Power Selections), Instrument Appreciation.
7: Climbing
Teaching of Power Selection - Normal & Maximum Rate (Engine & RPM Limitations), Effect of Altitude on Manifold Pressure - Full Throttle Altitude, Levelling Off - Power Selection, Climbing with Flaps Down, Recovery to Normal Climb, En Route Climb (Cruise Climb), Maximum Angle Climb, Altimeter Setting Procedures, Prolonged Climb & Use of Cowl Flaps, Instrument Appreciation.
8: Descending
Teaching of Pre-Descent Checks, Power Selection, Powered Descent (Cruise Descent), Levelling Off - Power Selection, Descending with Flaps Down, Descending with Landing Gear Down, Altimeter Setting Procedures, Instrument Appreciation.
8E: Emergency Descent (VNO)
Teaching of considerations and Limitations in Turbulence.

9: Turning
Teaching of Medium Turns, Climbing & Descending Turns
10: Stalling
Teaching of Slow Flight (not below Vmca), Safety Checks & Power Selection, Symptoms of the Stall, Recovery Without and With Power, Recovery when a Wing Drops, Stalling with Power On, Stalling with Flap Down, Stalling in the Approach Configuration (Straight & Turning), Recovery at the Incipient Stage (from various Attitudes/Configurations), Recovery During Changing Configuration, Instrument Appreciation.
12: **Take-Off & Climb**
Teaching of Pre-Take Off Checks, Into Wind Take-Off, Crosswind Take-Off, Short Field Take-Off, Performance Considerations - Minimum Control Speed, Safety Speed, Landing Gear and Flap Retraction, Power Selection, Circuit Procedures
13: Approach & Landing
Teaching of Aerodrome Approach Checks, Circuit Procedure, Pre Landing Checks, Powered Approach & Landing, Asymmetric Committal Height, Use of Flaps, Crosswind Landing, Flapless Landing, Short Field Landing
13E: Balked Landing & Go-around
Teaching of Go-Arounds from Missed Approach and From Touch Down (Propeller Setting, Power Selection, Flap & Landing Gear Selection)
15: Advanced Turning
Teaching of Steep/Advanced Turns, Steep Descending Turns, Steep Climbing Turns, Recovery From Unusual Attitudes, Stalling in the Turn & Spiral Dives (Load Factor, Limitations, Manoeuvring, Speed Limitations).
19: Instrument Flight (Basic)
Teaching of Straight & level, Climbing, Turning, Descending on instruments.

CRI ME LESSON 7: 'The Mock Skill Test or Proficiency Check'

Scenario:

The student has his MEP (land) Skill Test or Proficiency Check booked with an examiner and is feeling under confident. A pre-flight chat should enable the trainee CRI to develop a lesson plan for ground brief and flight.

Requirements of the MEP (land) Skill Test & Proficiency Check

Although not an examiner, the CRI should familiarise himself for the test schedule for the MEP (land) Skill test and proficiency check, since much of his work will involve training pilots towards this end. Details can be found in the Examiner's Handbook.

CRI ME Ex7a: 'The Mock Skill Test' - Long Briefing Topics:

(1) Content of the MEP (land) Skill Test. Relevant Sections of **SRG 1157**.
(2) Typical Examiner Brief
(3) Student & Examiner Paperwork – **SRG 1107** & **SRG 1157**.
(4) Discussion of Navigation requirements.
(5) Discussion of each air exercise in the check.
(6) Discussion of Tolerances.

Or

CRI ME Ex7b: 'The Mock Proficiency Check' - Long Briefing Topics:

(1) Content of the MEP (land) Prof Check. Relevant Sections of **SRG 1157**.
(2) Typical Examiner Brief
(3) Student & Examiner Paperwork – **SRG 1107** & **SRG 1157**.
(4) Discussion of Navigation requirements.
(5) Discussion of each air exercise in the check.
(6) Discussion of Tolerances.

CRI ME Air Exercise 7a - 'The Mock Skill Test':

(1) Mock Skill Test carried out.

Or

CRI ME Air Exercise 7b - 'The Mock Proficiency Check':

(1) Mock Proficiency Check carried out.

The Examiner's Report **SRG 1157** is shown on a later page.

Notes on MEP (land) Skill Tests & Proficiency Checks

- **SRG 1157** has some items which are marked with an M, meaning mandatory. However, all items should be assessed.
- **SRG 2199** and **SRG1157** are both advertised as being suitable, however **SRG 1157** is better for GA aircraft.
- On-line form **SRG 3108** is used after a successful skill test to apply for the rating.
- If the rating has expired and is now on the reverse of the licence, On-line form **SRG 3108** and a licence fee will be required.
- The navigation part of the Skill Test/Proficiency Check need only be a short transit (10 mins) to the airwork area and can be accomplished using whatever means.
- Only one of the 3 stalls needs to be assessed, however the examiner may choose to assess more, or even all 3.
- Section 3A (VFR navigation) must always be completed unless section 3B (Instrument flight) is done.
- The RTO is an integral part of the MEP (land) Class Rating, so must be carried out as part of the ST/PC.
- Touch and go landings are not necessarily part of the MEP (land) course. Discuss with the applicant whether or not they are comfortable doing them. If not, then taxy back for another take-off each time. If they are, discuss who will move various levers on the runway as this applicant's training may be different to others.
- The requirement not to have done more than 25% of the required training for an applicant does NOT apply to the renewal or revalidation of a class rating.
- **Section 3A - En-Route (VFR)**. The exact content and duration of section 3A is at the discretion of the examiner and depends on the recent experience of the applicant and the performance and complexity of the aircraft used for test. As a minimum it should comprise one route sector or navigation leg, sufficient for the applicant to demonstrate proficiency in en-route VFR procedures. For example, the applicant might be briefed to take the aircraft to a defined destination, away from the point of departure, where it is suitable to conduct the airwork exercises. For less experienced applicants, perhaps those who fly infrequently or those who have not flown VFR in the UK for some time, it might be appropriate to plan and manage a slightly longer, more involved en-route section. Note however, that this is not intended to replicate the en-route section of an initial PPL or CPL skill test, thus a flight time in the cruise of approximately 15-30 minutes (not more than 45) is envisaged for this section.

Applicant's details

Name: ..... CAA Ref No: ..... A/C Type/Reg: ..... FLT Time: ..... Date: .....

Manoeuvres/Procedures M (Mandatory)			Pass /Fail
Section 1 Departure			
1.1	Pre-flight including: Documentation Mass and Balance Weather briefing NOTAM		
1.2	Pre-start checks		
1.2.1	External		
1.2.2	Internal	M	
1.3	Engine starting: Normal Malfunctions	M	
1.4	Taxiing	M	
1.5	Pre-departure checks: Engine run-up (if applicable)	M	
1.6	Take-off procedure: Normal with Flight Manual flap settings Crosswind (if conditions available)		
1.7	Climbing: Vx/Vy Turns onto headings Level off	M	
1.8	ATC liaison - Compliance R/T procedure		
Section 2 Airwork (VMC)			
2.1	Straight and level flight at various airspeeds including flight at critically low airspeed with and without flaps (including approach to VMCA when applicable)		
2.2	Steep turns (360º left and right at 45º bank)	M	
2.3	(i) Clean stall (ii) Approach to stall in descending turn with bank with approach configuration and power (iii) Approach to stall in landing configuration and power (iv) Approach to stall, climbing turn with take-off flap and climb power (single engine aeroplane only)	M	
2.4	Handling using autopilot and flight director (may be conducted in section 3) if applicable	M	
2.5	ATC Liaison - Compliance, R/T procedure		
Section 3A En-route procedures VFR			
3A.1	Flight plan, dead reckoning and map reading		
3A.2	Maintenance of altitude, heading and speed		
3A.3	Orientation, timing and revision of ETAs		
3A.4	Use of radio navigation aids (if applicable)		
3A.5	Flight management (flight log, routine checks including fuel, systems and icing)		
3A.6	ATC liaison - Compliance, R/T procedure		

* Shall be flown solely by reference to instruments. If this condition is not met during the Skill Test or Proficiency Check, the type rating will be restricted to VFR only.

Manoeuvres/Procedures M (Mandatory)			Pass /Fail
Section 3B Instrument flight			
3B.1*	Departure IFR	M	
3B.2*	En-route IFR	M	
3B.3*	Holding procedures	M	
3B.4*	3D operations to DH/A of 200 feet (60m) or to higher minima if required by the approach procedure (autopilot may be used to the final approach segment vertical path)	M	
3B.5*	2D operations to MDH/A and MAP	M	
3B.6*	Flight exercises including simulated failure of the compass and attitude indicator: Rate 1 turns, Recoveries from unusual attitudes	M	
3B.7*	Failure of localiser or glideslope		
3B.8*	ATC liaison - Compliance, R/T procedure		
Section 4 Arrival and landings			
4.1	Aerodrome arrival procedure	M	
4.2	Normal landing	M	
4.3	Flapless landing	M	
4.4	Crosswind landing (if suitable conditions)		
4.5	Approach and landing with idle power from up to 2000' above the runway (single engine aeroplane only)		
4.6	Go-around from minimum height	M	
4.7	Night go-around and landing (if applicable)		
4.8	ATC liaison - Compliance, R/T procedure		
Section 5 Abnormal and emergency procedures (This section may be combined with sections 1 through 4)			
5.1	Rejected take-off at a reasonable speed	M	
5.2	Simulated engine failure after take-off (single engine aeroplanes only)	M	
5.3	Simulated forced landing without power (single engine aeroplanes only)	M	
5.4	Simulated emergencies: (i) Fire or smoke in flight; (ii) Systems malfunctions as appropriate		
5.5	Engine shutdown and restart (ME Skill Test only) (at a safe altitude if performed in the aircraft)		
5.6	ATC liaison - Compliance, R/T procedure		
Section 6 Simulated asymmetric flight			
6.1*	Simulated engine failure during take-off	M	
	(at a safe altitude unless carried out in FFS or FNPT II) (This section may be combined with sections 1 through 5)		
6.2*	Asymmetric approach and go-around	M	
6.3*	Asymmetric approach and full stop landing	M	
6.4	ATC liaison - Compliance, R/T procedure		

SRG 1157 test schedule

Extra CRI ME Lesson – Your Student's Pre-Test Paperwork

Practical Considerations

As an instructor, it is a very important part of your student's training, that you ensure his paperwork is ready for the examiner. Few examiners have the patience to wait while badly completed forms are filled out or corrected.

The Course Completion Certificate

Course Completion Certificate for issue, revalidation, renewal or variation of a Single or Multi-Pilot Type/Class Rating or the renewal of an Instrument Rating

Civil Aviation Authority

This form is intended for use in the provision of evidence in support of an application made to the CAA using the CAA's online application service. Once completed the form should be scanned or photographed and uploaded by the applicant as part of an online application to the CAA.

FALSE REPRESENTATION STATEMENT
It is an offence under the UK Air Navigation Order to make, with intent to deceive, any false representation for the purpose of procuring the grant, issue, revalidation, renewal or variation of any certificate, licence, approval, permission or other document. This offence is punishable on summary conviction by a fine and on conviction on indictment with an unlimited fine or imprisonment or both.

1 COURSE/TRAINING COMPLETION CERTIFICATE
To be completed by the Training Organisation
If a separate course completion certificate has not been provided

I certify that (name) Alan Viator CAA Personal reference number (if known): 2 4 6 8 9 4 G

Date of Birth 12/04/1985 has satisfactorily completed a course of training in accordance with Part-FCL for the following:

Type/Class Rating [√] **and/or** Instrument Rating [ ]

Date Training commenced:	07/01/2024	Date Training completed:	16/02/2024
Aircraft Type/Class name (including variants)	MEP (land) DA-42		

Training completed (select one):	Initial Type/Class Rating Training	Refresher Training	No Refresher Training required	Extend privileges of the class/type rating and/or instrument rating
	[√]	[ ]	[ ]	[ ]

The course consisted of 8 hours of flight instruction of which 0 hours consisted of synthetic flight instruction in a FNPT I or FNPT II/III or FTD 2/3 or FFS. FSTD Identification Number of device used ..... (which must be issued in accordance with UK (EU) Regulation no. 1178/2011) (Please annotate UK FSTD/FTD/FFS Identification number if available).

Competent Authority issuing qualification certificate for the device.: .....

Please specify a specific instrument rating training hour separately from the type/class rating training hours

(For MEP only) 5 hours of dual flight instruction in engine failure procedures and asymmetric flight techniques.

Flight Details (if applicable*):

Aircraft Registration: ..... Number of take-offs and landings: .....

Base training Instructor name: ..... Licence number: .....

Authorising Competent Authority: .....

Theoretical Knowledge Training (if applicable*):

Theoretical knowledge examination pass mark (%): 90 Date: 01/02/2024

The applicant has completed a reduced course of training. [ ] Please state the basis for this and provide a detailed explanation (if applicable):

Recommended for Skill Test or Proficiency Check by:

Name: Algenon Kestrel Position: Instructor Licence No: 223445H

Approved Training Organisation Details:

Approved Training Organisation (ATO)/Declared Training Organisation (DTO) Kestrel Flight School

ATO/DTO number: 0666 ATO/DTO issuing Authority: UK CAA

Name of Head of Training (or authorized signatory**): Hubert Kestrel Position: CFI/HoT

Signature of Head of Training or authorized signatory: ..... Date: 17/02/2024

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The examiner will need to see a correctly completed and signed course completion certificate. For class ratings, form **SRG 1107** is used. This form is shown below. The form must be signed by the CFI or Head of training of the ATO. Note, only Page 1 of this 2 page form is required.

Section - 4: THE CRI (ME) Assessment of Competence (AoC)

On satisfactory completion of the CRI course, the applicant shall demonstrate, to a CAA FIE, the ability to instruct a student pilot to the level required, including pre-flight, post-flight and theoretical knowledge instruction as laid out in **Standards Document 10**.

The CRI assessment of competence is divided into 4 main sections as follows:

Section 1: Theoretical Knowledge
Section 2: Pre-Flight Briefing
Section 3 & 4: Flight (Main & Supplementary exercises)
Section 7: Post-Flight Debriefing.

1. The AoC comprises oral theoretical examinations on the ground, pre-flight and post-flight briefings and in-flight demonstrations.

2. An applicant shall have received instruction on the same class of aeroplane used for the test.

3. Before taking the AoC, an applicant shall have completed the required training. The ATO shall produce the applicant's records when required.

4. Test Section 1: The oral theoretical knowledge examination part of the skill test, is sub-divided into 2 parts: The lecture and oral questioning.

5. Test Sections 2, 3 & 7 are for the FI(A) rating for single-engine (SE) single-pilot aeroplanes (SPAs). These sections comprise exercises to demonstrate the ability to be a CRI, (ie instructor demonstration exercises) chosen by the examiner from the flight syllabus of the CRI training course. The applicant will be required to demonstrate CRI abilities, including briefing, flight instruction and debriefing.

6. Test Section 4 is intentionally left blank and may be used for inclusion of other CRI demonstration exercises, as decided by the examiner and acknowledged by the applicant before the AoC.

7. During the AoC the applicant will occupy the seat normally occupied by the CRI, ie the RHS. The examiner will act as the 'student' in the LHS. The applicant will be required to explain the relevant exercises and to demonstrate them to the 'student'. Thereafter, the 'student' will execute the same manoeuvres including typical mistakes of inexperienced students. The applicant is expected to correct mistakes orally and or, if necessary, by intervening.

8. Test Sections 1 & 2 through 7 (as relevant) must be completed within a period of 6 months but all sections should, wherever possible, be completed on the same day. Failure in any exercise within Sections 2,3 and 4 (if applicable) and 5/6 (if relevant) requires a re-test covering all exercises. Section 1 (Theoretical Knowledge), if failed, may be taken separately.

9. The examiner may terminate the test at any stage if it is considered that the applicant's demonstration of flying or instructional skills require a re-test.

10. The examiner will normally be the pilot-in-command, (PIC) except in circumstances agreed by the examiner when another FI(A) is designated as PIC for the flight. Responsibility for the flight shall be allocated in accordance with national regulations.

See **Appendix 10** for a typical test.

The typical sequence in which the assessment will normally be conducted (with approximate durations for an initial issue) are:

(a) Administration and examiner's brief - 30 minutes
(b) Pre-Flight Briefing by instructor (Section 2) - 30 minutes
(c) Flight (Section 3 and additional exercises as required) – 60-90 minutes
(d) Post-Flight Debrief by applicant (Section 5) - 10 minutes
(e) Lunch
(f) Long briefing and theoretical knowledge (Section 1) - 2 hours
(g) Result, Examiners debrief and administration - 30 minutes

The examiner will explain and ascertain the instructor's understanding of the following definitions to be used throughout the assessment:
Demonstrate: If asked to 'demonstrate' an exercise or manoeuvre the instructor is expected to fly the complete exercise as a pure demonstration of piloting skill.
Patter: If asked to 'patter' an exercise or manoeuvre the instructor is expected to commentate whilst flying the manoeuvre, bringing out and highlighting any relevant teaching points. He is not required to break the exercise down into a lesson or offer the student control to practise.
Teach: If asked to 'teach' an exercise or manoeuvre the instructor is expected to break down the manoeuvre into its relevant parts and devise a lesson, giving the student time to practise and noting or correcting any faults or errors of technique.

Section 1 - Theoretical Knowledge Oral Subjects

a. Air Law
b. Aircraft General Knowledge
c. Flight Performance and Planning
d. Human Performance and Limitations
e. Meteorology
f. Navigation
g. Operational Procedures
h. Principles of Flight ME
i. Training Administration

Section 2 - Pre-Fight Briefing

a. Visual Presentation
b. Technical Accuracy
c. Clarity of Explanation
d. Clarity of Speech
e. Instructional Technique
f. Use of Visual Aids
g. Student Participation

Section 3 - Flight

a. Arrangement of Demo
b. Synchronisation of Speech with Demo
c. Correction of Faults
d. Aeroplane Handling
e. Instructional Technique
f. General Airmanship/Safety
g. Positioning Use of Airspace

Section 4 - Other Exercises As determined by the examiner

Section 7 - Post-Flight De-briefing

a. Visual Presentation
b. Technical Accuracy
c. Clarity of Explanation
d. Clarity of Speech
e. Instructional Techniques
f. Use of Models and Aids
g. Student Participation

Recommended Reading for CRI Course

Standards Document 10 – Guide forInstructors AoC
Standards Document 14 – Single Engine Pilots & Examiners
SRG 1157 – Examiner's Report for Class Rating
On-line form **SRG 3108** – Application for Issue, Renewal & Revalidation of Class Rating
SRG 1169 – Instructor Assessment of Competence
Flight Examiner's Handbook
CAP 804 – For Reference only

Part 4: Student Ratings & Courses

The Multi-Engine Piston (MEP land) Rating & Course
Multi-Engine Piston MEP (land) Course Lessons

The Multi-Engine Piston (MEP) Rating

Pre-Entry Requirements

The pre-entry requirements for an MEP rating are 70 hours PIC on aeroplanes. PICUS or SPIC is acceptable in this regard. The training must be conducted at an ATO (not a DTO) by a suitably qualified FI or CRI.

MEP (land) COURSE PRE-ENTRY CHECKLIST		
Hold Licence?	Type	
Have 70 hours PIC or PICUS/SPIC (A)	P1 (A)	

Course Details

Flight Training: The MEP flying training course consists of a minimum of 6 hours flight instruction, a minimum of 2:30 on normal operations and a minimum of 3:30 on engine failure and asymmetric procedures.
Ground Training: At least 7 hours of ground theoretical instruction is required. A multi-choice written paper of 50 questions concerning both MEP general and aircraft specific subjects must be passed with a pass mark of 75%. The CAA do not provide such written papers and it is left to the ATO to produce them.

Assessment: A skill test is required with a multi-engine examiner within 6 months of commencing the course. Application for the rating must take place within 6 months following the skill test.

Validity

The rating is valid for 12 months plus the remainder of the month of test.

Revalidation

To revalidate the rating without loss of the expiry date, a proficiency check (in an aeroplane of approved flight simulator) must be completed in the final 3 months of the validity of the rating, and:

- complete at least 10 route sectors (at least 15 mins cruise) during the period of validity of the rating, or
- complete one route sector with an examiner during the period of validity of the rating which may take place during the proficiency check.

If the proficiency check is takes more than 3 months before expiry, then the new expiry date is 12 months plus the remainder of the month of test.

Renewal

To renew an expired rating, refresher training at an ATO (not a DTO) is required to the necessary standard, followed by a proficiency check.

Recency

FCL.060 Recent experience:

(b) Aeroplanes, helicopters, powered-lift, airships and sailplanes.

A pilot shall not operate an aircraft in commercial air transport or carrying passengers:
as PIC or co-pilot unless he/she has carried out, in the preceding 90 days, at least 3 take-offs, approaches and landings in an aircraft of the same type or class or an FFS representing that type or class.
Additionally, to carry passengers at night, the PIC must, in the preceding 90 days, have completed at least 1 take-off, approach and landing at night as a pilot flying in an aircraft of the same type or class or an FFS representing that type or class, or hold an instrument rating.

NOTE:

With effect from November 2021, a new on-line form **SRG 3108** is now available for initial issue of a rating or for transferring an expired rating from the back of a licence:

Online application form SRG3108 is now live and can be used for class, type and instrument rating applications, including ratings for microlights and airships.

How much will it cost me?

A fee for each rating or LAPL privilege applied is:

- *Initial issue £127*
- *Renewal, revalidation, variation £93 (excluding LAPL).*

Note: *Revalidation not requiring action by the CAA (eg when the examiner signs the licence) will continue to be free of charge.*

MEP (land) Course Lessons

List of Suggested Lessons for the Be-76 aircraft

All Engines	
Ex22.1: MEP1: Introduction & General Handling 1:	Introduction, Retractable landing gear, Constant speed propeller, Autopilot & General Handling. Emergency descent.
Ex22.2: MEP2: General Handling 2:	Take-Off, Climb, Navigation, Steep turns, Stalling, Descent, Circuit & landing. Rejected Take-Off (RTO).
Ex22.3: MEP3: 2 Engined Circuits:	2-Engined circuits and go-arounds (Full flap and flapless).
Asymmetric	
Ex23.1: MEP 4: Asymmetric 1:	Full engine shutdown and restart. Recognition of engine failure. Asymmetric general handling. Zero thrust setting.
Ex23.2: MEP 5: Asymmetric 2:	Engine fail and fire in cruise scenarios. Critical speeds.
Ex23.3: MEP 6: EFATO and Asymmetric Go-arounds:	Simulated asymmetric circuits and go-arounds in the local area.
Ex23.4: MEP 7: Simulated Asymmetric Circuits:	Simulated asymmetric circuits and go-arounds in the airfield circuit.
MEP 8: Practice Skill Test:	Revision and test preparation.

MEP1: Ex22.1: Introduction & General Handling 1 (Be-76):

Practical Considerations

- Many students beginning an MEP course will never have flown an aircraft with retractable landing gear or constant-speed propeller. It is worth either spending a bit of time briefing this, or better, spend an hour or so in an SEP aircraft with these features. It saves time and money in the long run.
- Feathering check: Students familiar with constant speed propellers in SEP aircraft will not be familiar with the feather check on an MEP aircraft. Set the rpm below the governing range, say 1500. 2000 rpm is typically bottom of the propeller governing range. Quickly move lever through the gate and back before the prop has time to feather. If there is little or sluggish response, repeat with more time in the feather position. You are checking that the propeller would feather if allowed to continue.
- Some aircraft call for a Governor check (not Be-76): set rpm, increase MP, check RPM constant. Then reduce MP.

Long Briefing

Spend some time looking at the take-off and landing charts from the PoH.

MEP1: Ex 22.1: Introduction & General Handling 1

Beech Duchess Be76

AIM: To become familiar with the Be-76 and its general handling characteristics.

24 May22

Cockpit Familiarisation

- **Seat Position:** Full Rudder Travel, Seat Belts
- **Doors:** Make sure they are properly closed
- **Equipment:** Locate Gear/Fuel Tool Fuel Strainer
- **Avionics & Instruments:** Thorough Familiarisation

External Checks

- **Fuel Drains:** Locate and drain. See later page.
- **Other:** Propeller Safety and clearance. Oil & Fuel Levels. Gear Bays. Windscreen. Rear Door Security. High Tail inaccesible. OAT Probe.

Engine Start

- Start LEFT engine first
- Use Checklist, Lookout - restricted vision
- After Start Checks & set-up as much as possible

Taxi

- Parking Brake - Pumping technique - see PoH
- Directional Control
  Co-ordinated use of rudder, differential braking & differential power. Avoid power against brakes.
- Taxy on the centre-line
  Wider wheel base - larger wingspan, offset props.
- Anticipate:
  Braking - more inertia. Turns - larger turning circle.
  Speed - Higher idle thrust, don't taxy too fast or ride brakes.
- Be aware of Prop wash

Lean Mixtures for Taxy

Power Checks

- Use checklist, angle a/c off the taxiway, prop wash
- Propeller Check & Feather Check important
- Note engine idle rpms

Take-Off

- Line up on RW. Hold on brakes. Set 2000 rpm.
- Check Ts &Ps, suction, charging. Engines stable.
- Release brakes - maintain RW centre-line.
- Check airspeed LIVE. Smoothly apply **full** power.
- Keep hand on **BOTH** throttles
- Light rearward pressure on elevator.
- Rotate at Vr - 71 kts. Accelerate to 85 kts (TOSS)
- Commit to continue take-off - Dab brakes.
- Gear **UP** - Flaps should already be up for Take-Off.

Climb

- **>400':** MP **25"** **2500 rpm** **Rich** or **Leaned**
  Think order of levers: Big pull on Throttles - small tweak on rpms, mixtures in line with props.
- Climb at Vy 85 kts or Cruise Climb 100 kts.
- 1000' aal: Checks: Lights, fuel pumps, Ts & Ps
- **Announce: After Take-Off Checks** 'Complete'
- Electric Trim & Autopilot Master Switches **ON**
- Heater as Required
- Advance Throttles to maintain **MP** in climb

Cruise

- MP **22"** **2200 rpm** **Leaned** 140-150 kts.
- Cowl Flaps **Closed**. Cruise Checks.
- **FREDA** & Icing checks as required.
- Use of Autopilot. Various modes.

Descent

- **MP 18"** **2400 rpm** **RICH** (Idle descent undesirable)
- **Fuel Pumps ON** **Landing Lights ON**
- Retard Throttles to maintain MP in descent

Emergency Descent

1.1: EMERGENCY DESCENT

1.	Propellers	2700 RPM
2.	Throttles	IDLE
3.	Airspeed	140 kts
4.	Landing Gear	DOWN

Important Weight Limitations

Max Ramp Weight	3916 lbs
Max Take-Off & Landing	3900 lbs
Max Zero Fuel Weight	3500 lbs
Max Baggage Comp Weight	200 lbs

Take-Off

TOSS 85 kts **Gear UP** **Flap UP**

>400' Climb Power: **25"** **2500 rpm** **Rich or Leaned**

Vr = 71 kts

Ts & Ps

Service Limitations

- **Flap Limits:** 0-20° **120 kts** >20° **110 kts**
- **Gear Limits:** Extend **140 kts** Retract **112 kts**

Level-Off

- **MP 18"** **2400 rpm** **RICH** **115 kts** (gear UP)
- **MP 18"** **2400 rpm** **RICH** **105 kts** (gear DN)

Approach & Circuit

- **Downwind:**
  Select **GEAR DN**. Pre-Landing Checklist: **BUMP FFIHL**
  MP 18-22" **2400 rpm** **RICH** **115 kts Gear DN Flap UP**
- **Late Downwind:** Select **Flap 10°**
- **Base Leg:**
  MP 15-18" **2400 rpm** **RICH** **90 kts Gear DN Flap 20°**
- **Final Approach:**
  MP As Required **Max rpm** **RICH** **85 kts Gear DN**
  On Final & Stable: **Flap DN/35°** if appropriate
  Otherwise Go-Around

Flap DN Final Approach Speed: 76 kts
Flapless Final Approach Speed: 87 kts

Stabilised Approach

By 300' agl on every approach we should be

- Gear Down
- On the correct vertical profile
- Stabilised at the target approach speed
  Verbalise: **'300' stable - continue'** else **'go around'**

Landing

- **Reds Blues Greens**
- **Touch Down at 76 kts**
- **Crosswind landing** - Use crab method 25 kts max
- **After landing -** Keep eyes outside to maintain directional control.
- **Touch & Go:** No student flap lever selections.

After Landing

Gentle braking only to prevent tyre damage!

- Taxy clear and stop before making lever selections
- Make sure the heater is set to BLOWER ONLY
- It is easy to forget to turn the mags off after engine shutdown
- Turn off Fuel selectors. Trim Full Nose Down.

MEP 2: Use of the Autopilot

AIM: To learn how to use the autopilot fitted to G-DANL.

T&E: Overload, Mode confusion, Unscheduled autopilot input. **M:** Use autopilot in cruise, Mode awareness, Switch **OFF** for Take-Off.

The use of the autopilot during appropriate phases of flight allows the pilot to better manage the workload in the cockpit and free up capacity for other tasks.
The autopilot system installed in G-GPAT consists of 4 main components:

1: The Autopilot Master Switch below the R Magneto Switch.
2: Th Autopilot Control Panel above the Master Batt Switch
3: The Autopilot Mode Annunciator above the fuel gauges
4: The Autopilot Disconnect Switch on the P1 control yoke

The Autopilot is best disconnected using the 'Paddle'

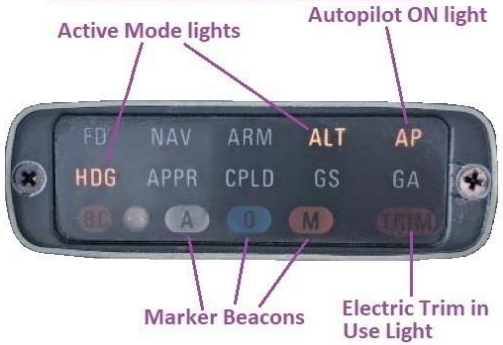
In order to use the autopilot, the Autopilot Master Switch and the Electric Trim switch need to be ON. (The Autopilot should be tested on the ground but not used until airborne.)

Test the Autopilot by turning on both the Autopilot and Electric Trim Switches, then press the TEST switch on the Autopilot Control Panel. Then use the Autopilot disconnect switch on the P! yoke to silence the beep. Turn off both the Autopilot and Electric Trim Switches.

Autopilot Modes

HDG - Heading Select. The aircraft flies the heading selected on the heading bug on the HSI.
FD - Flight Dirctor. The Flight Director Command Bars appear and give guidance, but the AP is NOT necessarily engaged.
ALT - Altitude Hold. The aircraft maintains the altitude at which the button was pressed.
NAV - Navigation Mode. The aircraft follows the VOR/LOC or GPS output to the HSI.
BC - Back Course ILS. Not used in Europe.
APPR - Approach Mode. The aircraft will couple to and follow the ILS Localiser and Glide Slope.
CPLD - Coupled to either the ILS or the NAV output to the HSI
UP/DN - Vertical Speed Mode. Pressing and holding the UP or DN side of the rocker switch will cause the aircraft to begin a climb or descent. When released, the aircraft maintains that Vertical Speed (VS).

Autopilot Mode Annunciator



The Autopilot Mode Annunciator indicates those modes which are actually engaged. Pressing a button on the Autopilot Control Panel does not guarantee that anything will happen. Only by checking the Annunciator can you be sure that the mode has engaged. It is easy to think the autopilot is doing one thing when in fact it is doing something different!

Autopilot Control panel

LIMITATIONS: CAA Regulations in the UK prohibit the use of the autopilot below 1000' above terrain unless coupled to an approach to land when lower limits apply (200' - 300' depending on the Autopilot).

Training Exercise

1: After take-off, level out and fly straight and level.
2: Switch on the Autopilot & Electric Trim Master Switches
3: Turn the heading bug on the HSI to your present heading.
4: Press the HDG & ALT Buttons on the AP Control Panel The aircraft should now maintain straight and level.
5: Experiment by turning the heading bug and watch the aircraft follow.
6: Press the ALT switch to disengage ALT mode, then press and hold the UP VS Switch until a 500 fpm climb is entered, then release. The aircraft continues to climb. When ready to level out, press ALT again

Air Exercise

1. Thorough introduction to the a/c. Cockpit familiarisation and extended external checks. Seat and rudder pedals positioned and locked.
2. Start-up from the checklist. Discussion of starter duty cycle and start faults. After start checks.
3. Brake check: throttle to idle before check to prevent power against brakes. Taxying: increased inertia. Caution centre-line tracking. Prop clearance especially over grass. Do not rush.
4. Power Checks: One engine at a time, slowly from the checklist, explaining each check. Instructor demonstrates the first engine.
5. Before take-off checks: Consider cowl flap position. Fuel tank to engine. Briefing: Discuss take-off normal procedure.
6. Take Off: Instructor demonstration: Do not accept immediate clearance. Bring to halt on RW centreline. Do not set parking brake. Stabilise at 2000 rpm before smoothly setting T/O power. Hold light back pressure during roll to prevent wheelbarrowing. Ailerons into wind. Maintain centre-line. 2 stage rotation - initially accelerate in level attitude until V_{YSE} then pitch up to climbing attitude. Assume landing back until V_{YSE} or V_{TOSS}. Initial climb. Target V_y or cruise climb speed. 'Dab brakes' – gear up. Above 200' can retract flap (not Be-76) but better to wait until 400'. Reduce to climb power only after retracting gear and flap. Remember to lean the mixture in line with the prop lever (Be-76 only for simplicity). Choice of climb speed (Be76): V_x (71 kts), V_{yse} (85 kts), en-route climb speed (100 kts). Max ROC 1000 fpm. Draw attention to the correct climbing attitude. After take-off checks. Announce checks complete clearly. Consider heater and electric trim. It is important to make the after take-off sequence punchy so you are ready to turn at 500' if needed. Maintain climb power throughout the climb by inching throttle forward. At top of climb cruise at 22"/2200. TOC checks, including cowl flaps as required.
7. At a safe height, effects of controls differences.
8. Climbing (max 1000 fpm), use of 3 levers (including mixture – OK to lean in climb). S & L at different speeds. Power/Attitude relationship.
9. Config changes. Handling differences in landing configuration. Small power changes.
10. Teach use of the autopilot and GNSS, and give time for student practice. Make sure they can use ALT HOLD, VS & HDG modes.
11. Demonstrate an idle descent but do not allow student to practice as it is an unpleasant manoeuvre. No power off descents. Better to use 16-18"/2400 rpm.
12. Explain reasons for an emergency descent – fire, oxygen etc. Demonstrate an emergency descent. Student practice.
13. Discuss Descent planning. 300' per Nm plus 3 miles to slow down. Ends with joining circuit. Suggest descent at 16-18"/2400 rpm. Then level out at circuit height with same power setting for downwind. No need to adjust. Demonstrate rejoining the circuit using this method. Never allow the gear warning horn to sound continuously – it is negative training. Do not allow the student to operate with the horn sounding.
14. Demo circuit and landing. When selecting gear down, automatically add 2" MP to prevent speed decay. Base leg 90 kts, approach 85 kts. Threshold speed 76 kts (flapless 87 kts). Must be above 76 kts for flare. Do not close throttle before starting the flare.
15. Taxi clear. After landing checks. Heater to blower only.
16. Taxi to parking.

Flight Prompt Card

Ex 22.1: MEP Be76 All Engines Part 1

1: A/c FAMIL inside and out.
2: Start Up: TEACH 1st Eng, STUDENT STARTS 2nd.
3:Taxy.
4: Power Checks. TEACH 1st Eng, STUDENT DOES 2nd. 5: Before TO Checks & Briefing.
6: TEACH Take Off to Top of Climb. Checks.
7: 22"/2200. Effects of Controls Diffs. STUDENT PRACTICE.
8: Climbing. Ts & Ps. Cowl Flaps.
9: STUDENT PRACTICE.
10: Descending. DEMO Idle Descent. No Practice. Unpleasant!
11: TEACH Cruise Descent. 16-18"/2400 rpm. STUDENT MAINTAINS.
12: TEACH Circuit Join & Approach. Pre-landing Checks. 13. PATTER Landing & Rollout.
14. After Landing and taxy to parking.

Debriefing

To be added

Common Student Faults

- Many students may never have flown an aircraft with retractable landing gear or constant-speed propeller. They may struggle with the order of levers. Practice several climbs and level-outs. It is worth either spending a bit of time practicing this, or better, spend an hour or so in an SEP aircraft with these features. It saves time and money in the long run.

Common Instructor Faults

- It is easy to forget how overwhelming it can be for a student who has only flown a basic SEP aircraft (2 levers) to find themselves in a 6 lever aircraft (+gear lever). Make sure that the student is completely comfortable with their operation before continuing. If necessary, spend some time in an SEP aircraft with a VP propeller and retractable landing gear.

MEP2: Ex22.2: General Handling 2 (Be-76):

Practical Considerations

- The student should already be familiar with the steep turns and stalls being taught in this lesson. However, it may be some time since such skills were last practiced.
- Rejected Take-Off (RTO): At a suitable speed, either point out something abnormal (no airspeed, low oil pressure, strange noises etc), or throttle back one engine and say ‘simulated engine failure’. If student does not retard the throttles immediately, then the instructor must do so. Never call ‘stop’ as this is unrealistic.

Long Briefing

To be Added

MEP2: Ex22.2: General Handling 2: Steep Turns & Stalling

Beech Duchess Be76
23 Mar 23

AIM: To learn to fly steep turns with and without gear & flap. To practice stall recoveries in various configurations of gear and flap.
T&E: Other a/c, loss of control spin, injury, engine problems. **M:** Lookout, HASELL checks, SSR = Standard Stall Recovery.

Steep Turns

Part of the Skills Test for the MEP is to fly Steep Turns with a minimum bank angle of 45 degrees, maintaining entry speed and altitude. This is done in two different configurations: Clean (Gear UP, Flap 0), and Approach (Gear Down, Flap 20).

NOTE: There is no requirement to carry out HASELL checks before practicing steep turns, however a good lookout is needed. Remember this is a visual manoeuvre and a good lookout should be maintained throughout.

Steep Turns (Clean)

Set-Up:
At least 2000' agl, straight & Level, FREDA checks complete. Gear UP, Flap 0.
Set 22"/2200 rpm. Good look out, particularly in direction of turn. Note Altitude.

Entry to Turn:
Extra power may be needed during the turn. Roll smoothly to 45 degrees. Extra back pressure needed on elevator

Maintaining the Turn:
Keep a good lookout throughout. Monitor the VSI, Altimeter and Horizon frequently to ensure performance is met. Eyes mostly outside!

Exiting the Turn:
Roll smoothly back, anticipating any roll out to a specific heading. Release back pressure. Remove added power.

Steep Turns (Approach Configuration)

Set-Up:
At least 2000' agl, straight & Level, FREDA checks complete. Gear DN, Flap 20° (Speed!)
Set 20"/2200 rpm.Good look out, particularly in direction of turn.Note Altitude & Speed.

Entry to Turn:
~2" Extra power is needed passing 30 degrees in the turn. Roll smoothly to 45 degrees. Extra back pressure needed on elevator.

Maintaining the Turn:
Keep a good lookout throughout. Monitor the VSI, Altimeter and Horizon frequently to ensure performance is met. Eyes mostly outside! Watch speed does not increase to Vfe.

Exiting the Turn:
Roll smoothly back. Release back pressure. Reset 22" MP

Common Faults: Insufficient bank, poor Alt keeping, poor lookout.

Stalling

HASELL Checks

Do NOT abbreviate to HELL Checks

H: Height - Sufficient to recover by 2000'
A: Airframe as required (Gear & Flap)
S: Security - Seat Belts, no loose objects
E: Engine - Check Ts & Ps, Carb Heat, Cowl Flaps Open.
L: Location - Clear of any a) Airfields, b) Built-Up Areas, c) Controlled Airspace & Cloud or d) Danger Areas.
L: Lookout - 2 x 90 degree turns or 1 180 degree turn.

Stalling (Clean) Full Stall

At least 2500' agl, S&L, HASELL checks. Gear UP, Flap 0. Cowl Flaps OPEN.
Set 18"/**2500** rpm, Mixture RICH. ~115 kts. Reduce MP towards Idle.
Pitch up to maintain altitude. Recover at the FULL STALL.
Not stall warner! **STANDARD STALL RECOVERY (SSR)**

Stalling (Approach Configuration) Approach to Stall ONLY

At least 2500' agl, S&L, HASELL checks. Gear DN, Flap 20°. Cowl Flaps OPEN.
Set 13"/**2500** rpm, Mixture RICH. ~100 kts. Reduce MP if needed.
Enter a 20° turn left or right. Pitch up to maintain altitude. Recover at the first sign of the stall. **STANDARD STALL RECOVERY (SSR)** **Gear Up Flap 0**

Stalling (Landing Configuration) Approach to Stall ONLY

At least 2500' agl, S&L. Gear DN, Flap 20. Cowl Flaps OPEN. HASELL Checks
Set 13"/**2500** rpm, Mixture RICH. Set Flap 35 . ~85 kts. Reduce MP if needed. Pitch up to maintain altitude. Recover at the first sign of the stall.
STANDARD STALL RECOVERY (SSR). FLAP 20 - GEAR UP - FLAP 0.

STANDARD STALL RECOVERY
Move the control column centrally forward until symptoms stop
Then - Apply **FULL POWER** (Prevent yaw with rudder)
When speed permits, level the wings with aileron
Gently ease out of the dive

For Test Purposes: Recover with min height loss, to a clean climb at Vy. Remember order of Gear and Flap retraction.

Common Faults: No HASELL, recovery not +ve enough, Flap/gear

Air Exercise

1. Student Start up, taxy out, power checks, before take-off checks.
2. Student Take-off.
3. Student climb to cruise and TOC checks. Cruise at 22”/2200.
4. Check student can navigate.
5. Teach Steep Turns clean: 22”/2200 little or no extra power needed. Min 45° AOB. Followed by student practice.
6. Steep Turns Flap 20, gear down: 24/22. Need 2” extra power to maintain airspeed.
7. Teach Stalls: HASELL (not HELL) – Height to recover by 2000’. Set rpm to 2400 or 2500 to allow full power to be accepted by the propeller. Mixture rich. First teach the Clean Stall: Set up at 16-18”/2400, clean. Reduce power enough to prevent the gear horn or all the way to idle. Recover from full stall to Vy. SSR. Followed by student practice.
8. Teach Base Turn Stall: Set up at 16-18”/2400 clean. Then Gear Down, Flap 20. 20 deg AOB. Recover at first sign of stall to clean climb at Vy. SSR. Followed by student practice.
9. Teach Final Approach Stall: Set up at 16-18”/2400 clean. Then Gear Down, Flap 20°. Lookout turn. Flap Full. Do not allow student to manoeuvre for lookout with full flap. Recover at first sign of stall to clean climb at Vy. SSR. Remember to retract drag flap ASAP. Followed by student practice.
10. Teach basic Instrument appreciation if appropriate.
11. Student rejoins for circuit and landing. In circuit, instructor takes radio and guides checks. Reds/Greens/Blues checks on final. Land flaps as required. Introduction of stable approach criteria.
12. Touch & go (instructor changes flap). Student circuits to touch & go. After Landing stress eyes out and manage landing roll. No student lever selections at this stage. Never allow student to retract their own flap on the runway. Instructor/Examiner always does this. Say ‘Flaps up, go when you’re ready’.
13. Taxi clear. After landing checks. Taxi back to holding point.
14. Rejected take-off practice. Instructor will call out a failure before Vr that will require the student to stop. Do not call ‘stop!’.
15. Taxi to parking.

Flight Prompt Card

Ex 22.2: MEP Be76 All Engines Part 2

1: REVISION: STUDENT Start Up. 2: STUDENT Taxy.
3: Power Checks. 4: Before TO Checks & Briefing.
5:STUDENT Take Off to ToC. Checks.
6: REVISION: Cruise 22”/2200. STUDENT PRACTICE.
7: TEACH Steep Turns Clean 22”/2200 rpm. STUDENT PRACTICE.
8: TEACH Steep Turns Gear Down Flap 20, 22”/2200 rpm. STUDENT PRACTICE.
9: Stalls: Mix Rich. 22”/2400. HASELL.
10. TEACH Clean Stall - Recover at Full Stall. STUDENT PRACTICE.
11: TEACH Base Turn Stall - Gear Down, Flap 20 16-18”/2400 - Recover at 1st sign. STUDENT PRACTICE.
12: TEACH Final Stall - Gear Down, Flap Full. 16-18”/2400. Recover at 1st sign. STUDENT PRACTICE.
13: STUDENT Cruise Descent: 16-18/2400.
14:STUDENT Circuit Join & Landing. Final Checks.
15: Instructor Taxies back to Holding Point.
16: STUDENT Circuit. 17:STUDENT Taxy & Shutdown.

Debriefing

To be added

Common Student Faults

- Do not allow students to undershoot on the approach. As the student begins to fly longer aircraft, this will become more critical. Stick with the PAPIS for longer.

Common Instructor Faults

To be added.

MEP3: Ex22.3: 2-Engined Circuits (Be-76):

Practical Considerations

- Fitting a faster twin into a busy circuit of slow, single-engined aircraft can be a challenge. If necessary, leave the circuit for general handling practice and return when quieter.

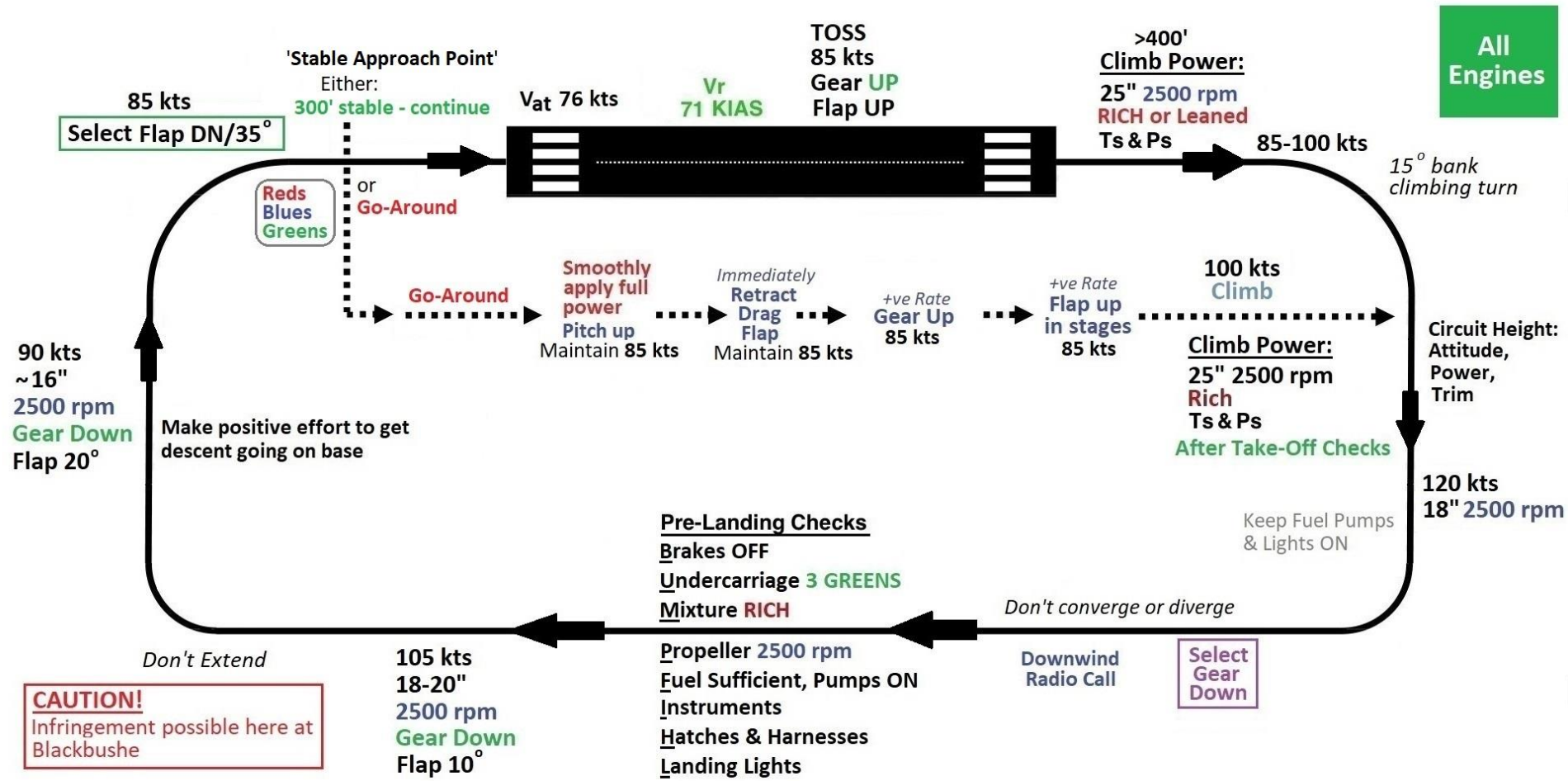
Long Briefing

To be Added

MEP 3: All-Engines Circuits (Flaps DN landing)

Beech Duchess Be76
23 JAN 21

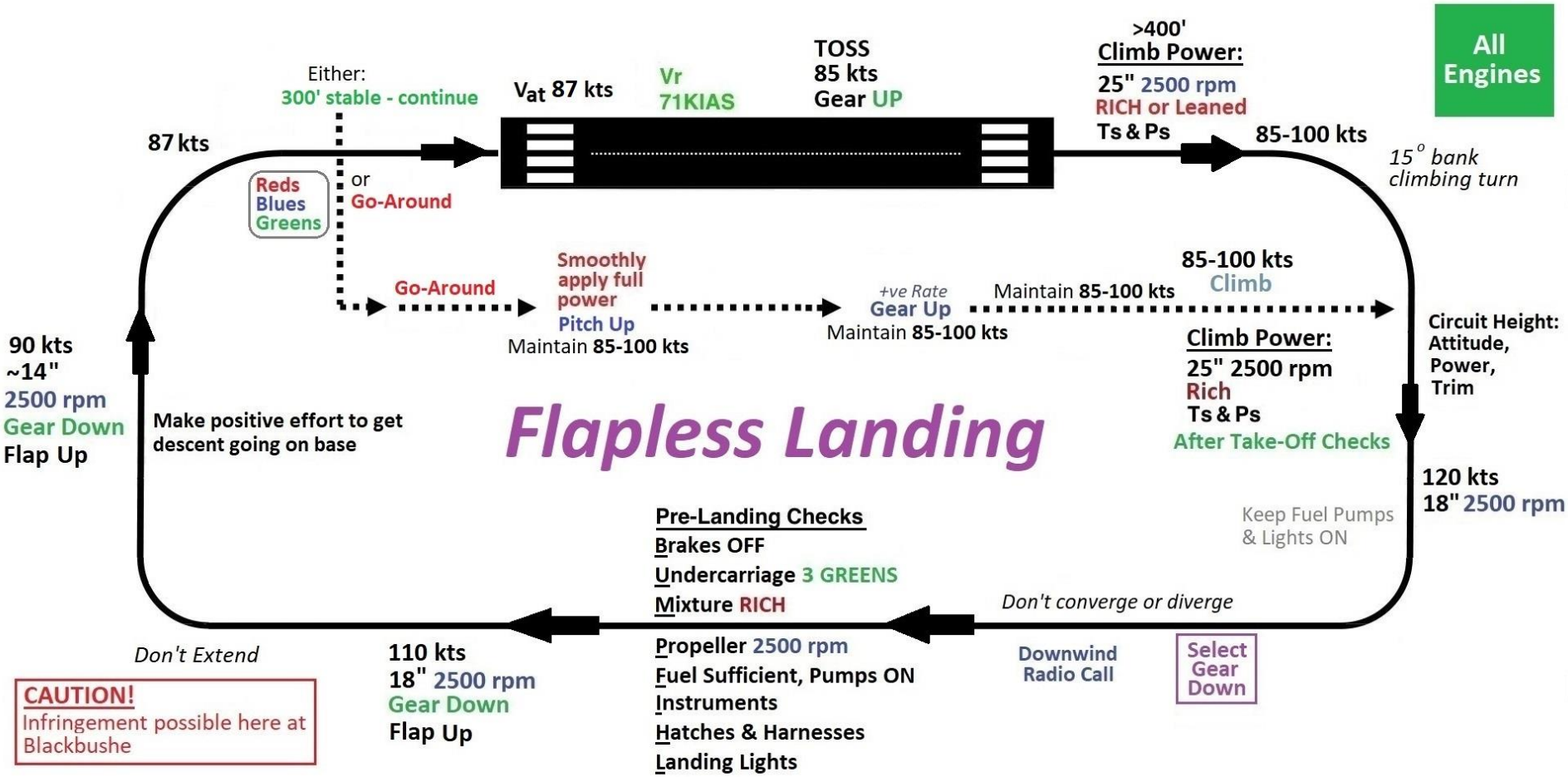
AIM: To learn to fly a 2-engined circuit and land with flap DN. To learn to fly a 2-engined go-around.
T&E: Circuit traffic, landing gear position, Unstable approach, RW occupied, stalling, overspeed, loss of control.
M: Lookout, Pre-landing checks, Red/Blue/Green Checks, Go-around, Scan ASI.



MEP 3: All-Engines Circuits (Flapless Landing)

Beech Duchess Be76
22 Jun21

AIM: To learn to fly a 2-engined approach and land without the use of flap. To learn to fly a flapless go-around.
T&E: Circuit traffic, landing gear position, Unstable approach, RW occupied, stalling, overspeed, loss of control.
M: Lookout, Pre-landing checks, Red/Blue/Green Checks, Go-around, Scan ASI .



Air Exercise

To be added

Flight Prompt Card

Ex 22.3: MEP (DA42) All Engines Circuits

1: REVISION: STUDENT Start Up, Taxi, Power Checks, Before TO Checks & Briefing.
2: STUDENT Circuit to G/A. Flap DN. Repeat as needed.
3: STUDENT Circuit to T&G. Flap DN. Repeat as needed.
4: STUDENT Circuit to T&G. Flapless. Repeat as needed.
5: STUDENT After landing & taxi.
6. TEACH RTO. STUDENT PRACTICE.

Common Student Faults

- Failure to get the aircraft descending on base, and so ending up high on final.
- Failure to observe stable approach criteria, or to refer to committing.

Common Instructor Faults

- Do not move on to asymmetric work if the student has not properly grasped two-engined flying.

Asymmetric Section

MEP 4: Ex23.1: Asymmetric 1 (Be76):

Practical Considerations

- For the full engine shutdown, the instructor will fly straight and level while the student shuts the engine down from the checklist. It is important that the instructor carefully monitors the student's actions to prevent both engines being shut down. Ensure the student pauses for confirmation before moving each control.
- Some aircraft have restrictions on actually shutting an engine down in flight, such as time or altitude limits. Prior to this flight, any limitations should be reviewed with the student from the PoH. The Be-76 has no such restrictions.
- A long, straight transit of about 30 miles or more is needed for the shutdown. Prior planning is needed.
- The shutdown should be completed at a safe altitude (suggest 3000' or above) and close to an airfield.
- After the engine shutdown, briefly discuss crossfeed, and why it is unlikely/dangerous to use it routinely.
- When demonstrating engine failures to the student, always make sure you fly in a straight line at constant altitude to show the importance of maintaining them. Say the words 'Heading' – 'Altitude'. Always shut down in a straight line rather than in a turn to make the effects clearer.
- When closing a throttle to simulate an engine failure, cover the quadrant with a folded map or similar.
- To show effect of speed and power on rudder requirement:
    - **a: Constant power, changing airspeed:** In cruise, throttle one eng back to zero thrust. Set climb power (25/25) on the other eng. Student controls the rudder only. Instructor raises nose gradually. As the airspeed reduces student sees increasing rudder requirement to maintain direction.
    - **b: Constant airspeed, changing power:** In cruise, the instructor throttles both engines back to zero thrust (or to just above the point that the gear warning sounds) and enters a descent at 100 kts. The student is given control of the rudder only. The instructor then gradually increases power on one engine towards maximum power whilst maintaining 100 kts using the elevator. The student reports how the rudder requirement needed to maintain direction varies.
    - Hence worst possible situation is low airspeed/high power ie EFATO.
- This is a long lesson with a lot to take in. Do not hesitate to break it up into 2 lessons if the student is overloaded.

Long Briefing

Engine Failure in Cruise Scenario:

Control	**Rudder** to keep straight **Elevator** to maintain att/alt **Ailerons** to keep wings level	**PHASE 1**
Increase Power	Increase **Power** on live eng to maintain speed. **Mix Prop Throttle**. **Fwd Fwd Fwd.** R to L	
Minimise Drag	**Gear Up**, **Flap Up**	
Identify/Feather **Whether to Feather?**	**Identify** – Dead Leg, Dead Engine **Verify** – Retard Throttle. **PAUSE!!!** Look at Eng. • If fire or damaged (visible, audible) or rpm dropping rapidly - feather immediately. • Otherwise, troubleshoot – Fuel ON, Pump ON, carb heat, magnetos etc.	
Secure Failed Engine ☹	**Fuel Selector** Off RE-identify each selection before seeking confirmation **Cowl Flaps** (probably closed) **CH** as required (probably OFF but ON for practice) AUX **Fuel Pump** off **Magnetos** Off **Alternator** Off	**PHASE 2**
Look After Live Engine ☺	**Alternator** ON: check load **Magnetos** on BOTH AUX **Fuel Pump** On **Ts** & **Ps** monitor: Check speed, if possible, reduce power **Cowl flaps** (Open or Half open?) **Fuel**: ON. Don't automatically crossfeed due possible contamination/mismanagement	
Restart? Crossfeed?	Only if greater need	
Flight Continuation Considerations	Declare Mayday, Transponder, Get weather, Divert or continue? Plan ahead for landing, **tDODAR**, Approach Bucket, Brief Passengers,	**PHASE 3**

Board Briefing

Ex MEP Asymmetric Part 1a

Be-76

06 May 24

AIM: To recognise, control and identify an engine failure and to show the effects of power and speed on the control of asymmetric flight.

T&E: Other aircraft, controlled airspace, loss of control, weather, overheat of operating engine. **Low speed. Wrong engine control.**

M: Lookout, pre-flight planning, Ts & Ps/FREDA, Critical Speeds: Vsse = 71 kts, Vyse = 85 kts. **Confirmation.**

Airex: **1: REVISION**: Start-Up, Checks, Take-Off & Climb to safe altitude.

2: SHUTTING DOWN AN ENGINE

Instructor Flies a/c S & L
Student shuts down eng from Checklist
CONFIRMATION!
Check Eng Instruments!
Cowl Flaps!

3: FLIGHT WITH ONE ENGINE INOP

Look at engine instruments
Straight & Level - Rudder Trim!
Note Rudder Trim position
Turning towards live engine
Turning towards failed engine
Descending - may not need to reduce pwr
Climbing - Full Power on live eng!
Minimal rate of climb

4: AIR-START OF FAILED ENGINE

Instructor Flies a/c S & L
Students starts failed eng from checklist
CONFIRMATION!
Zero Thrust Position
FREDA

5: RECOGNITION OF ENG FAILURE S & L

Aircraft trimmed S & L -
Instructor closes a throttle

EXTERNAL INDICATIONS:
YAW - ROLL - PITCH DOWN - SPIRAL DESCENT

INTERNAL INDICATIONS:
YAW - ROLL - PITCH DOWN - SPIRAL DESCENT

6: CONTROL OF A/C AFTER ENG FAILURE

YAW - RUDDER TO PREVENT
ROLL - AILERONS TO PREVENT
PITCH DOWN - ELEVATOR TO PREVENT
ALTERNATIVE METHOD - CLOSE BOTH THROTTLES

7: IDENTIFICATION OF FAILED ENGINE

DEAD LEG - DEAD ENGINE
IDLE LEG - IDLE ENGINE

8: ENGINE FAILURE IN TURNS

FAILURE OF 'INSIDE' ENGINE
More Rapid Roll

FAILURE OF 'OUTSIDE' ENGINE
Tends to Roll Level

9: EFFECT OF AIRSPEED ON RUDDER REQT

Zero Thrust One Engine
25/25 on the other
CONSTANT POWER
Student keeps a/c straight with rudder
Instructor raises nose to reduce IAS
Note effect on rudder input reqd
Instructor lowers nose to increase IAS
LOW IAS - MORE INPUT
HIGH IAS - LESS INPUT

10: EFFECT OF POWER ON RUDDER REQT

Zero thrust on both engines
CONSTANT AIRSPEED
Instructor flies 100kt descent initially
Student keeps a/c straight with rudder
Instructor increases power on one eng
Instructor transitions to 100 kt climb
Note effect on rudder input reqd
Instructor reduces pwr - descends 100 kts
LOW POWER - LESS INPUT
HIGH POWER - MORE INPUT

11: ENGINE FAILURE IN DESCENT

On Return to airfield
One engine to Zero Thrust
Easy to Control
Can be Hard to Notice

Skeleton Board Briefing

Ex MEP Asymmetric Part 1a

Be-76

06 May 24

AIM: To recognise, control and identify an engine failure and to show the effects of power and speed on the control of asymmetric flight.

T&E:

M:

Airex: **1: REVISION**:

2: SHUTTING DOWN AN ENGINE

3: FLIGHT WITH ONE ENGINE INOP

4: AIR-START OF FAILED ENGINE

5: RECOGNITION OF ENG FAILURE S & L

6: CONTROL OF A/C AFTER ENG FAILURE

7: IDENTIFICATION OF FAILED ENGINE

8: ENGINE FAILURE IN TURNS

9: EFFECT OF AIRSPEED ON RUDDER REQT

CONSTANT POWER

10: EFFECT OF POWER ON RUDDER REQT

CONSTANT AIRSPEED

11: ENGINE FAILURE IN DESCENT

MEP: ASYMMETRIC 1

LESSON AIM: To recognise the symptoms of engine failure and to handle the aeroplane during & after failure
THREATS & ERRORS: Other aircraft, Engine overheat or shock cooling, Shutdown of wrong engine.
MANAGEMENT: Lookout, Ts & Ps, Confirmation, Touch Drills, Checklist Discipline
AIR EXERCISES:

1: Feathering & Unfeathering

Instructor flies, student feathers and secures engine from checklist. Confirmation first!
Heading and altitude maintained throughout.
Student GH practice. Turns, climbs etc. gentle turns and poor rate of climb.
Student restarts from the checklist.

2. Recognition of Engine Failure

Looking Outside: Yaw – Roll – Pitch Down - Spiral descent **Looking Inside:** Instruments - Ball – Fuel Flow?

3. Control to Prevent

Yaw	Prevent with Rudder	**Roll**	Prevent with Ailerons
Pitch Down	Prevent with Elevator	**Speed Reduction**	Prevent by adding power to the live engine

4. Engine Failure in Turn

Inboard engine:	Aircraft overbanks.	**Outboard engine:**	Aircraft rolls out of turn.
Yaw	Prevent with Rudder	**Yaw**	Prevent with Rudder
Roll	Maintain Bank with Ailerons	**Roll**	Maintain Bank with Ailerons
Pitch Down	Prevent with Elevator	**Pitch Down**	Prevent with Elevator
Speed Reduction	Prevent by adding power on live engine	**Speed Reduction**	Prevent by adding power on live engine

5. Identification & Verification

Dead leg – Dead engine (Idle Leg – Idle engine)
Feather touch drills.
CONTROL – IDENTIFY – CONFIRM – FEATHER?
When would you feather? Fire, damage. Do we need to feather? Look at engine and instruments.

6. Effect of Power & Speed on yaw and rudder requirement.

Effect of Power	High Power – High Rudder Forces
Effect of Airspeed	Low Airspeed – High Rudder Forces

Hence worst possible situation is low airspeed/high power ie **EFATO**.

7: Engine Failure in Descent.

Difficult to notice.

Board Briefing

Ex MEP Asymmetric Part 1b

Be-76

06 May 24

AIM: To learn the full engine shut down in cruise drill and the engine fire in cruise drill.

T&E: Other aircraft, controlled airspace, loss of control, weather, overheat of operating engine. **Low speed. Wrong engine control.**

M: Lookout, pre-flight planning, Ts & Ps/FREDA, Critical Speeds: Vsse = 71 kts, Vyse = 85 kts. **Confirmation.**

Airex: **1: REVISION**: Start-Up, Checks, Take-Off & Climb to safe altitude.

2. Full Engine Shutdown in cruise drill

Start off S&L in Cruise
Engine Problem Occurs
Investigate & Troubleshoot

DECIDE - Shut down or Not?

IF Decision is to shut down:
Close Throttle
CONTROL!
Increase Power on Good engine
Check gear and flap are up
Identify Failed Engine - Dead Leg - Dead Engine
Verify by moving failed throttle

PAUSE

DECIDE WHETHER TO REALLY SHUT DOWN OR NOT
IF Decision is to really shut down:
Close Throttle - Feather Propeller - Mixture to ICO

TOUCH DRILLS ONLY FOR THE LESSON!

PHASE 2:
Secure Failed Engine - Look after good engine - Flow

PHASE 3:
Flight Continuation Plan:

Destination:	Continue or Divert?
Communicate:	ATC, Passengers
Briefing:	Prepare for Asymmetric app & ldg.

3. Engine Fire in Cruise Drill

MEMORY ITEMS

1: Fuel Selector -	OFF
2. Mixture -	IDLE CUT OFF
3. Propeller -	FEATHER
4. Aux Fuel Pump -	OFF
5. Magnetos -	OFF
6. ALT Switch -	OFF
7. If FIRE not out -	EMERGENCY DESCENT & LAND ASAP or
8. If FIRE is out -	LAND ASAP

EMERGENCY DESCENT

1. Propellers -	2700 rpm
2. Throttles -	IDLE
3. Airspeed -	140 kts
4. Landing Gear -	DOWN

Skeleton Board Briefing

Ex MEP Asymmetric Part 1b

Be-76

06 May 24

AIM: To learn the full engine shut down in cruise drill and the engine fire in cruise drill.

T&E:

M:

Airex: **1: REVISION:**

2. Full Engine Shutdown in cruise drill

DECIDE - Shut down or Not?

PHASE 2:

PHASE 3:

3. Engine Fire in Cruise Drill

MEMORY ITEMS

EMERGENCY DESCENT

MEP 4: Asym 1: Engine Shutdown in Flight

Beech Duchess
23 JAN 21

AIM: To learn how to shut down and restart an engine in flight. To learn how to handle the aircraft with one engine inoperative.

T&E: Double engine failure, loss of control, engine overheat, damage or cold soak. **M:** Confirmation, checklist discipline, speed awareness.

In this lesson there will be a full in-flight shutdown and restart of an engine.
The instructor will fly the aircraft, keeping it straight and level, while the student shuts down the engine from the checklist.
Once the engine is shutdown, the student will have the opportunity to handle the aircraft with one engine inoperative. This will include turns, climbs and descents.

NOTE: Ensure latest checklist version is used

Beechcraft Be-76 Duchess G-DANL V3.2 07/03/20

2.2d: PRACTICE FEATHERING & SECURING IN CRUISE

Note: *First Decide the Engine to be Shut Down for Practice.*

- Airspeed ..... **100 Kts MINIMUM**
- Power on Live engine..... **2500 RPM/25" MP**
- Power on other engine..... **THROTTLE IDLE** for 20 secs minimum before shutdown
- Gear And Flaps ..... **UP**
- Throttle (inop engine) ..... **CONFIRM/CLOSED**
- Propeller (inop engine)..... **CONFIRM/FEATHER**
- Mixture (inop engine) ..... **CONFIRM/IDLE CUT-OFF**
- Airspeed ..... **85 Kts MINIMUM**
- Fuel Selector (inop engine)..... **CONFIRM/OFF**
- Cowl Flaps ..... **SET to keep CHT on Live CLOSED on inop Engine.**
- Carburettor Heat (both engines) **CONFIRM/OFF**
- Aux Fuel Pump (inop engine) .... **CONFIRM/OFF**
- Magneto/Start Switch (inop engine) **CONFIRM/OFF**
- ALT (inop engine)..... **CONFIRM/OFF**
- ALT (live engine)..... **CONFIRM/ON**
- Magneto/Start Switch (live engine) **CONFIRM/BOTH**
- Aux Fuel Pump (live engine)..... **CONFIRM/ON**
- Engine Instruments on Live Engine **CHECK**
- Electrical Load on Live Engine ... **CHECK MAX 100%**
- Suction..... **CHECK**
- Fuel Selector (live engine) ..... **CONFIRM/ON**

When ready to restart the engine, use the Air Start Checklist Below:

Beechcraft Be-76 Duchess G-DANL V3.2 07/03/20

2.3: AIR START

CAUTION: The pilot should determine the reason for engine failure before attempting an air start.

NOTE: Airspeed should be maintained at or above 100 KIAS to ensure the engine will windmill.

NOTE: Two air start procedures follow, one with unfeathering accumulator and one without:

2.4: AIR START (WITH UNFEATHERING ACCUMULATORS)

1. Fuel Selector — **ON**
2. Throttle — **SET APPROX ¼ TRAVEL (25%)**
3. Aux Fuel Pump — **ON**
4. Magneto/Start Switch — **BOTH**
5. Propeller Control — **MOVE FORWARD UNTIL ENGINE WINDMILLS, THEN BACK TO MIDRANGE.**
   - If airspeed is below 100 kts use starter momentarily.
6. Mixture — **FULL RICH**

If propeller does not unfeather or engine does not turn, proceed to **AIR START WITHOUT UNFEATHERING ACCUMULATORS** procedure.

CAUTION: Expect yaw as power becomes available.

NOTE: If engine fails to run, clear engine by allowing it to windmill with mixture in the FULL LEAN position. When engine fires, advance mixture to FULL RICH.

When engine starts:

7. Throttle — **SET 15"**
8. Propeller — **SET 2000 rpm**
9. Mixture Control — **LEANED** (75%)
10. Aux Fuel Pump — **OFF** (when power regained)
11. ALT Switch — **ON**
12. Oil Pressure/Temperature — **CHECKED**
13. Engine — **WARM UP** (15"/2000 rpm)
14. Power — **AS REQUIRED** once warm
15. Trim — **AS REQUIRED**

MEP 4: Asym 1: Single Engine Turns, Climbs & Descents

Beech Duchess Be76
24 JAN 21

AIM: To learn how to safely perform one engine inoperative turns, descents & climbs.
T&E: Other aircraft, Loss of control, Engine overheat. **M:** Lookout, Speed & bank angle awareness, FREDA Checks.

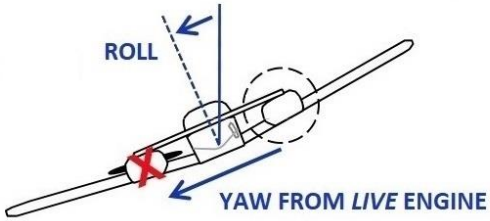
Single Engine Turns

VFR TURNS:
- Turns made under visual conditions should be limited to 20° when single-engine.

IFR TURNS:
- All turns in IFR flight should be rate 1: 3° per second
- In asymmetric flight, extra care must be taken to avoid overbanking
- Asymmetric turns should always be level, never climbing or descending

TURNS INTO THE *DEAD* ENGINE

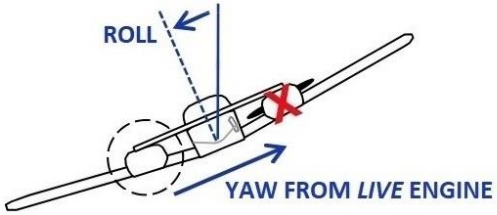
- This is the more critical situation, as the aircraft will tend to overbank, because the asymmetric yawing moment is aided by the horizontal component of lift, producing a rolling moment.



- Opposite aileron is required to maintain the desired angle of bank and rate of turn

TURNS INTO THE *LIVE* ENGINE

- This is the less critical situation, with a tendency for the aircraft to roll out of the turn. The asymmetric yawing moment opposes the horizontal component of lift, producing an opposite rolling moment



Single Engine Climb

- In the climb, more rudder will be required than in straight & level flight, due to the increased asymmetric thrust and lower airspeed
- For continued climb, it is advisable to trim out as much rudder load as possible
- On one engine, climbs will require **FULL POWER** on the live engine and will result in very low rates of climb, say 1-300 fpm.

Single Engine Descent

- In the descent, the amount of rudder pressure will be lower due to the lower thrust and higher airspeed
- Anticipate the level-off, and apply power smoothly keeping the ball centered, otherwise, an abrupt application of power will result in uncoordinated yawing

MEP 4: Asym 1: Engine Failure in Flight - Recognition

Beech Duchess Be76

24 JAN 21

AIM: To learn to recognise the initial effects of an engine failure in cruise flight, and to take appropriate corrective action.

T&E: Other aircraft, Loss of control, Double engine failure, Engine overheat. **M:** Lookout, Speed awareness, Confirmation, FREDA Checks.

Effect of Engine Failure: In Straight & Level Flight

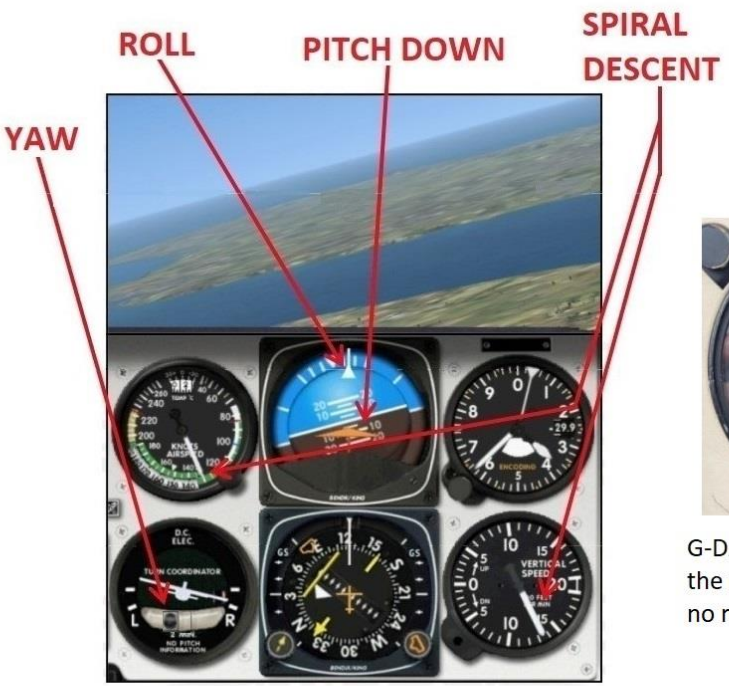
- Begin in normal level cruise **MP 23"** **rpm 2300** **~130 kts**
- Look Outside. Close One Throttle completely
- Visually observe effects

Aircraft will:
YAW...then...**ROLL**...then **PITCH DOWN**...then enter...**SPIRAL DESCENT**

- Repeat demonstation looking inside at the instruments

Each Effect needs a **CONTROL RESPONSE**

YAW	ROLL	PITCH DOWN
↓	↓	↓
RUDDER	AILERON	ELEVATOR



G-DANL turn co-ordinator with the right engine feathered and no rudder trim.

Maintain Heading & Altitude

Effect of Engine Failure:

In Turns: Example: Right Hand Turn

INSIDE ENGINE FAILS

- **YAW:** Fast to develop
- **ROLL:** Fast to develop
- **PITCH DOWN:** Fast to develop
- **SPIRAL DESCENT:** Fast to develop

- Effects are: **fast to develop**
  easier to detect
  harder to correct

OUTSIDE ENGINE FAILS

- **YAW:** Slow to develop
- **ROLL:** Slow to develop
- **PITCH DOWN:** Slow to develop
- **SPIRAL DESCENT:** Slow to develop

- Effects are: **slow to develop**
  harder to detect
  easier to correct

Can be dangerous during a turn onto finals - with low power set and the outside engine failing, the failure may not be easily noticed.

Engine Failure in Descent

Can be difficult to detect
Often first noticed on level out

MEP 4: Asym 1: Actions Following an Engine Failure in the Cruise

Beech Duchess Be-76
31 DEC 20

Actions following an Engine Failure in the Cruise

- When an engine fails, the aircraft will immediately yaw towards the failed engine. If uncorrected, it will roll wing-down into the failed engine, and then pitch down. If uncorrected further, a spiral descent will develop.

The First action therefore is:

1 ➡ CONTROL
- Correct the **YAW** by centering the ball with **RUDDER**
- Correct the **ROLL** with **AILERON**
- Correct the **PITCH DOWN** with **ELEVATOR**

2 ➡ ADD POWER
- Set **MP 25"** **2500 rpm** on live engine or full power if reqd

- A slightly higer pitch attitude is needed (+2°)
- Check airspeed stabilising at ~110 kts
- Trim accurately, then.....

3 ➡ REDUCE DRAG - Gear UP - Flap UP

4 ➡ IDENTIFY
DEAD LEG - DEAD ENGINE (Idle Leg - Idle Engine)

5 ➡ WHETHER TO FEATHER? (See Page 20)
- Diagnose problem and decide if a shut down is required. If so...

6 ➡ FEATHER (Do NOT Rush)
- Failed Engine: **THROTTLE** - Close to Verify
- Failed Engine: **PROP** - Feather
- Failed Engine: **MIXTURE** - Idle Cut-Off (ICO)

- When workload permits:

7 ➡ Complete Phase 2 Checks Use the flows shown on page 21

8 ➡ Flight Continuation Planning See Page 22

Consider a 'Mayday' or 'PAN' call.
Have a plan for the continuation of the flight. Divert/Continue?
With regard to Fuel, Weather, Terrain, airport facilities etc.

Effect **Corrective Action**

Maintain Heading & Altitude

To Maintain
Straight & Level Flight

- 2500 rpm 25" MP
- Wings level, Pitch +2°
- Trim (Elevator & Rudder)

MEP 4: Asym 1: Engine Failure in Flight - Whether to Feather?

Beech Duchess Be76
24 JAN 21

AIM: To understand the decision making process used to decide whether or not to feather an engine in cruise flight.
T&E: Shutting down a healthy engine, Rushing into an unnecessary & irreversible course of action. **M:** Pace, Troubleshoot, assess, TDODAR.

The priorities after an Engine Failure in Cruise are as follows:

- **Control the aircraft** - in Yaw, pitch and roll
- **Apply More Power** - Forward, Forward, Forward (Right to Left)
- **Gear Up, Flap Up** - Check they are
- **Identify & Verify** - Dead Leg, Dead Engine
- **Whether to Feather?** - Decide whether to restart or Feather

If Feathering:

Identify, Verify, Feather, Feather, Feather Phase 2 Checks. Flight Continuation.

If Not Feathering:

Try to Restart

Whether to Feather?

When an engine fails after take-off (EFATO), we don't have time to troubleshoot and decide whether or not to feather - we automatically do it. We have not long since carried out our before take-off checklist, so there is every reason to believe that all the switches are in the correct position.

However, some time later, in the cruise, if an engine should overheat, catch fire or fail, we may wish to take a little time to troubleshoot before making the decision to feather it.

The first thing to do is look at the engine itself, and the engine instruments. Is there something obviously wrong? For example:

- **Fire**
- **smoke**
- **Paint blistering on the engine cowling**
- **Obvious mechanical damage to the propeller or engine**

In this case, it is fairly obvious we will need to feather it straight away.

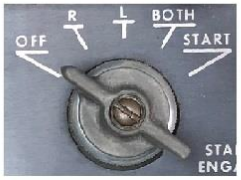
There may be abnormal indications such as

- **Very high EGT or CHT indication**
- **High Engine Vibration**

It may be possible to solve these problems by running the engine at idle, rather than feathering it.

It may be that a switch or control has inadvertently been moved to the wrong position:

- **Mixture**
- **Fuel Selector**
- **Magnetos**
- **Fuel Pump**
- **Carb Heat**



In these cases, just changing a switch position may restore the engine.

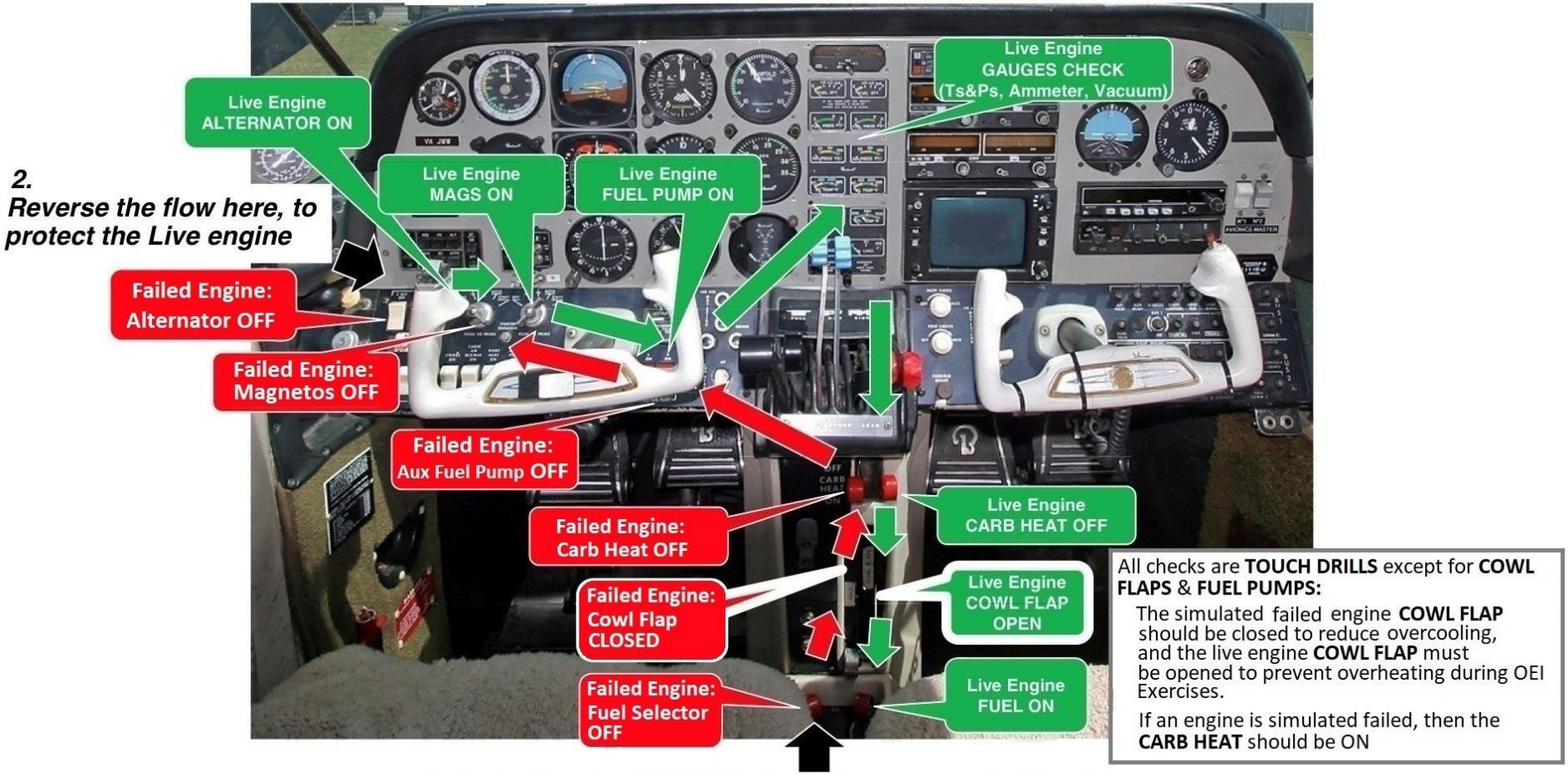
The Golden Rule is:
In the cruise, take some time to diagnose the problem before feathering.

AIM: To learn how to memorise the ***PHASE 2*** flow checks used to secure a failed engine and to protect the live engine.

T&E: Other aircraft, Loss of control, Double engine failure. **M:** Lookout, Speed awareness, Confirmation, Checklist discipline.

PHASE 2 Flow Checks after engine shut down

Example: Left engine failed/feathered



All checks are **TOUCH DRILLS** except for **COWL FLAPS** & **FUEL PUMPS:**

The simulated failed engine **COWL FLAP** should be closed to reduce overcooling, and the live engine **COWL FLAP** must be opened to prevent overheating during OEI Exercises.

If an engine is simulated failed, then the **CARB HEAT** should be ON

1: Begin flow for PHASE 2 checks here, securing the Failed Engine

MEP 4: Asym 1: Engine Fire in the Cruise & Flight Continuation

Beech Duchess Be76
24 JAN 21

AIM: To learn and practice the actions for an engine fire in the cruise. To learn how to plan what happens next.
T&E: Other aircraft, Loss of control, Engine overheat. **M:** Lookout, Speed & bank angle awareness, Checklist discipline, FREDA Checks.

We have studied and practiced the procedure for a simple engine failure in cruise flight.

If, however, the failure is due to a fire, our priorities change a little. Our first priority after maintaining control of the aircraft must be to extinguish the fire.

The checklist accomplishes this by cutting off the fuel supply. The following checklist needs to be comitted to memory:

4.2: ENGINE FIRE IN FLIGHT (CRUISE)

1.	Fuel Selector	OFF
2.	Mixture Control	IDLE CUT OFF
3.	Propeller	FEATHER
4.	Aux Fuel Pump	OFF
5.	Magneto/Start Switch	OFF
6.	ALT Switch	OFF
7.	If fire not out	EMERGENCY DESCENT and land immediately
8.	If fire is out	LAND at nearest suitable airport

1.1: EMERGENCY DESCENT

1.	Propellers	2700 RPM
2.	Throttles	IDLE
3.	Airspeed	140 kts
4.	Landing Gear	DOWN

Fire can be identified by the following means:

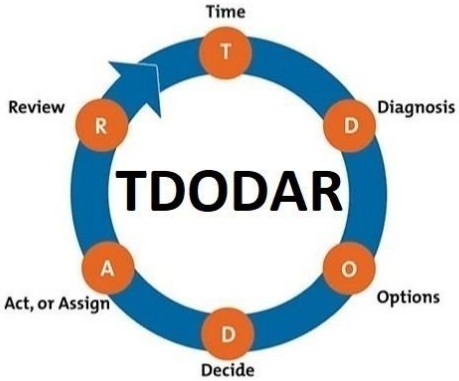
Very High EGT, Paint blistering on engine nacelle, smoke coming from engine, flames coming from engine & because the examiner says there is a fire!!

Flight Continuation Planning (Phase 3)

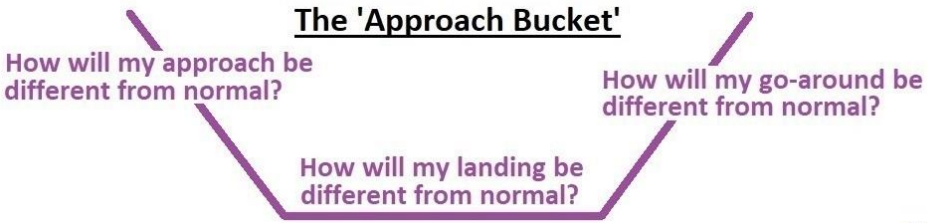
It is all very well dealing with the emergency situation: controlling an engine failure, extinguishing a fire etc. However, a plan needs to be formulated as to how to continue the flight. Questions to be considered?

1: Where will you land? How will you get there?
2: Will you declare a MAYDAY or PAN?
3: What will you squawk on the Transponder?
4: How will your approach, landing and possible go-around differ?
5: What will you tell your passengers?

There are several problem-solving tools available, one of which is the **tDODAR Loop** shown below. Discuss with your instructor if unfamiliar.



The 'Approach Bucket'



Air Exercise 1a

1. Student Start up, taxy out, power checks, before take-off checks.
2. Student Take-off & climb to 3000’ and TOC checks. Cruise at 22”/2200 rpm.
3. Instructor flies straight & level at 3000’ or as needed, while student feathers and secures the engine from the checklist. Introduce touching controls for confirmation first. Constantly refer to your heading and altitude throughout to draw attention to your priorities.
4. When trimmed and engine shut down, give control to student for general handling practice. Turns at 15° AoB. Practice as necessary.
5. Give control to student for general handling practice. Descent at 16-18” on live engine. Practice as necessary.
6. Give control to student for general handling practice. Climb at full power. Note poor rate of climb – 200-300 fpm. Practice as necessary.
7. Take control and remove feet from rudder. Show student the position of the ball with engine feathered. Remember for later (take photo). Alternatively, trim the rudder and take a photo of the rudder trim gauge with one eng feathered and the other at 25/25.
8. Then fly S&L, allow student to restart the engine from the checklist.
9. When the student reaches the part about setting power, take control, remove feet from pedals, set the throttle to the same ball position is found (12-13” on Be76). This is then the zero thrust setting. Then direct the student to continue with the checklist. Alternatively, show that the trimmed position before is no longer sufficient. Add power on the windmilling engine until the rudder trim is correct.
10. Instructor demo. Recognition of failure. Close a throttle but do not touch the controls. Student looks outside and sees Yaw - Roll - Pitch. Draw attention to the spiral descent that ensues.
11. Repeat the exercise with the student looking inside at the instruments. Note the ball, horizon and VSI.
12. Repeat the exercise with the student looking outside, but teach the student to prevent the yaw with rudder, prevent the roll with aileron and prevent the pitch down with elevator. Increase power to maintain airspeed. Mix – prop – throttle. Student practices. Initially with throttle quadrant on display, later with it covered. Practice until competent.
13. Repeat the exercise with the student looking inside at the instruments, but teach the student to prevent the effects. Increase power to maintain airspeed. Mix – prop – throttle. Student practices. Initially with throttle quadrant on display, later with it covered. Practice until competent.
14. Instructor demonstrates engine failure of inboard engine in the turn. Aircraft overbanks. Show effect of rudder to prevent yaw, aileron to initially maintain turn, elevator/power to maintain alt/airspeed. Repeat with outboard engine showing that the aircraft tends to bank out of the turn before going the other way.
15. Introduce ‘Dead leg – Dead engine’. Give student control during S&L in trim. Cover the throttles. Close 1 throttle – allow student to identify the failed engine. Student must say ‘Left’ or ‘Right’ and touch the appropriate lever. The less the student says the better. Give zero thrust after identification. Practice as needed.
16. Effect of airspeed: **Constant power, changing airspeed:** In cruise, throttle one eng back to zero thrust. Set climb power (25/25) on the other eng. Student controls the rudder only. Instructor raises nose gradually. As the airspeed reduces student sees increasing rudder requirement to maintain direction.

17. Effect of Power: **Constant airspeed, changing power:** In cruise, at circuit power setting (18/24), instructor throttles both engines back to idle, and flies a descent at 100 kts. He then increases power on the other eng towards max power and transitions to a climb to keep 100 kts. Student controls the rudder only and feels rudder requirement increasing as power on live eng increases. Back to 2 eng. Hence the worst possible situation is low airspeed/high power ie EFATO.
18. Student flies and navigates the aircraft in descent towards the airfield. Do not allow gear horn to sound.
19. Instructor closes one throttle in descent to simulate engine failure in descent. Note it is much harder to notice, and may not be picked up until power is increased.
20. Student joins the circuit to land. After landing checks and taxi to parking.

Air Exercise 1b

1. Student Start up, taxy out, power checks, before take-off checks.
2. Student Take-off & climb to 3000' and TOC checks. Cruise at 22"/2200 rpm.
3. Instructor demonstrates and teaches the full engine failure in cruise scenario. Student just watches and learns. Start with suggesting that an engine is overheating. Talk about opening cowl flaps, reducing power on that engine etc to try to contain. Then close throttle. Control the aircraft in all 3 axes, increase power to 25/2500, check gear and flap are up. Identify using dead leg – dead engine. Verify by pretending to move the throttle. Then pause and consider 'whether to feather?' Look for obvious problems or signs of damage or leakage. Look at the engine and the engine instruments. Then make the decision to feather – Touch drills for feathering. Phase 1 complete. Then Phase 2 flow (touch drills only) to secure dead engine and look after live engine. Then Phase 3: Flight continuation planning. Should take at least 10 minutes to run. Then restore to normal.
4. Student then practices the whole scenario at least twice.
5. Instructor then teaches the engine fine in cruise procedure.
6. Student practices.

Flight Prompt Card

Ex 23.1a: MEP (Be76) Asymmetric Part 1a

1: REVISION: STUDENT Start Up, Taxi, Power Cx, Before T/O Cx & Briefing. 2: STUDENT Take-Off. Climb to 3000'.Checks. 3: Instructor flies S&L while student shuts down engine from checklist. CONFIRMATION!
4:STUDENT PRACTICE handling OEI. Turning 15ºAOB.
5:STUDENT PRACTICE descending OEI. 16-18".
6:STUDENT PRACTICE climbing OEI. Full Power.
STUDENT PRACTICE AS NEEDED.
7: Instructor flies S&L and removes feet from rudder. Note position of ball/trim. 8: Instructor flies S&L while student re-starts eng from checklist. CONFIRMATION!
9: When reaching part about setting power, take control, show zero thrust. 10: TEACH effects of eng fail S&L looking out. 11: TEACH effects of eng fail S&L looking in. 12: Effects of eng fail S&L looking out, student preventing effects. STUDENT PRACTICE as needed. 13: Effects of eng failure S&L looking in, student preventing effects. STUDENT PRACTICE as needed. 14: TEACH effects of eng fail in turn. Inside & outside. STUDENT PRACTICE. 15: 'Dead leg Dead Engine'. Cover throttles. STUDENT IDENTIFIES & CONTROLS. 16: Effect of Airspeed on rudder: Instructor flies, student has rudder: 1 eng zero thr other 25/25. Raise nose. 17: Effect of pwr on rudder: Instructor flies, student has rudder: 2 engs zero thrust. 100 kt desc. Add power to one engine. Transition to 100kt clb. 18: Instructor DEMO eng fail in descent. 19: REVISION: STUDENT Nav & rejoin circuit.
20: REVISION:STUDENT circuit & ldg. After ldg & taxi.

Ex 23.1b: MEP Be76 Asymmetric Part 1b

1: REVISION: STUDENT Start Up, TAXY, Power Checks, Before TO Checks.
2: REVISION: STUDENT Take Off to Top of Climb. Checks. Cruise 22"/2200.
4: DEMO Complete Eng fail in cruise scenario (touch drills only).
5: TEACH Complete Eng fail in cruise scenario (touch drills only).
6: STUDENT PRACTICE.
7: DEMO Complete Eng fire in cruise scenario (touch drills only).
8: TEACH Complete Eng fire in cruise scenario (touch drills only).
9: STUDENT PRACTICE.
10: PATTER Sim Assym Circuit to Full stop.
11: REVISION:STUDENT Taxy & Shutdown.

Debriefing

- The take home message from this lesson is that the aeroplane flies perfectly well on one engine as long as the necessary actions are taken in a timely manner. This is probably one of the few times the student will see the engine actually shut down (he should see it in the skill test too), and is important to show as it builds confidence in the aircraft asymmetric performance.

Common Student Faults

To be added

Common Instructor Faults

- Do not move on to the asymmetric phase of training until the student has a thorough grasp of 2 engined flight.
- During the engine full shutdown, the student's attention will be mainly inside the cockpit so the instructor must maintain a good lookout.
- If the engine is always simulated failed by closing the throttle, the student never gets a change to verify the failure by moving the throttle. Occasionally, fail an engine by closing the mixture. Make sure the rpm doesn't reduce too far (1000 rpm minimum). Restart by closing throttle, mixture rich.
- Make sure that when the engines is feathered, that you point out how misleading the MP indications are. Also, there will be levers in all directions. It can be very confusing.

MEP 5: Ex23.2: Asymmetric 2 (Be76):

Practical Considerations

- Do not use crossfeed lightly. It may be more practical and safer to leave the system alone. It is easy to mismanage the fuel system by crossfeeding. The engine failure may be due to contamination of fuel. Crossfeed is rarely needed in UK due to the proximity of airfields. Many engine failures of MEP aircraft are due to fuel mis-management.
- During the demonstration of critical speed, there is no need, or desire to reduce the speed to Vmca. It is a demonstration of the effect of airspeed on rudder input required, and how feathering and bank can reduce that input. It is NOT an experiment to determine Vmca, Ideally the speed would reduce to around Vyse or maybe as low as 80 kts but there is no need to go lower. There have been a number of fatal spins entered recently as a result of this exercise being flown too slowly. Remember, you are not a test pilot, just an instructor setting out to show the effects of various scenarios on rudder input required.
- There is a demonstration of the effect of drag on rate of climb following an engine failure. This is a good demonstration of why we clean up and feather the engine following an EFATO. Demonstrate only as follows, while the student notes the rate of descent/climb:
    - Instructor flies S&L gear down, flaps full, then sets one engine full power, the other to idle. He then adjusts attitude to maintain Vyse. The student will probably see a rate of descent.
    - Then the instructor raises the gear but maintains Vyse - the student should note a lower rate of descent.
    - The instructor then retracts all the flap but maintains Vyse - the student should note a lower rate of descent or possibly level flight.
    - The instructor now sets zero thrust on the idle engine but maintains Vyse - the student will probably note a small rate of climb.
    - The instructor banks 5° towards the live engine but maintains Vyse - the student will note a higher rate of climb.

Board Briefing

Ex MEP Asymmetric Part 2

Be-76
02May24

AIM: To show the factors affecting the critical speed, and to learn and practice the EFATO drill.
T&E: Other a/c, weather, double engine failure, loss of control, infringement.
M: Lookout, pre-flight planning, confirmation, speed awareness.

Airex: **1: REVISION** - Taxi, Take-Off, Climb

2: DEMONSTRATION OF CRITICAL SPEED

Instructor flies A/C S&L, Clean
One Engine Idle - One Engine Full Power
Student controls Rudder only
Instructor Raises Nose to reduce IAS
Student maintains direction with rudder
Student notes effect of reducing airspeed on rudder input reqd
NO NEED TO REDUCE TO VMCA!

3: EFFECT OF ZERO THRUST

Student continues to maintain direction with rudder
Instructor sets ZERO THRUST on Idle Engine
Student notes effect on rudder input required

4: EFFECT OF BANK TOWARDS LIVE ENGINE

STUDENT continues to maintain direction with rudder
Instructor banks 5° toward live engine
Student notes effect on rudder input required

INSTRUCTOR RECOVERY:
KEEP RUDDER IN, THROTTLE BACK, LOWER THE NOSE
BEWARE OF THE STALL

5: DEMONSTRATION OF EFFECT OF DRAG ON EFATO

Instructor flies 1 Eng Full , 1 ENG Idle, Gear & Flap Down Vyse
Student notes VS
Instructor Raises gear. Student notes VS
Instructor Retracts Flap. Student notes VS
Instructor sets ZERO Thrust. Student notes VS
Instructor banks 5° towards live engine. Student notes VS.

6: EFATO DRILLS

Immediate Actions:

CONTROL
Rudder - Keep straight
Elevator - Lower nose to maintain V_{YSE} 85 kts
Aileron - Wings level or up to 5° towards live eng

ADD POWER
FWD - FWD - FWD
All levers fully forward Right to Left

REDUCE DRAG
Gear Up Flap UP

IDENTIFY & VERIFY
DEAD LEG - DEAD ENGINE
Move Throttle to Verify

FEATHER
Throttle - Close
Propeller - Feather
Mixture - ICO

Subsequent actions as time permits

7: ENG FAILURE BELOW TOSS (85 kts)

Full Rudder - Keep Straight
Close BOTH Thriottles
Lower Nose Land Ahead

8: DEMO SIMULATED OEI VISUAL CIRCUIT TO LAND

Keep it similar to 2 Eng circuit
Asymmetric Comittal Height
Close Both Throttles in flare

Skeleton Board Briefing

Ex MEP Asymmetric Part 2

Be-76
02May24

AIM: To show the factors affecting the critical speed, and to learn and practice the EFATO drill.
T&E:
M:

Airex: **1: REVISION** - Taxi, Take-Off, Climb

2: DEMONSTRATION OF CRITICAL SPEED

3: EFFECT OF ZERO THRUST

4: EFFECT OF BANK TOWARDS LIVE ENGINE

INSTRUCTOR RECOVERY:

5: DEMONSTRATION OF EFFECT OF DRAG ON EFATO

6: EFATO DRILLS
Immediate Actions:
CONTROL

ADD POWER

REDUCE DRAG

IDENTIFY & VERIFY

FEATHER

7: ENG FAILURE BELOW TOSS (85 kts)

8: DEMO SIMULATED OEI VISUAL CIRCUIT TO LAND

MEP 5: Asym 2: Critical Speeds Demonstration

AIM: To learn how to recognise the approach to V_{mca} and how to recover from it.

T&E: Other aircraft, Loss of control, Engine overheat. **M:** Lookout, Speed & rudder awareness, Learn recovery procedure.

Critical Speeds Demonstration

The instructor will set up the aircraft as follows in order to demonstrate loss of directional control at Vmca:

In cruise throttle one engine back, and one full forward. Raise the nose progressively until heading is lost. Note the speed at which loss of heading occurs. This is Vmca unfeathered.

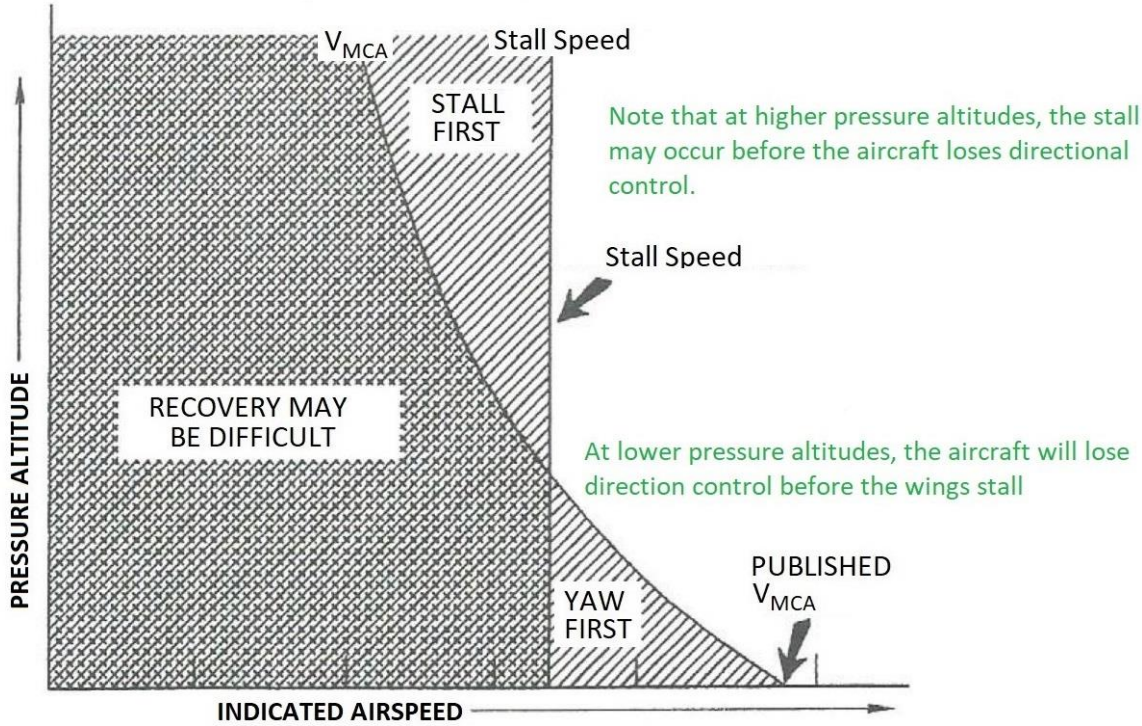
Repeat with zero thrust rather than idle set on 'failed engine'. Note that heading is lost at a lower airspeed. This is Vmca feathered.

To recover:

'Keep the Rudder In!', lower the nose while throttling back the live engine. As the speed increases, increase power on the 'live engine' and select the correct attitude to maintain blue line speed.

Note that the published Vmca is defined under certain specified conditions. The actual Vmca on the day will vary according to various factors.

This exercise is a demonstration only and the student is not expected to repeat it or be examined on it during the test.



Relationship between stall speed and V_{mca} for aircraft with normally aspirated engines

23

Air Exercise

7. Student Start up, taxy out, power checks, before take-off checks.
8. Student Take-off & climb to 3000’ and TOC checks. Cruise at 22/22.
9. Revision: Student flies S&L while instructor covers throttle quadrant and retards a throttle. The student will: CONTROL - IDENTIFY - CONFIRM.
10. Critical Speeds Demonstration: Show effect of zero thrust and bank on rudder input required. In the cruise at around 3000’, the instructor flies (student follows through on the rudder only) and the instructor throttles one engine back to idle, and the other full forward. He raises the nose progressively so that the airspeed reduces to Vyse. He then raises the nose to maintain this speed.
    He then asks the student how much rudder he is holding. Then, he sets zero thrust on the idle engine and asks again. He then banks 5° towards the live engine and asks the question again. Each time the rudder input should reduce. To recover from this situation: ‘**Lower the nose, throttling back, keep the rudder In!**’. This is a demonstration only and not for student practice.
11. Instructor demonstrates and teaches the full engine fire in cruise scenario. Student just watches and learns. The Be-76 has a very specific short checklist for this. If the fire is out, then continue with Phase 2 & 3. If not, convert to an emergency descent.
12. Student then practices the whole scenario at least once.
13. Student then navigates back to airfield for a landing.

Flight Prompt Card

Ex 23.2: MEP Be76 Asymmetric Part 2

1: REVISION: STUDENT Start Up, TAXY, Power Checks, Before TO Checks.
2: REVISION: STUDENT Take Off to Top of Climb. Checks. Cruise 22"/2200.
3: Critical Speeds DEMO ONLY! Student FT on rudder. Instructor flies S&L. Throttles 1 eng back to IDLE, 1 ENG FULL POWER. Raises nose until Vyse. Ask how much rudder. Then set ZERO Thr – ask again. Then 5° bank – ask again. RECOVER! Lower nose, THR back, Keep the rudder in! ***NO STUDENT PRACTICE!***
8: DEMO Instructor flies with 1 engine full power, 1 eng idle GEAR DN, FLAP DN at Vyse. STUDENT NOTES VS. Instructor raises gear. STUDENT NOTES VS. Instructor retracts flap STUDENT NOTES VS. Instructor sets ZERO Thrust STUDENT NOTES VS. Instructor banks 5° towards live eng. STUDENT NOTES VS. Shows reason for removing drag and feathering/bank.
9: TEACH EFATO in local area 1500-2500'-first without drills, then with drills.
10: STUDENT PRACTICE.
11: STUDENT Cruise Descent and join.
12: PATTER Sim Assym Circuit to Full stop.
13: REVISION:STUDENT Taxy & Shutdown.

Debriefing

It is important that the student separates the 3 different failure drills:

1. **Engine failure in cruise**: More relaxed pace with emphasis on confirmation. Do not automatically feather. Pause and diagnose.
2. **Engine fire in cruise**: Separate checklist which cuts of fuel and feathers engine asap. Then if fire is not out becomes an emergency descent.
3. **EFATO**: Punchy drills required. Always feather, since the before take-off checks have only just been completed.

Make sure the student takes the time to learn these drills either in or out of the aircraft.

Remember to point out that there is an alternative method of control following an EFATO – closing both throttles will restore controllability.

Common Student Faults

- The student must commit the immediate actions to memory. Encourage the student to sit in the aircraft and practice the EFATO drill.

Common Instructor Faults

- Do not begin the Vmc demonstration at too high an altitude otherwise the stall warner may be encountered before the loss of heading. In the Be-76 this typically occurs at around 5000’. Ideally, begin around 3000’. Remember that significant altitude will be gained as the speed reduced during this demonstration.
- Make sure to keep one hand on the live throttle during the Vmca demonstration to make the subsequent recovery easier.

MEP 6: Ex23.3: EFATO & Single Engine Go-arounds (Be76):

Practical Considerations

- Do not simulate an engine failure below 500’ agl, and always be ready for the student to put in the ‘wrong’ rudder.
- During a simulated asymmetric go-around, expect the student to put in the ‘wrong rudder’.

Long Briefing

To be Added

MEP 5: Asym 2: Engine Failure After Take-Off

Beech Duchess Be76
17 Jul 21

AIM: To learn how control the aircraft following an engine failure on take-off. To learn to identify and feather the failed engine.
T&E: Other aircraft, Loss of control - stall/spin, Double engine failure. **M:** Lookout, Speed & bank angle awareness, Checklist discipline.

Take-Off Safety Speed - V_{TOSS}

- This is the minimum flight speed at which the average pilot can safely control the aircraft without throttling back the *live* engine following an engine failure after take-off **(EFATO)**.
- The safety speed for the Be-76 is 85 kts
- Since the rotate speed is 71 kts, the gear is not retracted until 85 kts
- Should an engine failure occur between 71 kts and 85 kts, both throttles should be closed and the aircraft landed back on the runway

An EFATO is serious!!

There are 3 main hazards assosciated with an EFATO in a multi-engine aeroplane:

- **Loss of Directional Control**
- **Stall or Spin due to loss of Airspeed**
- **Loss of Climb Performance**

Ensuring flight at Vyse ensures the best chance of success

NOTE: This may require 2-3° bank towards the live engine.

The EFATO Drill

The EFATO drill sequence achieves the best possible performance from the aircraft.

- Yaw will be severe and full rudder may be required to centre the ball
- The airspeed will reduce quickly, so it is important to lower the nose to just above the horizon: +2°

- **CONTROL** In all 3 Axes!
- **FORWARD FORWARD FORWARD**
  All levers forward from right to left
  Check Full Power
- **Gear UP - Flap UP**
- **IDENTIFY** Dead Leg - Dead Engine
- **VERIFY** Retard the suspected Throttle
- **FEATHER FEATHER FEATHER**
  Dead Engine **THROTTLE**: Close to Verify
  Dead Engine **PROP**: Retard to Feather
  Dead Engine **MIXTURE**: Idle Cut-Off
- **Stabilise Climb at V_{yse} (85 kts)**
- **Complete Phase 2 Flow Checks**
  See Flow Diagram **Only if time permits**

Other Important Speeds

(at 3900 lbs)

2 Engines

V_x	71 kts
V_r	71 kts
V_y	85 kts
V_{SSE}	71 kts
V_{GL}	95 kts

1 Engine Inoperative

V_{xse}	85 kts
V_{yse}	85 kts
V_{mca}	65 kts

Multi Engine Climb Performance

- When one engine on a twin fails, you typically lose 80% to 90% of your excess thrust.
- Which means that if you were climbing at 1200 fpm with both engines, if you configure and fly the aircraft *perfectly* after an engine failure, you will likely see around 200 fpm, which is pretty bad. !

During EFATO:

Maintain Heading & Speed

MEP 5: Asym 2: Engine Failure After Take-Off - Test Format

If an **Engine Failure after Take-Off** were to occur for real, follow the procedure shown on the previous page. **CONTROL, FULL POWER, GEAR UP Flap UP, IDENTIFY, VERIFY etc...**
However, during the test, the examiner needs to cover the throttle quadrant so that you cannot see which engine has failed. This means you cannot select **Full Power.**

So, for the purposes of the test ONLY, the order is changed, so that you must identify which engine has failed as soon as you have controlled the aircraft.

In the Climb-out (MP 25" 2500 rpm 100 kts), the Examiner will obscure the throttle quadrant (usually with a map!) **and retard the L or R Throttle**

CONTROL

- Correct the **YAW** by centering the ball with **RUDDER**
- **PITCH DOWN** with **ELEVATOR to maintain 85 kts**
- Correct the **ROLL** with **AILERON**, wings level

NOTE: Centering the ball will not provide the maximum aircraft performance available. Discuss with your instructor.

IDENTIFY (Dead Leg - Dead Engine)

- Call Out **Left** or **Right Engine Failure**. **Any Fire**?
- Examiner will reveal Quadrant stating **Fire** or **No Fire**.

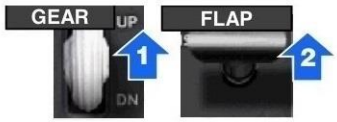
NOTE: The candidate is required to identify the failed engine before the examiner reveals the throttle quadrant for the **MAX POWER** sweep forward of controls.

- The normal EF training drill and the actual EF procedure is to check **FULL POWER** and **GEAR & FLAP UP** before the **IDENTIFY** step.
- However, in the test, the examiner will obscure the throttle quadrant until the candidate has identified the failed engine, so the **POWER** and **GEAR/FLAP** items are conducted after the **IDENTIFY** step.

Check FULL POWER

Levers FWD, FWD FWD from Right to Left

CHECK GEAR UP, FLAP UP



Re-Identify and **Verify**

FEATHER (Touch Drill)

Feather, Feather, Feather by touch only from Left to Right

As soon as you correctly identify the failed engine, the examiner will reveal the levers

Stabilise climb at V_{yse} (85 kts)
Complete Phase 2 Flow Checks (if time permits)
Return for a Single Engine Landing (Mayday or PAN)

During EFATO

Maintain Heading & Speed

Air Exercise

1. Student Start up, taxy out, power checks, before take-off checks.
2. Student Take-off & climb to 3000’ and TOC checks. Cruise at 22/22.
3. Practice EFATO in the local area until the student confident to return to circuit. Instructor demonstrates/teaches: Sets up aircraft to simulate climb away from airfield. Gear UP, Flap UP, 25”/2500 rpm 100 kts. At about 2000’ agl closes one throttle – Controls yaw with rudder (85 kts), controls speed with elevator (85 kts), wings level. Say ‘Hdg & speed’. Recovers to 2 eng climb.
4. Student flies, instructor covers throttles and retards one. Student practices control. Plenty of practice.
5. Instructor sets up aircraft again and closes one throttle – Controls yaw with rudder (85 kts), controls speed with elevator (85 kts), wings level. Say ‘Hdg & speed’. Then Fwd Fwd Fwd, Gear UP, Flap UP, Identify, Verify, Feather (L or R throttle and touch), Feather (L or R prop and touch), Feather (L or R mixture and touch), Recovers to 2 eng climb.
6. Student flies, instructor covers throttles and retards one. Student practices control followed by feather drills. However, as the throttle is covered, he will have to identify the failed engine first. Plenty of practice including some where the instructor leaves the gear of flap extended to see if the student follows the drill properly.
7. Instructor then takes control and sets up at a disused airfield for a simulated asymmetric approach (Flap 20 only). At 1000’ (committal height) agl DEMO/FT of a simulated asymmetric go-around.
8. Downwind, hands control to student to fly simulated asymmetric approach and go-around. More practice.
9. Student flies back to airfield
10. Instructor demonstrates a simulated asymmetric circuit and landing. Flap full at committal height. Announce intentions.
11. Instructor taxies back to holding point.
12. Instructor demonstrates EFATO, simulated asymmetric circuit and simulated asymmetric go-around.
13. Student flies simulated asymmetric circuit and landing.
14. Instructor taxies to parking

Flight Prompt Card

Ex 23.3: MEP (Be76) EFATO & OEI G/A

1: REVISION: STUDENT Start Up, Taxi, Power Cx, Before T/O Cx & Briefing. 2: REVISION: STUDENT Take-Off. Climb to 3000'. Checks.
3: DEMO/TEACH Climb 25/25 100 kts, close one throttle and control hdg & speed. 4: STUDENT PRACTICE throttles covered. 5: DEMO/ TEACH Climb 25/25 100 kts, close one throttle and control hdg & speed. Then touch feather drills. Phase 1. 6: STUDENT PRACTICE with throttles covered. 7: DEMO/TEACH OEI app Flap 20 to ACH then OEI G/A. 8: STUDENT PRACTICE.
9: STUDENT returns to airfield. 10: Instructor DEMO/ TEACH OEI circuit & ldg. 11: Instructor taxi to RW.
12: Instructor DEMO/TEACH EFATO, OEI circuit & OEI G/A. 13: STUDENT flies OEI circuit & Ldg. 14: Instructor taxies to parking.

Debriefing

It is important that the student separates the 3 different failure drills:

1. **Engine failure in cruise:** More relaxed pace with emphasis on confirmation. Do not automatically feather. Pause and diagnose.
2. **Engine fire in cruise:** Separate checklist which cuts of fuel and feathers engine asap. Then, if the fire is not out - becomes an emergency descent.
3. **EFATO:** Punchy drills required. Always feather, since the before take-off checks have only just been completed.

Make sure the student takes the time to learn these drills either in or out of the aircraft.

Common Student Faults

- Putting in the wrong rudder on EFATO and go-around. Although rare, this error can be catastrophic, so the instructor must be ready.
- Forgetting to check the gear and flap are up. If this error continues, ask the student to leave the gear down. Then simulate a failure and see what happens.
- Forgetting to 'feather the engine'. In this case, don't give them zero thrust and their workload will increase.
- Allowing the airspeed to reduce below Vyse. Initially this is a debrief point, but more than 5 kts below and there could be controllability issues.
- Pointing to one lever (say L) and saying right. This must be addressed immediately. In the skill test or proficiency check, this will require a repeat for the examiner to be sure. If the repeat is the same, then the item is failed.

Common Instructor Faults

- After zero thrust has been set, if the gear warning horn sounds, increase thrust as necessary to prevent it. It is distracting and negative training. Once the gear is selected down, reset zero thrust.
- If the students carries out the initial actions correctly, but fails to carry out the feathering drills, facilitate this by asking questions like ‘why do you think the rate of climb is so poor?’ Let the student work it out for themselves.

MEP 7: Ex23.4: Asymmetric Circuits (Be76):

Practical Considerations

- Do not simulate an engine failure below 500’ agl, and always be ready for the student to put in the ‘wrong’ rudder.
- During a simulated asymmetric go-around, expect the student to put in the ‘wrong rudder’.
- Never touch and go from a simulated asymmetric circuit. The ‘failed’ engine may be slow to respond, so always taky back for another set of circuits after the simulated asymmetric landing.
- Simulated asymmetric circuits can be very tiring for students. Consider carefully before exceeding 2 sets of circuits with taxy back.

Long Briefing

1: Demonstration of EFATO (Be-76):

Control	**Rudder** to keep straight **Lower Nose** to maintain speed Vyse 85 kts and to improve forward visibility **Ailerons** to keep wings level or 2-3° towards live eng (same direction as rudder)
Increase Power	Increase power to MAX on live engine. **FWD FWD FWD** Right to Left. (For test purposes identify straight away)
Minimise Drag	**Gear Up** (if required) Then raise nose to maintain speed **Flap Up** (if required) Then raise nose to maintain speed
Identify & Feather	**Identify** – Dead Leg, Dead Engine (For test purposes identified straight away) **Verify** – Retard Throttle **Feather - Feather - Feather (Left-Right)** (Touch drills only)
Secure Failed Engine Only if time permits or return not possible RE-identify each selection	**Fuel Selector** Off **Cowl Flaps** (probably closed) **CH** as required (probably OFF but ON for practice) AUX **Fuel Pump** OFF **Magnetos** Off **Alternator** Off
Nurse Live Engine	Not required if returning for immediate landing but consider reducing power when level. If diverting carry out these actions.
Land ASAP But Do Not Rush	Preferably at airfield of departure if possible. Take gear down at normal point in circuit or when ready to descend on base. Take flap to APP on base leg. Keep the circuit shape the same. 95 kts Min 85 kts on final until committed at ACH. Then consider selecting Flap LDG. **RED BLUE GREEN** Checks!! Flaps LDG. 76 kts.

Asymmetric Go-Around Flap APP or UP

Full Throttle (rudder) **Gear & Flap Up (immediately)** **Raise nose**	maintain **HDG/SPEED 85kts** maintain **HDG/SPEED 85kts** to maintain **HDG/SPEED 85kts**	**POWER UP – GEAR UP – FLAP UP – NOSE UP**

Asymmetric Landing Flap Full

Select flap full at Committal height if all conditions met

For simulated asymmetric landing, close both throttles during the flare’

Board Briefing

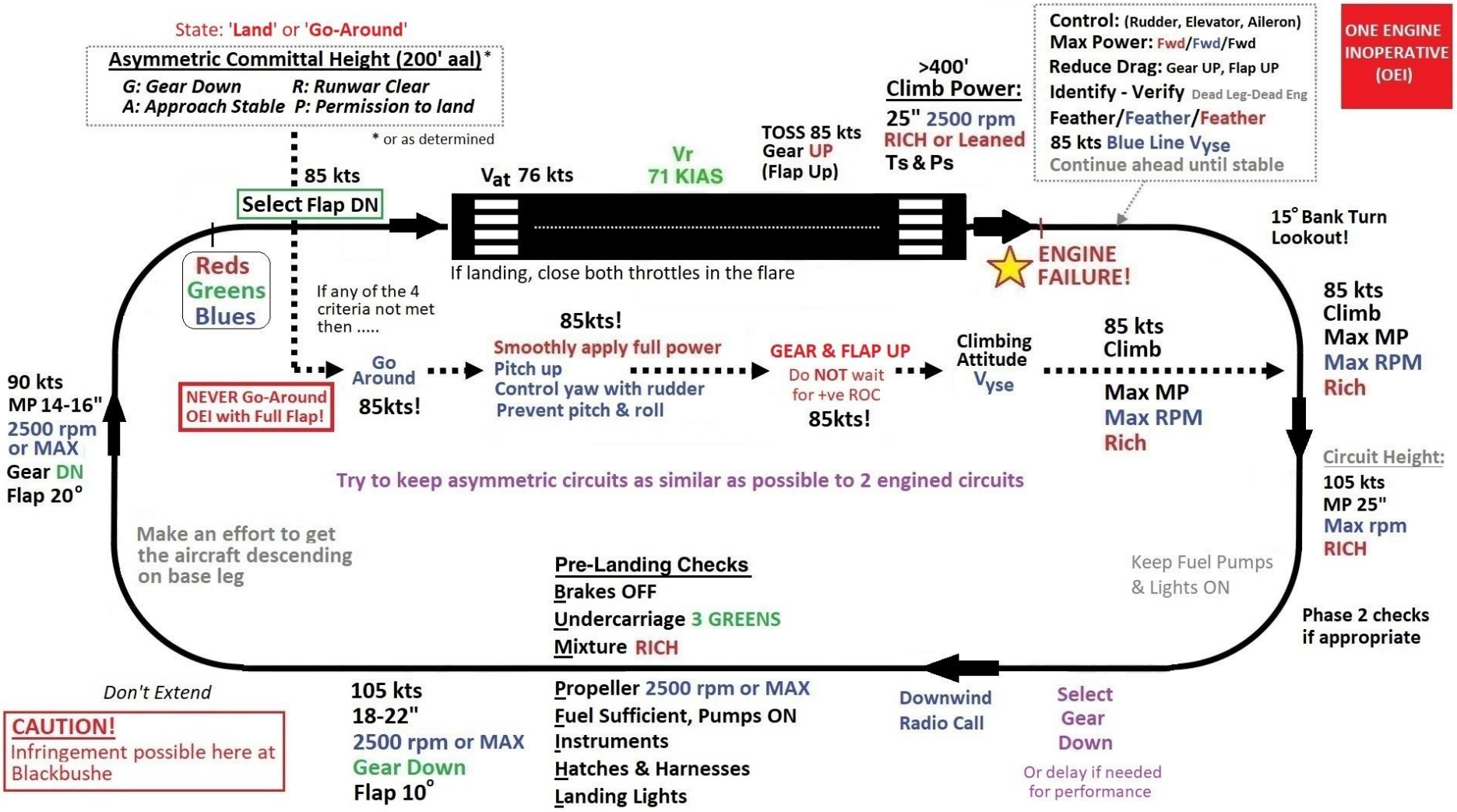
MEP 6: Asym 3: Single-Engine Circuits

Beech Duchess Be76

17 Jul 21

AIM: To learn to fly a one-engine inoperative circuit, and land with flap DN. To learn to fly a OEI go-around.

T&E: Circuit traffic, Landing gear position, Unstable approach, Loss of control. M: Lookout, Checklist discipline, Committal height, speed awareness.



Skeleton Board Briefing

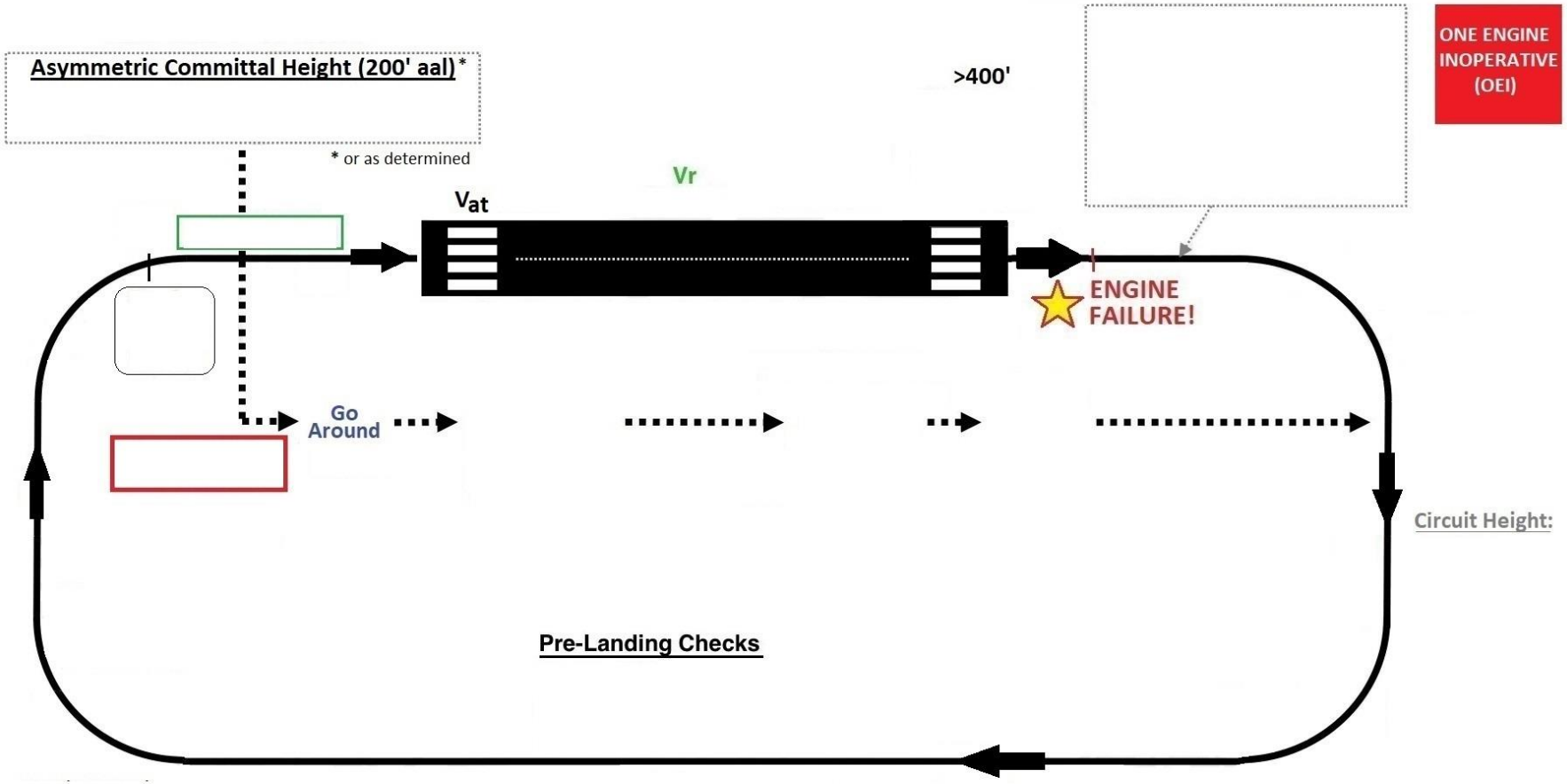
MEP 6: Asym 3: Single-Engine Circuits

Beech Duchess Be76

17 Jul 21

AIM:

T&E: M:



APPENDIX 3 - Asymmetric Committal height (ACH)

AIM: To understand and apply the concept of an asymmetric committal height.

T&E: Loss of height in OEI go-around, Density altitude, Pilot recency/ability, Obstructions. **M:** Calculate suitable asymmetric committal height.

What is Asymmetric Committal Height (ACH)?

The minimum height above the runway, from which an asymmetric (OEI) approach may be safely abandoned.

What is the significance of ACH?

In the event of an asymmetric (OEI) go-around, the aircraft will take some time to clean up (ie, flaps up, landing gear up) before climbing away.
The transition time from approach configuration to best single engine rate-of-climb (Vyse) will involve some height loss due to poorer aircraft performance (ie climbing on one engine) and relatively high drag from the failed engine.
Therefore, with an ACH established, there will be sufficient time for the aircraft to maintain or accelerate to Vyse and still be able to maintain directional control whilst retracting gear and flap.

Where is the ACH Published?

For a very few aircraft, such as the DA42, an absolute minimum ACH is published in the Pilot's Operating Handbook or Flight manual. However, for the vast majority of light twin-engined aircraft, it must be established by the pilot.

What factors affect the ACH we nominate?

ACH varies according to the following factors:-

Aircraft Type - How much thrust can the engine provide.
Aircraft Mass - More power required for higher mass.
Airfield Elevation - Aircraft performance will decrease when the aerodrome is at a higher elevation.
Air Temperature - The warmer the air, the less dense it is, therefore, aircraft performance will decrease.
Obstructions & Terrain - With higher ground along the take off path (tall trees, terrain, power lines etc) a higher ACH should be nominated to clear these obstacles safely.
Pilot Skills - Less experienced pilots or pilots out of current practice should nominate a higher ACH.

What height should ACH be?

Some aircraft state a minimum ACH in the PoH.
When conducting OEI/asymmetric training or testing, a rough figure of 200-300ft AGL may be used.
However, it can vary with the different factors already described.
In the event of a real OEI/asymmetric condition, ACH may be lowered to ensure a landing is possible. In such an event, the approach speed should be maintained above Blue Line speed (Vyse) until a visual landing is assured.

What happens at/after ACH?

The full landing flap setting should not be selected until the pilot commits to land, which should not occur until ACH.
Once below ACH, an OEI pilot is committed to land. Use the following guide in making the decision:

- **On speed, on profile, on centerline**
- **Configured to land** (ie, **approach flaps down, landing gear down**)
- **Runway is clear**
- **Clearance from ATC to land has been received.**

If after ACH the runway should become blocked, it is considered safer to land on the grass than execute a single engined go-around below ACH.

Exceptions:

In certain circumstances a pilot may be committed to land from above ACH.

For example if the gear cannot be raised or if the airframe has accumulated ice, the aeroplane may not have the performance to go-around and therefore is already committed.

In IMC, would you go around from 300, 400, or 500 ft if you have an engine failed, a 250ft cloudbase and a DH of 200' on an ILS?

OEI = One Engine Inoperative ie Asymmetric

At ACH, clearly state '**LAND**' or '**Go-Around**'.

Air Exercise

1. Student Start up, taxy out, power checks, before take-off checks. Full emergency briefing.
2. Student take-off. Once above 400' agl and gear is up, instructor covers throttles and retards one. Student to control heading and speed and identify failed engine. This causes instructor to uncover the throttles, allowing EFATO touch drills to be done. Once correctly carried out, instructor sets zero thrust (11% or until beeping stops) on 'failed engine'.
3. Student carries out simulated asymmetric circuit to committal height.
4. Instructor calls 'not stable', 'runway occupied' but preferably not 'go-around'. Student carries out simulated asymmetric go-around.
5. Student carries out simulated asymmetric circuit to land. Instructor reminds him to close both throttles in the flare.
6. Instructor taxies back to holding point to give the student a break. Instructor checks trim and flaps.
7. Student repeats further sets of approaches as required.
8. Instructor taxies to parking.

Flight Prompt Card

Ex 23.4: MEP (Be76) Asymmetric Circuits

1: REVISION: STUDENT Start Up, Taxi, Power Cx, Before T/O Cx & Full emergency Brief.
2: STUDENT Take-Off. Climb. Instructor covers throttles and retards one. STUDENT EFATO drills.
3: STUDENT OEI circuit to committal height.
4: Instructor prompts STUDENT OEI G/A.
5: STUDENT OEI circuit to land. Close both throttles.
6: Instructor taxi back to holding point. TRIM, FLAP
7: STUDENT PRACTICE sections 2-5 as required.
8: Instructor taxi back to park.

Debriefing

- This is a very busy exercise and the student will be exhausted afterwards. However, it is very important so make sure the student is happy with all the drills and procedures.

Common Student Faults

- Putting in the wrong rudder on EFATO and go-around. Although rare, this error can be catastrophic, so the instructor must be ready.
- Forgetting to check the gear and flap are up. If this error continues, ask the student to leave the gear down after take-off. Then simulate a failure and see what happens.
- Forgetting to 'feather the engine'. In this case, don't give them zero thrust and their workload will increase. See if they can work out what the problem is.
- Allowing the IAS to reduce below Vyse. Initially this is a debrief point, but more than 5 kts below and there could be controllability issues.
- Pointing to one lever (say L) and saying right. This must be addressed immediately.

Common Instructor Faults

- Never simulate an engine failure below 500’ agl. Be ready for the student to put in the ‘wrong’ rudder.
- Never Touch & Go from a simulated asymmetric approach, in case the ‘failed engine’ does not respond quickly. Always taxi back. This also gives the student a break. The instructor should taxi the aircraft back to the holding point and ask the student to relax.
- This exercise is very tiring for the student, especially on the leg muscles. Alternate engines for simulated failures.
- Do not attempt more than 3 sets of approaches.

MEP 7: Practice Skill test (DA-42):

APPENDIX 2
Multi-Engine Piston (land) Skill Test / Proficiency Test Format

AIM: To understand what is required of the applicant in the MEP (land) skill test.

T&E: Nerves, unpreparedness. **M:** Study, practice, familiarity with drills, PoH & checklists.

You will be assessed on:

Section 1: Departure

- Pre-flight Briefing
  Notams, weather briefing, performance, weight & balance
- Pre-Start Checks & Walkaround
  Possible oral questions during walkround
- Internal checks & Engine Starting
- Taxying, Run up & Pre-Departure Checks
  Taxy speed, checklist usage, pace
- Take-Off Procedure
  Stabilising on RW before setting power
  Ailerons into wind/ back pressure
- Climb at Vx or Vy to Level Off
  Gear retraction, setting of climb power
  Accuracy of speed, lookout

Section 2: Airwork (VMC)

- Straight & Level flight at various airspeeds
- Flight at Critically low airspeed
- Steep Turns Clean and in App Config Min 45° A of B
  Keep minimum 45 degrees A of B. Altitude keeping!
- Stall in the clean config
  HASELL!! Recover at Full Stall, +ve recovery
- Approach to the Stall in the app config with bank
  HASELL!! Recover at first sign of the stall
- Approach to the Stall in the landing configuration
  HASELL!! Recover at first sign of the stall
- Autopilot & Flight Director Handling

Section 3A: En-route Procedures VFR

- There may be a short VFR Navigation leg.
- The examiner will be looking for good flight planning, map reading, ETA calculation, use of any Navaids and flight management as well as good heading and altitude keeping
  Prepare a Navigation Log and check NOTAMs, weather

Know how to use the GNS 430W!

Section 4: Arrival and Landings

- Aerodrome arrival procedures
  Standard overhead or commercial join
- Normal 2-Engine landing with Flap DN
  Likely to be a touch & go. Discuss with examiner who will move levers
- Flapless 2-Engine landing
  Likely to be a touch & go. Discuss with examiner who will move levers
- Crosswind landing if applicable
- 2-Engine Go-Around

Section 5: Abnormal/Emergency Procedures

- Rejected Take-Off (RTO) at a reasonable speed
  Examiner will NOT call STOP. He will point out a malfunction, the decision to stop is yours
  Do not brake aggressively
- Simulated Fire or Smoke in Flight
  The aircraft checklist is available
  Simulated Systems Malfunction
  The aircraft checklist is available
- A Full Engine Shutdown at a Safe Altitude
  May be an actual shutdown or simulated
  Consider whether to feather before doing so
  Use flow checks previously described
  Back up with aircraft checklist afterwards
  Have a plan for continuing the flight (Divert?) **Mayday?**
- Engine Restart at Altitude
  The aircraft checklist is available

Section 6: Simulated Asymmetric Flight

- Simulated Engine Failure After Take-Off (EFATO)
  Will be simulated above 500' aal after climb power set
  Identify the failure to reveal the throttle quadrant
  Fly 85 kts!
- Asymmetric Approach & Go-Around
  Go-Around likely to be at committal height due to examiner saying runway is blocked
  Apply power smoothly Speed!
- Asymmetric Approach & Full Stop Landing
  Remember to close both throttles for landing

During all sections of the test, you will be assessed on Airmanship & ATC Liaison

Suggested Take-Off Brief

'Today, the take-off will be from runway 25, with a wind of 320/15, so a crosswind from the right.
I will line up on the runway, and bring the aircraft to a halt on the centreline. I will set 2000 rpm against the brakes, and check Ts & Ps stable. I will smoothly advance the throttles to full power.
I will rotate at 71 kts, and accelerate in ground effect to 85 kts and climb away at that speed or higher. I will dab the brakes and retract the landing gear.
I will then set climb power.
If I have an engine problem before rotation, I will close the throttles and bring the aircraft to a halt with the brakes.
If I have an engine problem after rotation, but below 85 kts, I will close both throttles and land back on the runway or other surface.
If I have an engine problem after rotation, but at or above 85 kts, I will continue the take-off. I will control the aircraft in yaw with rudder, in pitch to 85 kts with elevator, and will maintain wings level with aileron.
I will apply full power from right to left, gear up, flap up. I will identify the problem engine using 'dead leg - dead engine'.
I will verify by moving the affected throttle, then 'feather, feather, feather' from left to right.
I will then declare an emergency and return for a single engine landing on runway 25 if performance permits.

On successful completion of the Skill test, the examiner may issue an SRG 1100 - Temporary Licence certificate, valid for 8 weeks.

Differences Training

FCL.710 addresses class and type ratings concerning variants.
In order to extend privileges to another variant of aircraft within one class or type rating, the pilot shall undertake differences or familiarisation training as appropriate.
Differences training requires the **acquisition of additional knowledge and training on an appropriate training device or the aircraft**.

Familiarisation training requires the **acquisition of additional knowledge** (GM1 FCL.710). This could be self study of the PoH.

2.1 Class ratings (aeroplane): SP and SEP or MEP aeroplane (land or sea):

Manufacturer	Aeroplanes		Licence Endorsement
All manufacturers	SEP (land)	(D)	SEP (land)
	SEP (land) with variable pitch propellers		
	SEP (land) with retractable undercarriage		
	SEP (land) with turbo or super charged engines		
	SEP (land) with cabin pressurisation		
	SEP (land) with tail wheels		
	SEP (land) with EFIS		
	SEP (land) with SLPC		
	SEP (sea)	(D)	SEP (sea)
	SEP (sea) with variable pitch propellers		
	SEP (sea) with turbo or super charged engines		
	SEP (sea) with cabin pressurisation		
	SEP (sea) with EFIS		
	SEP (sea) with SLPC		
All manufacturers	MEP (land)	(D)	MEP (land)
	MEP (sea)	(D)	MEP (sea)

2.2 Class ratings (aeroplane): SP and SEP TMG (land):

Manufacturer	Aeroplanes		Licence Endorsement
All manufacturers	All TMGs having an integrally mounted, non-retractable engine and a non-retractable propeller		TMG

Whenever "(D)" is indicated in column 3 in one of the lists mentioned in paragraphs 2.1 to 2.3 above, it indicates that differences training in accordance with FCL.710 is required when moving between variants or other types of aircraft which are separated by the use of a line, in column 2.

Although the licence endorsement (in column 4) contains all aircraft listed in column 2, the required familiarization or differences training must be completed before operating the respective variants

For SEP class ratings, differences training is a one-time sign off and never needs to be renewed.

For MEP class ratings, each different MEP aircraft is considered as a difference. The differences last for 2 years and must then be renewed.

Other than VP prop, differences are transfereable between SEP and MEP class ratings. VP prop needs a separate sign-off for SEP and MEP due to the differences in design of the system.

Part 5: Appendices

Appendix 1: Instructional Techniques
Appendix 2: Long Briefings
Appendix 3 Pre-Flight Briefings (Short Briefs)
Appendix 4: FIC Groundschool
Appendix 5: Flight Training
Appendix 6: Instructor Competencies
Appendix 7: CAA Forms & Documents
Appendix 10: Typical Instructor Assessments of Competence

Appendix 1: Instructional Techniques

Building Blocks

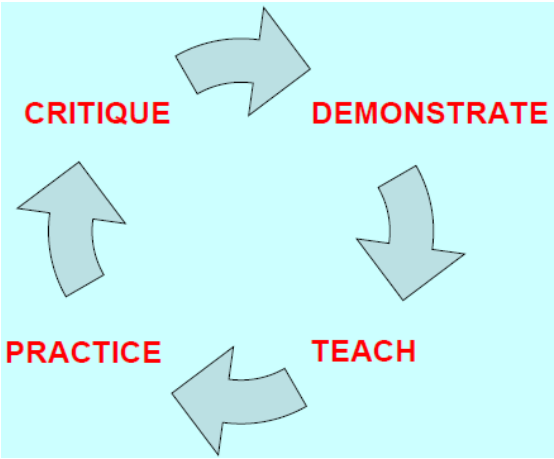
Several exercises can be broken down into smaller parts that can be mastered individually before being added together to create the finished product. Examples would be:

Turning, Climbing, Descending:	Entry. Maintaining. Rollout
Forced Landings:	Initial Actions. Troubleshooting. Field Selection. Mayday. Approach Planning etc
Circuits:	Take-Off. Climb. Downwind. Base. Final. Go-Around etc

Known to Unknown

There is a huge amount of material that the student must absorb in the process of flight training, so it always a good idea to start with something that they are familiar with. For example, before teaching levelling out from a climb, make sure they are happy maintaining a climb first. Then you can add-on the new skill to the old. Afterwards, you can go back and teach the entry.

Circle of Learning



A continuous loop, whereby the student learns by

- Watching a demonstration of the manoeuvre by the instructor.
- The instructor teaches that manoeuvre by breaking it down and pattering it.
- The student practices the manoeuvre.
- The instructor offers feedback, which may entail another loop.

Following Through on the Controls

In the early lessons, it can be beneficial for the student to place their hands and feet lightly on the controls while the instructor demonstrates a manoeuvre. This way they can gauge the amound and rate of input required before having a go for themselves. A similar method can be used by asking the student to place one finger on the throttle, for example during stall recovery demonstrations. Remember to tell the student to 'Relax' when you no longer need them to follow you through.

Work Cycles

There are several useful work cycles in basic flight training that can make life easier for both student and instructor. Do not hesitate to keep repeating them whenever reinforcement is needed.

SELECT – HOLD – TRIM: Used when learning to trim the aircraft. It stops the student flying by trimwheel and makes them look outside.

LOOKOUT – ATTITUDE – INSTRUMENTS: A very useful cycle used in Straight & Levl, Climbing, Descending and Turning. It forces the attention outside, and reminds them to glance at their instruments.

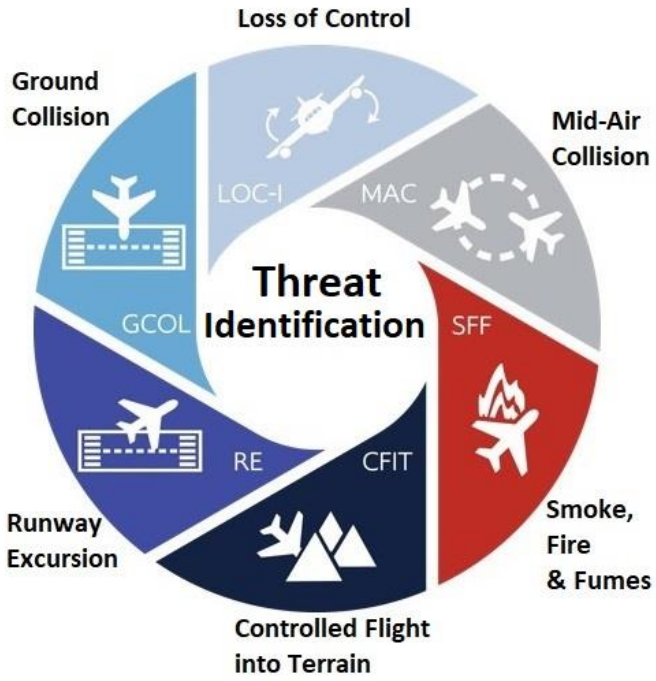
Threat & Error Management (TEM)

Examiners now want to see a thorough culture of TEM from all instructors and will expect frequent reference to be made to it. Not only should TEM be mentioned in ground briefings, but should then be referred to again in the air as relevant topics arise.

Make sure the student understands the diference between threats and errors: Threats are generally external to us and are present in our operating environment. Errors are usually internal to us – so human error and mistakes.

Threat Identification:

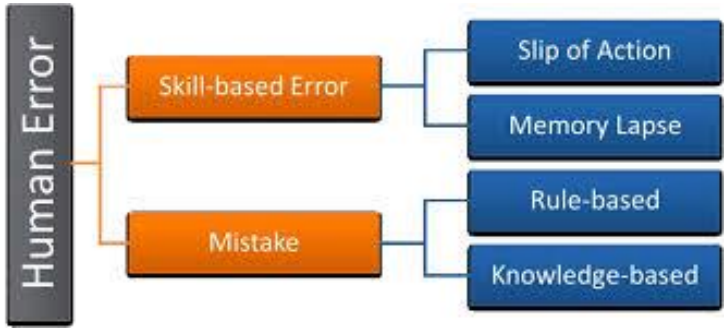
Try to **e**licit possible tnreats from the student either by asking open questions about the threats in the environment, or by guiding them with leading questions, or a model:



Identification of Errors:

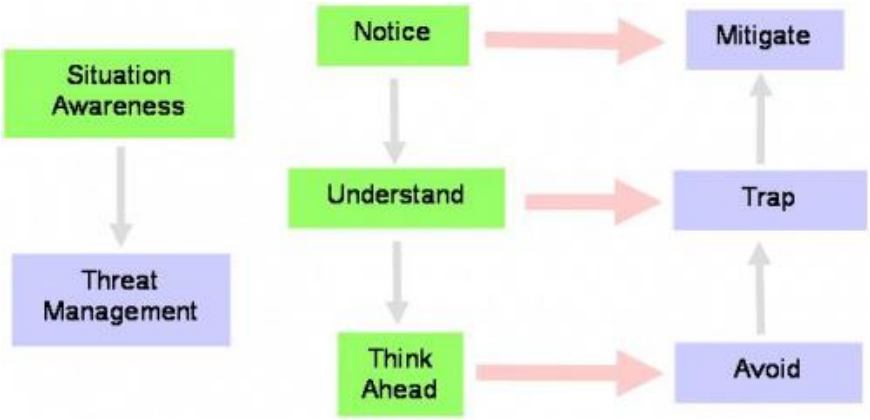
Depending on the experience of the student, it may be harder to identify errors. For example:

- Mis-set Altimeter or DI
- Airspace Infrincgement
- Forgetting to change fuel tanks
- Forgetting to carry out checks when required
- Forgetting to use Carb Heat on descent or forgetting to turn it off afterwards
- Joing for the wrong runway



Management:

Then when it comes to management of these threats and errors, it is important to suggest solutions. It is not enough to simply identify errors – they must be managed: avoided, trapped or mitigated. Once mentioned, try to revist these threats and errors frequently throughout the brief and flight. TEM can thus permeate the whole instructional process rather than just be a monotonous list at the beginning of a pre-flight brief.



Negative Training:

Avoid the use of negative training: Always tell the student what you want him to do, not what you DON'T want him to do. He may focus on these items instead of the primary task.

In the air, this can result in a poor instructional technique known as 'Instruction by Fault Analysis' where the instructor does not 'teach' the student what to do, he merely tells him that he is doing it incorrectly. This must be avoided at all costs.

Another example of negative training is flying around with the stall warner sounding during slow flight.

Debriefing:

- Debriefing is a very important, and often underused, part of the teaching process. It is important to consolidate the lerning objectives from the lesson before the student goes home and forgets. Just 5 minutes of debrief time can be invaluable.
- Make sure the student writes something down during the debrief. A student listening to a long list of importantpoints without a pen and paper is not going to improve.
- A facilatative approach to debriefing is often a good ide, especially with more advanced students. Questions like the following can prove enlightening: How did you feel that went? What could you have done differently? What were your best and poorest parts?
- Do not make a debrief a long, chronological list of student faults. Pick one or two good points, and a few negative points and debrief those.

Appendix 2: Long Briefings

Introduction

A detailed explanation and discussion conducted by a qualified flight instructor and covering the major considerations of an air exercise. The normal length should be approximately 40-50 minutes and it may be given either as a tutorial to an individual student or as an informal lecture to two or more students.

Long briefings are frequently given to students on bad weather days, and there is a requirement in every instructor AoC to deliver one:

From CAA Standards Doc 10:

The Lecture or Long Briefing

- The instructor will be expected to give a long briefing or short lecture lasting approximately 30 to 40 minutes.
- The subject will be determined by the examiner and should be made known to the instructor not less than 2 days before the date of the assessment. Subject matter should be relevant and related to the appropriate instructional privileges and pilot training syllabus. Examiners should vary the subject matter so that it becomes a useful and challenging exercise for the instructor to research and prepare the lesson and not just repeat something that has been prepared and delivered as part of the course.
- Instructors should expect to give the long briefing or lecture to a small audience comprising the examiner and other student pilots or instructors. Instructors will be expected to demonstrate effective use of a variety of training aids and equipment. Therefore, prior preparation and practice with such equipment is essential.
- Sufficient time should be allowed at the end of the briefing or lecture for a reasonable number of questions from the audience. The examiner must ensure however, that this does not become a lengthy session or that the instructor is exposed to unreasonable questioning.

Typical Examiner Requested Long Briefs:

- Asymmetric Blade Effect.
- Pick any recent light aircraft accident of an MEP aircraft and analyse using TEM.
- Why do pilots land gear up?
- The MEP (land) rating and how to keep it current.
- Aerodynamics of Asymmetric Flight

Useful Tips:

- Have a handout like the one below available to give to students either before of after the lesson. This will enable them to either follow you through as you give the lecture, or to consolidate with afterwards.
- Have printed pictures and illustrations available for students to look at. They will be drawn much more professionally that you can draw freehand on a whiteboard.
- Ask yourself the following questions: Why did you decide on that title? Why did you choose the illustrations you did? Why did you choose to present it in this way?
- During FIC training, it is a good idea to introduce each pre-flight briefing or lecture with a relevant accident. This will make it more real and give purpose to the exercise.

Common Faults:

- Avoid talking and writing on the white board at the same time with your back to the student(s).
- Make sure you use an aircraft model and keep it correctly oriented for the student's benefit.
- Make sure you include the student(s) in any briefing or lecture. Use eye contact and ask questions.

Example 1 Long Brief:

With thanks to Alastair Greenan

Flying Multi Engine Piston

blackbushe aviation
flying club and school

SAFER? ...MAYBE !

Multi Engine Piston– Safer?

blackbushe aviation
flying club and school

SAFER…..?

- Flying a Multi Engine Piston (MEP) is **SAFER**….. Right?
- Two engines must be twice as safe?
- Probably not much different to flying a single once you've 'got the hang of it' – just a bit quicker?

……MAYBE !

A Multi Engine Piston (MEP) **is safer,** with:

- **A suitably trained Pilot**
- **W**ho maintains **RECENCY** and
- Has the **Right Attitude to TEM**
- Remains **Mindful at All Times** to **additional risk in MEP flying**
- Considers **TEM specifically for Each Flight**

2

Multi Engine Piston – Same but VERY Different

blackbushe aviation
flying club and school

Multi Engine Piston – more to think about, and sooner:

- Some of the additional risk (Threats and Errors) in MEP flying relate to increased performance and complexity and apply to both higher performance SEP and MEP aircraft, some are specifically as a result of having more than one engine.

- Both increase the demands on the pilot, both in preparation and in flight

The 'Higher Performance Factor'

- Everything happens faster - higher speed requires more thinking ahead.

- More complexity to manage:
  - Retractable Gear
  - VP Propeller
  - Cowl Flaps
  - Turbos
  - Fuel Systems

The 'Second Engine Factor'

- Engine failure and resulting asymmetric thrust generally results in rapid loss of control unless correct actions are taken

- No 'one size fits all' - engine failure requires different actions dependent on aircraft performance, phase of flight, nature of the failure

- 'Two of everything', knowing your Left from your Right!

The Last Flight of Cessna 310Q G-BXUY

AAIB Bulletin: 11/2014	G-BXUY	EW/C2013/11/03

ACCIDENT

Aircraft Type and Registration:	Cessna 310Q, G-BXUY	
No & Type of Engines:	Two Continental IO-470-VO piston engines	
Year of Manufacture:	1970 (Serial No: 310Q-0231)	
Date & Time (UTC):	15 November 2013 at 1158 hrs	
Location:	Hawarden Aerodrome, Chester	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - 1 (Fatal)	Passengers - 1 (Fatal)
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	58 years	
Commander's Flying Experience:	1,645 hours (of which 261 were on type) Last 90 days - 18 hours Last 28 days - 6 hours	
Information Source:	AAIB Field Investigation	

The AAIB Report on G-BXUY

The Last Flight of Cessna 310Q G-BXUY

AAIB Report

- On 15th November 2013, G-BXUY was approaching to land at Hawarden Aerodrome at the end of a flight from Lognes-Emerainville Aerodrome near Paris
- The aircraft deviated to the left of the runway on final approach and appeared to witnesses to become unstable before it pitched up and rolled to the left.
- It struck the ground in a steep nose-down inverted attitude.

WHAT MIGHT HAVE HAPPENED AND WHY?

WHITEBOARD !!

The Last Flight of Cessna 310Q G-BXUY

Field Team Update….

- Weather conditions on 15 November were fine. The flight routed south of Paris before turning onto a north-westerly towards Bognor Regis. It then flew an approximately straight line to Hawarden, passing to the west of Birmingham.

- The pilot was in routine contact with Air Traffic Control (ATC) during the flight. The pilot made no transmissions to suggest that the flight was not proceeding entirely normally.

- Runway 22 was in use. Another light aircraft was in the circuit on a training flight; the conditions were good enough for an inexperienced student to make his first attempts at landing. The training aircraft was downwind as G-BXUY turned on to final approach and was not therefore in confliction.

- The pilot of G-BXUY called “final” and was cleared to land. He acknowledged with the words “cleared to land, golf uniform yankee”. This was the last transmission from the pilot, made just over a minute before the aircraft crashed.

AAIB Report

The Last Flight of Cessna 310Q G-BXUY
Field Team Update….

- The aircraft continued towards the runway, watched by staff in the control tower as well as other airfield personnel and a number of witnesses on an industrial site adjacent to the runway.

- The approach seemed normal until its late stages, when the aircraft deviated left of the runway centreline.

- When the aircraft was at a low height (witness estimates ranged between 10 ft and 50 ft), it seemed to become unstable. The Tower controller reported the wings rocking, as if the aircraft suddenly experienced buffeting from a strong wind (staff in the Tower, some saw the initial 'instability' which appeared also to include a yawing element and seeing the aircraft pitch to an unusually high nose attitude.

- The aircraft may have climbed a short distance, before the left wing dropped and the aircraft rapidly rolled to the left, striking the ground to the left of the runway (viewed from the approach).

AAIB Report

The Last Flight of Cessna 310Q G-BXUY
Field Team Update….

- Several reported that the aircraft was deviating to left of the runway centreline, and probably over the grass, before the pitch-up and left roll occurred. Those witnesses who described unusual engine sounds reported apparent changes in engine or propeller speed.

- One witness reported hearing alternating high and low "revving" and on looking up saw the aircraft yawing from side to side and the wings rocking.

- Another witness, who only heard and did not see the aircraft, reported hearing what sounded like a very sudden increase in propeller rpm for no more than a second before suddenly reducing again.

- Other witnesses reported engine sounds increasing in engine volume immediately before the accident, although some reported nothing unusual

AAIB Report

The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Fuel

- At the time of the accident, the pilot had flown 329 hours multi-engine, of which 261 hours were in G-BXUY. Between the pilot first flying G-BXUY post-refurbishment on 5 August 2013 and the day of the accident, he flew 20 flights in the aircraft, totalling 28 flying hours (**Good Recency**)

- The examiner who flew with the pilot in August 2013 described the pilot's flying as competent, including his single engine handling. The examiner had needed to make only minor comments on the pilot's overall performance. (**Competent**)

- With regard to fuel planning, the pilot was known for always using a dipstick to measure fuel quantities before flight rather than relying on fuel gauges and would have been aware of the exact quantity of fuel required for a flight. The pilot was also described as being very sensitive to fuel economy and aware of fuel prices at different airfields. These comments were supported by an airline pilot who flew with the pilot in 2006. He reported that the pilot seemed very competent and spent considerable time in flight achieving the most economical running conditions for the engines. (Prioritisation of Fuel Costs in Planning Phase)

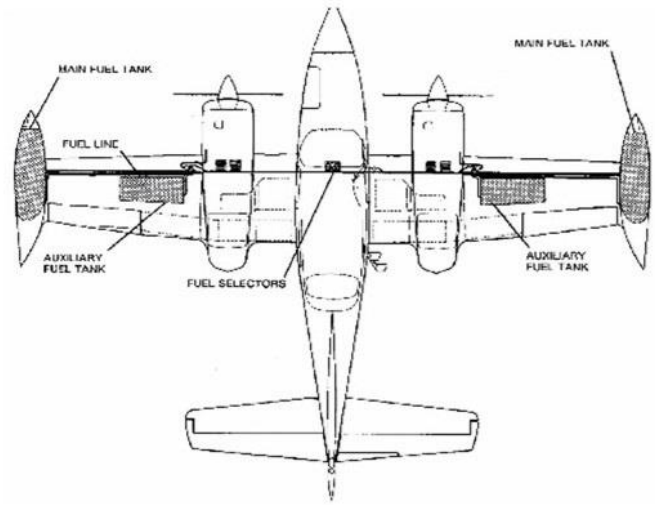
- It was established that the pilot telephoned Hawarden before the accident flight to enquire whether he could purchase fuel at a favourable rate. He established that he could, which would make the fuel available at Hawarden 9p / litre cheaper than that at Lognes-Emerainville (Prioritisation of Fuel Costs in Planning Phase)

The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Fuel Management

- The fuel system for G-BXUY comprised two 51 US gallon (193 litre), wingtip-mounted, main fuel tanks and two 20.5 US gallon (78 litre) auxiliary fuel tanks in the wing sections
- All tanks were deemed operational with no leaks as these were filled before the first leg of the flight and no defects were noted.
- Fuel gauges were operable and could be toggled to show main or aux fuel tank state.
- Tanks had been dipped before flight, so quantities were verified
- No auxiliary fuel pumps were fitted to the auxiliary tanks, and **therefore the POH recommended these tanks not be used in critical phases of flight** (i.e. when checklist requires aux fuel pumps on)

Cessna 310 Q Fuel System



The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Fuel Planning

- The aircraft did not depart Spain with all tanks full, **as it could then have reached Hawarden without refuelling.**
- At Lognes-Emerainville there would have been ample capacity in the main tanks so the pilot would have had no reason to put any fuel in the auxiliary tanks (above that already loaded in Spain).
- Therefore, it was concluded that the aircraft departed with 304 litres, consisting of 244 litres approximately evenly distributed in the main tanks, and the existing auxiliary tank fuel of about 60 litres
- Main tanks contained the **minimum** required for the flight

Fuel Loaded and Burned

Calculation

Event	Total fuel litres	Fuel distribution			
		Left main	Left aux	Right aux	Right main
Refuelled with 422 litres					
Depart Seo de Urgel	448	193	31	31	193
Trip fuel 247 litres					
Arrive Lognes-Emerainville	201	70	30	30	71
Refuelled with 103 litres					
Depart Lognes-Emerainville	304	121	30	30	123
Trip fuel 236 litres					
Arrive Hawarden (accident)	68	2	30	30	6

Sequence

The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Fuel

- The Pilot's flight planning did not account for actual average wind conditions.

- An average wind component of 020°/15 kt (based on the forecast winds taken from meteorological information issued on the morning of the accident) produced a revised flight time of 2 hours 41 minutes and a revised fuel burn of 215 litres.

Fuel – the difference for Wind

No	Option	Flight time (hr:min)	Trip fuel litres	Reserve fuel litres	Total fuel litres
1	Flight Plan estimate	2:15	180	40	220
2	Using still air conditions	2:34	206	40	246
3	Using forecast winds	2:41	215	40	255

- Something else unplanned occurred enroute - actual flight time of 2 hours 57 minutes (unexplained by wind alone) resulting in an additional 20 litres burned.

The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Fuel

- The Pilot had not prepared navigation log, relying instead on mental calculations. Consequently, when the flight started to take longer than originally planned, it may not have been immediately apparent that the fuel in the main tanks might not be sufficient to complete the flight safely.

- Fuel Management in flight - the aux tanks were not used in the flight and contents at the time of the crash were as initially loaded

- The main tanks, loaded with min trip fuel plus reserves (per the pilot's erroneous calculations), were near empty – low enough for intermittent fuel supply to the engines.

- The forensic investigation determined the left had stopped prior to ground impact – likely fuel starvation

- This resulted in a single engine failure (of the critical engine) on short final, but should have been manageable

Fuel State at Crash

Fuel tank quantities (litres)				
Left Main	Left Auxiliary		Right Auxiliary	Right Main
2	30		30	6
Total fuel 68 litres				

Left and Right Propellers

The Last Flight of Cessna 310Q G-BXUY

Causal Factors – Approach Speed

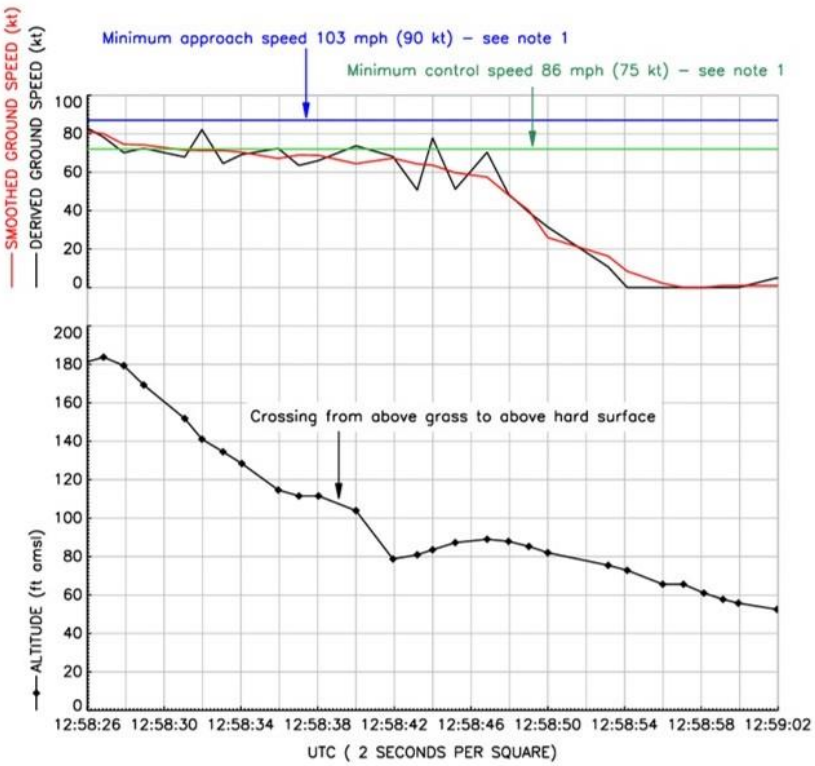
- A minimum control speed (VMC) represents the lowest airspeed that the aircraft can be controlled with one engine inoperative and the other at full power. It normally assumes a clean configuration, with the critical engine failed.

- For G-BXUY, the critical engine was the left engine, and the Vmc speed was 75kt.

- The manufacturer's recommended safe single engine speed was 91kt, with a best single engine rate of climb speed of 101kt.

- The manufacturer's minimum approach speed with 35° flaps was 90 kt, with power being reduced only just before touchdown. In case of a single-engine go-around, the target speed was 101 kt.

The Last 36 Seconds…



The Last Flight of Cessna 310Q G-BXUY
What the AAIB Concluded….

- The investigation concluded that the left engine lost power at a late stage of the approach due to fuel starvation.

- The pilot probably attempted a go-around manoeuvre, but the speed fell below the minimum single engine control speed, causing him to lose control of the aircraft.

- The cause of the fuel starvation was attributed to mismanagement of the aircraft's fuel system

Accident Site

The Last Flight of Cessna 310Q G-BXUY

What we have Learned….

- Correct Fuel Planning (allowance for wind). Critical to Safety, including robust allowances - loading minimum possible fuel to reduce costs when W&B allows more, adds risk. No PLOG with fuel calcs taken on the flight requiring mental maths for fuel state in flight

- Fuel Management in flight - aux tanks loaded; main tanks had min trip fuel plus reserves – adds complexity in flight (aux tanks not to be used in final phase per POH)

- Planning ahead - use of aux tanks in non-critical flight phase to preserve main tank reserves for final approach – reduce risk, maintain options

- A failed/failing engine at low power can be difficult to detect until you increase power (go round, end of descent, take off roll).

- Not maintaining recommended approach speed more critical in a twin due to asymmetric thrust with one engine failed (single simpler - becomes a glider)

- Go round below MCA not possible - below MCA, only closing both throttles removes asymmetric thrust and restores directional control.

Multi Engine Piston – Same but VERY Different

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Multi Engine Piston – more to think about, and sooner:

- Some of the additional risk (Threats and Errors) in MEP flying relate to increased performance and complexity and apply to both higher performance SEP and MEP aircraft, some are specifically as a result of having more than one engine.

- Both increase the demands on the pilot, both in preparation and in flight

The 'Higher Performance' Factor

- Everything happens faster - higher speed requires more thinking ahead.

- More complexity to manage:
  - Retractable Gear
  - VP Propeller
  - Cowl Flaps
  - Turbos
  - **Fuel System Complexity**

The 'Second Engine' Factor

- Engine failure and resulting asymmetric thrust generally results in rapid loss of control unless correct actions are taken

- No 'one size fits all' - engine failure requires different actions dependent on aircraft performance, phase of flight, nature of the failure

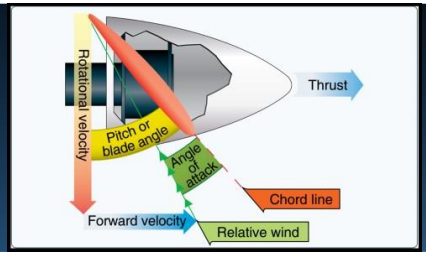
- 'Two of everything',, knowing your Left from your Right!

20

Long Brief: Example 2

With thanks to Alastair Greenan

MEP Flight Training – Asymmetric Blade Effect
The P-factor…



- The P-factor is also known as Asymmetric Blade Effect
- It is an aerodynamic effect experienced by a moving propeller, wherein the propeller's centre of thrust moves off-centre when the aircraft is at a high angle of attack.
- This shift in the location of the centre of thrust will exert a yawing moment on the aircraft, causing it to yaw to one side
- A rudder input is required to counteract the yawing tendency….

This aerodynamic effect occurs in both SEP and MEP aircraft, but has different implications

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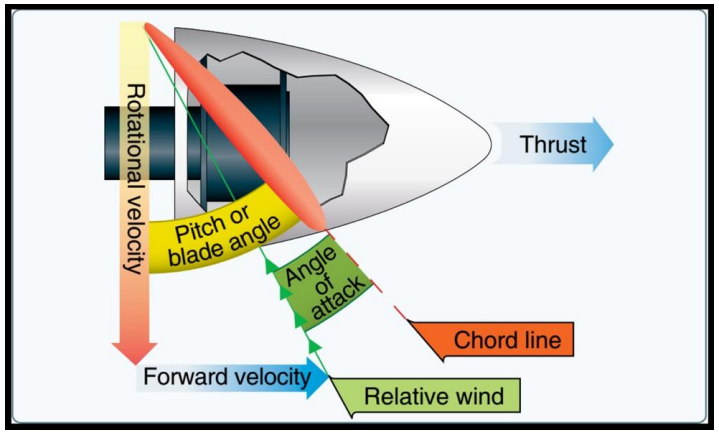
MEP Flight Training – Asymmetric Blade Effect
The P-factor…

- Propeller Blades are aerofoils
- For Propellers we use the term thrust instead of lift for the force generated by the airflow over the propeller (aerofoil Surface).
- The amount of Thrust/Lift generated is dependent on the same factors for both a wing and a propeller.



What are the factors that affect Lift/Thrust generated by an aerofoil…..?

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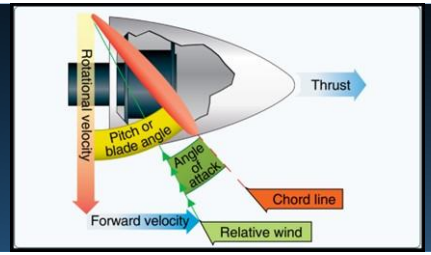
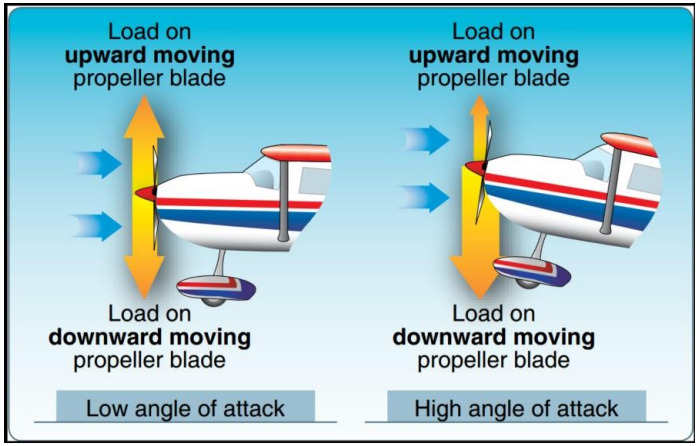
MEP Flight Training – Asymmetric Blade Effect The P-factor…



- When a propeller aircraft is flying at cruise speed in level flight, the propeller disc is perpendicular to the relative airflow through the propeller
- Each of the propeller blades contacts the air at the same angle and speed, and thus the thrust produced is evenly distributed across the propeller
- However, at lower speeds (e.g. Take Off and Climb), the aircraft will typically be in a nosehigh attitude, with the propeller disc rotated slightly upwards from the horizontal



This has *TWO EFFECTS*..

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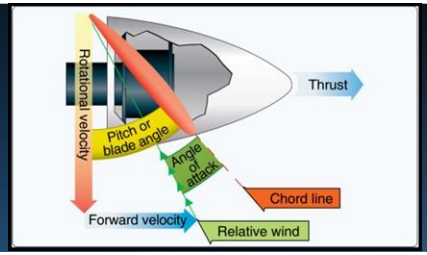
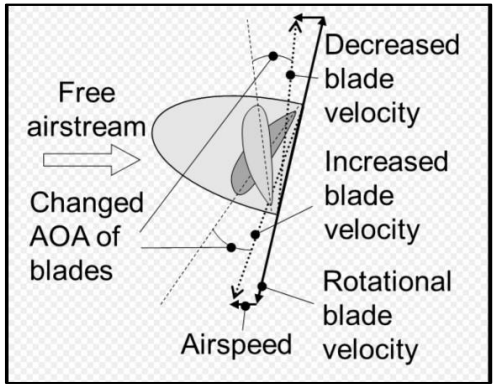
MEP Flight Training – Asymmetric Blade Effect Blade Forward Speed…

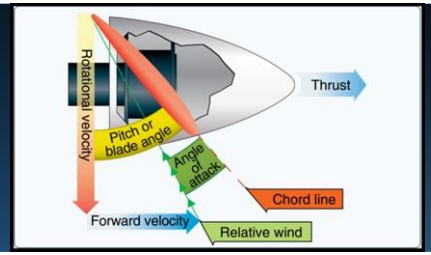


Firstly:

- The propeller blades will be more forward when in the down position, and more backwards when in the up position.
- The **propeller blade moving down and forward** (for clockwise rotation, from the one o'clock to the six o'clock position when viewed from the cockpit) **will have a greater forward speed**.
- This will **increase the airspeed of the blade**, and the down-going blade will **produce more thrust**.
- The **propeller blade moving up and back** (from the seven o'clock to the 12 o'clock position) will have a **decreased forward speed**, and therefore **a lower airspeed** than the down-going blade and **reduced thrust**.
- This asymmetry displaces the centre of thrust of the propeller disc towards the blade with increased thrust.

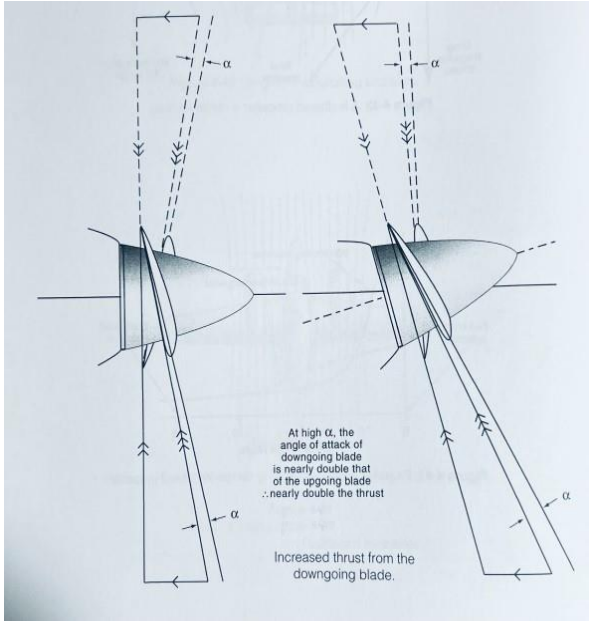


MEP Flight Training – Asymmetric Blade Effect Blade Angle of Attack…



Secondly:

- The **angle of attack of the down-going blade will increase**, and **the angle of attack of the up-going blade will decrease**, because of the **tilt of the propeller disc**
- The **greater angle of attack** of the **down-going blade** will produce **more thrust**
- The increased forward speed of the down-going blade marginally reduces its angle of attack, but this is much less than the increase in angle of attack caused by the tilt of the propeller disc. **Overall, the down-going blade has a greater airspeed and a greater angle of attack**
- P-factor is **greatest at high angles of attack and high power**, for example **during take-off** or in slow flight



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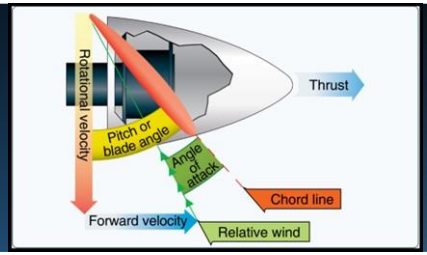
MEP Flight Training- Asymmetric Blade Effect



Or…..

[Asymmetric Blade Effect (the video...)]

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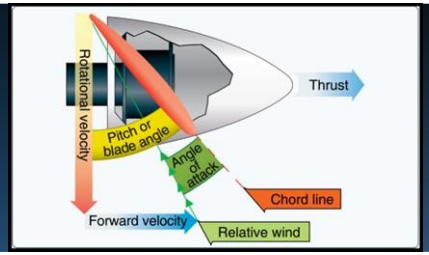
MEP Flight Training – Asymmetric Blade Effect Implications for MEP



- For multi-engine aircraft with counter-rotating propellers (like the Be76), the **P-factors of both engines will cancel out**
- However, **if both engines rotate in the same direction** (DA42), or **if one engine fails**, **P-factor will cause a yaw.**
- As with single-engine aircraft, **this effect is greatest in situations where the aircraft is at high power and has a high angle of attack (such as Takeoff and in the Climb)**
- The engine with the down-moving blades towards the wingtip produces more yaw and roll than the other engine, because the moment (arm) of that engine's centre of thrust about the aircraft centre of gravity is greater.
- Thus, the engine with down-moving blades closer to the fuselage will be the "critical engine", because its failure and the associated reliance on the other engine will require a significantly larger rudder deflection by the pilot to maintain straight flight than if the other engine had failed.

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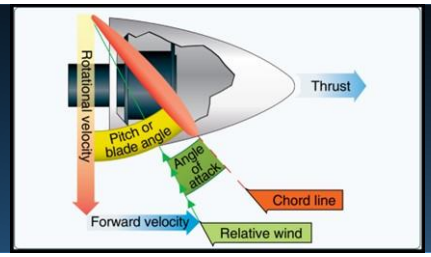
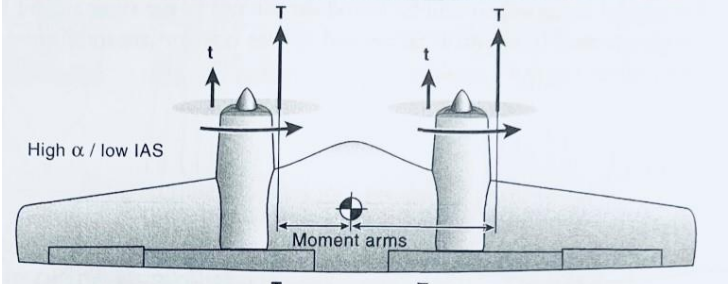
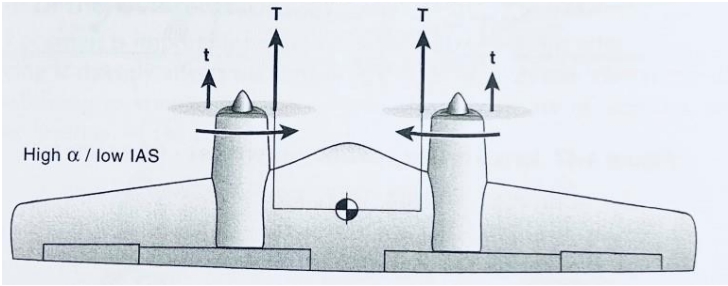
MEP Flight Training – Asymmetric Blade Effect Implications for MEP



P-Factor therefore determines which engine is critical engine:

- For most aircraft (which have clockwise rotating propellers), the left engine is the critical engine.
- For aircraft with counter-rotating propellers (i.e. not rotating in the same direction) the P-factor moments are equal and both engines are considered equally critical.
- With engines rotating in the same direction, P-factor will affect the minimum control speeds (VMC) of the aircraft in asymmetric powered flight.
- The published speeds are determined based on the failure of the critical engine. The actual minimum control speeds after failure of any other engine will be lower (safer).





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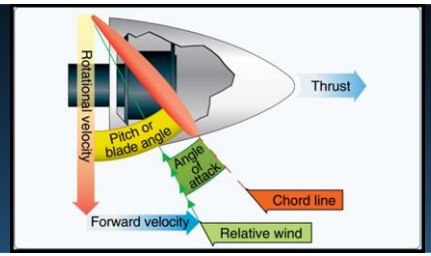
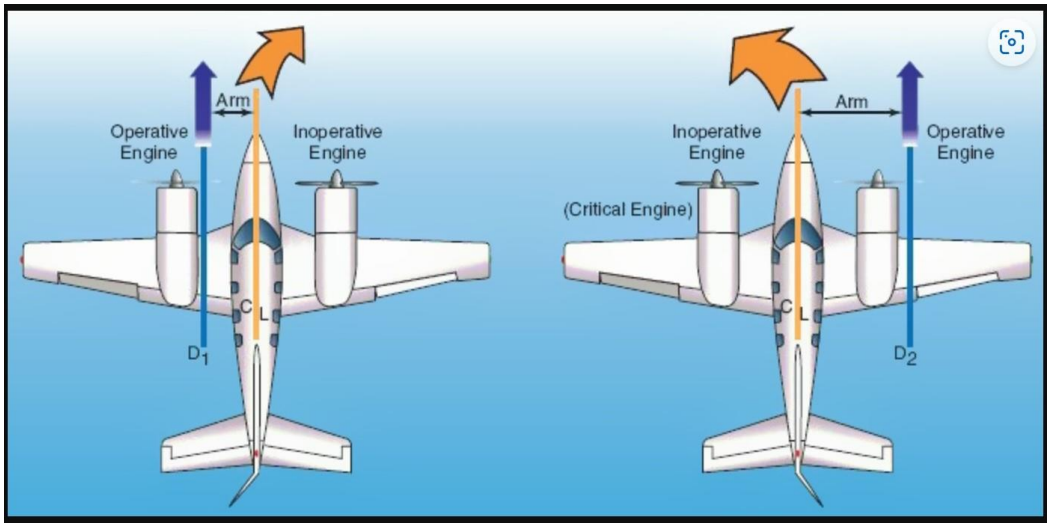
MEP Flight Training – Asymmetric Blade Effect Implications for MEP

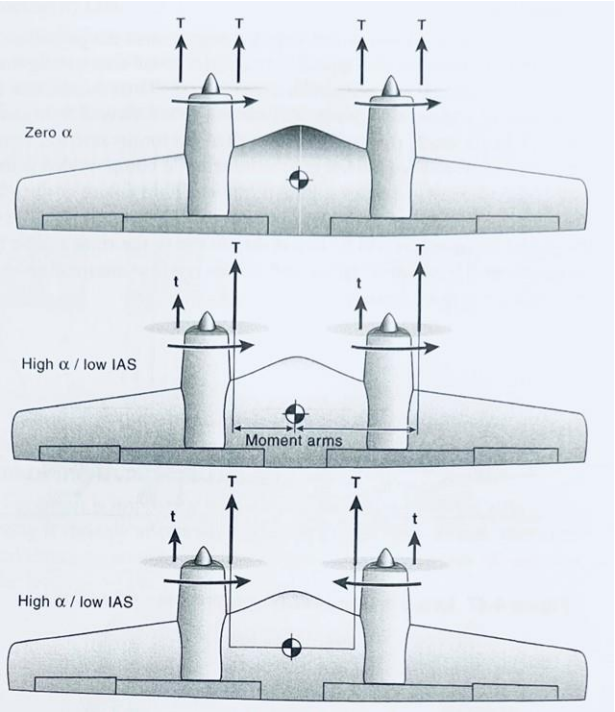


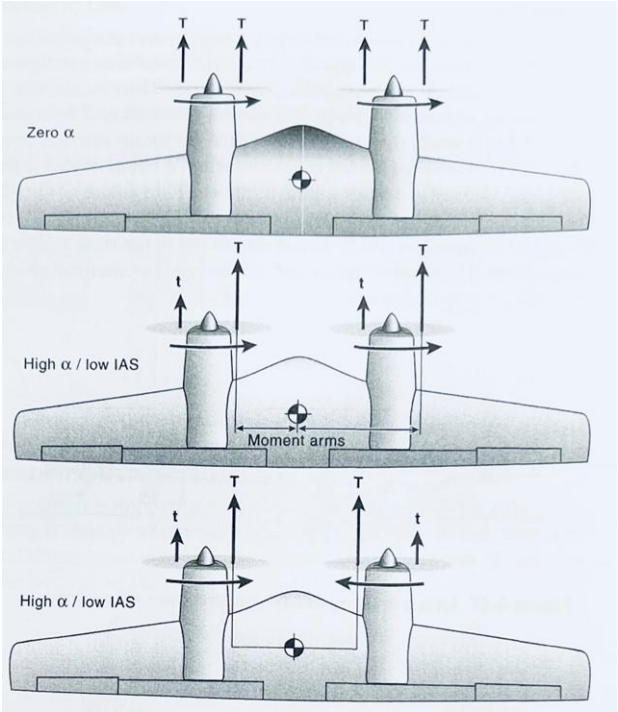
So, where both engines have **clockwise rotating propellers** as seen by the pilot (the most common configuration), the **operating right-hand engine will produce a more severe yawing moment** towards the dead engine, thus making **the failure of the left-hand engine critical**



But remember – each aircraft is different, and all aspects of your flight – flight self-briefing must reflect this!!

END

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Appendix 3: Pre-Flight Briefings (Short Briefings)

Introduction

The student has already either had a long brief on the subject, or self studied, so the purpose is not to teach the theory, but to provide a punchy overview of the entire flight that is about to take place, including pre-flight and post flight duties. It should leave the student in doubt about who will be doing what during the exercise.

In this regard, I am always reminded of the following limerick:

A gay man who lived in Khartoum,
Took a lesbian up to his room,
They argued a lot,
About who should do what,
And how, and with what, and to whom.

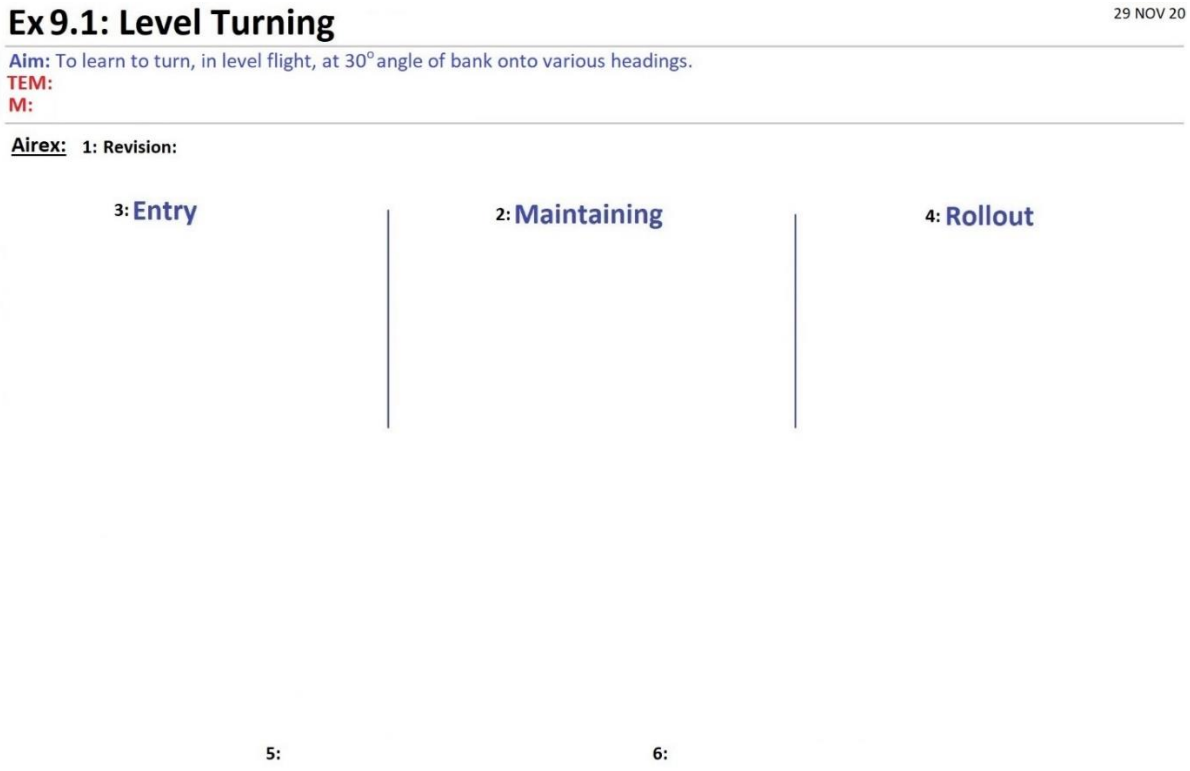
Although undoubtedly silly, it does get to the crux of the point of a short briefing! Note, not once do the participants use the word 'we'. 'How' is the most importand word of all.

The briefing normally includes a statement of the aim and brief allusion to principles of flight only if relevant. An explanation is to be given of the air exercises which are to be taught by the instructor and practised by the student during the flight. It should include how the flight will be conducted with regard to who is to fly the aeroplane and with what airmanship, weather and flight safety aspects which currently apply. The nature of the lesson will govern the order in which the constituent parts are to be taught.
The four basic components of the briefing will be:
1. The aim
2. Principles of flight (briefest reference only)
3. Threat & Error Management TEM.
4. The air exercise(s) what, and why and how and by whom.

Preparation

Make sure everything you need to deliver the pre-flight brief is available. There is nothing worse than an instructor having to leave the room to look for models or other aids. Even if this means delaying the start of the briefing, get everything together and ready, including the notes you will be using during the briefing.

Before starting the briefing, write the first part of the briefing on the board. Leave marks and spacers where you will write the remaining text, otherwise crowding can occur.



Do this in silence. Remember, NEVER talk to the student(s) while your back is turned and you are writing.

For example in Ex 9.1 you could prepare this part and lead the students through what follows.

Writing in CAPITALS rather than *cursive script* can be more legible to a class, depending on how neat your writing is. But avoid too many capitals.

Do not under-estimate the effectiveness of <u>underlining</u> something.

Do not be afraid to use abbreviations on your board briefing, as long as they have been explained: eg: clb for climb, Att for Attitude etc. Little diagrams are helpful too such as a mini balance ball for balance, or pair of eyes for lookout. This will make the board look more appealing than one covered with words.

Use colour consistently, with **RED** being used for importand things or danger.

<u>Build Up The Brief</u>

From Exercise 6 onwards, it can be a good idea to address the question as to WHY we are doing each lesson, as it is not always obvious to the student. 'Why are we learning to fly S&L?' 'Because when we are flying somewhere far away, the majority of our flying will be S&L.'

Make sure the student knows what the difference between a threat and an error is. Then, elicit the threats and possible errors from the students that you want, by guiding your questions: eg: 'what possible threat could we have on a busy weekend in the local area?' or 'what possible errors could we make when using the altimeter?' Just asking 'what threats are there today' could create all sorts of answers, many of them not relevant to the direcion you want to lead them. Then in the 'Management' row, add solutions to these threats and errors. It is not enough to simply identify errors – they must be managed: avoided, trapped or mitigated. Once mentioned, try to revist these threats and errors frequently throughout the brief and flight. TEM can thus permeate the whole instructional process rather than just be a monotonous list at the beginning of a pre-flight brief.

Outline how the flight will begin and who will do what to get the aircraft airborne. Use the words I and YOU (see below).

The use of colour on the board is important. Do not write everything in the same coulur. Have a system. **Red is useful for important or dangerous things.**

Then build up the rest of the board briefing by using building blocks. In this case begin with the 'Maintaining' building block. Then move onto the 'Entry' etc. Remember talk to the students, then turn and write in silence, then turn back and talk.

Remember to ask question regularly to prevent 'instructor drone-on'. An interactive and facilitative style is much preferable.

Talk about **HOW** things will be done, not just what will be done: 'I will enter the turn using co-ordinated input on the rudder and ailerons.'

Although it can be difficult at times, avoid the use of **WE** as much as possible. Use **I** and **YOU**. For example: 'I will fly the aircraft to the local area, where you will carry out a FREDA check. Then I will demonstrate how to carry out a HASELL check. You will then have a chance to practice.'

Make sure you use the word 'Teach' as appropriate. Many instructors say they will demonstrate a manoeuvre then the student will practice. There needs to be an element of teaching, after all, that is what an instructor does! Remember the Circle of Learning.

Avoid the use of negative training: Tell the student what you want him to do, not what you DON'T want him to do. He may focus on these items instead of the primary task.

Use of Visual Aids

Try to incorporate models and visual aids as much as possible. Always use the airraft model for all pre-flight briefings, especially when under assessment.

When holding the aircraft model, always orient the model so that it appears the correct way round for the student rather than the instructor.

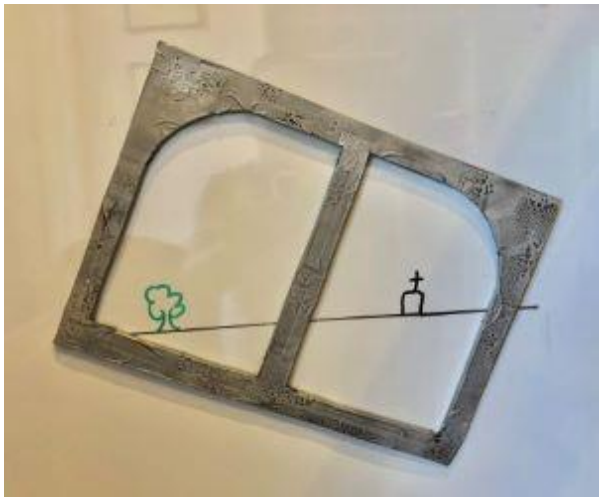
Which of these instructors has mastered the technique?

Actual aircraft instruments make very compelling teaching aids:

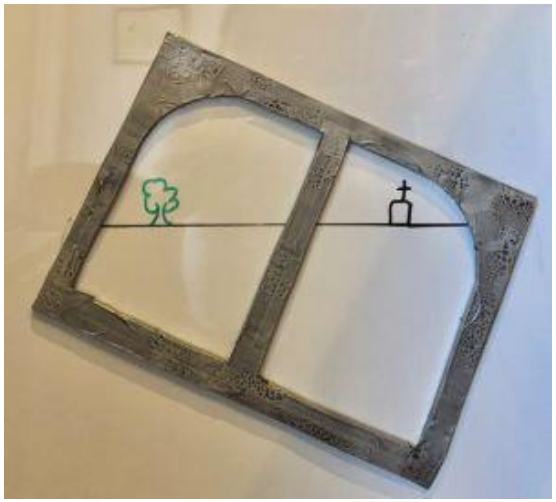
But having blown up diagrams of cut-away instruments allows you to explain their operation in more detail.

An aircraft window cutout can be used very effectively to show changing attitudes without having to redraw:

Straight & Level



Level turn to the right



Descending turn to the right

These can be made easily from cardboard, and if your whiteboard is magnetic, small magnets can be attached to the cutout to make it stay in place.

When showing changes in attitude using the cutout, be sure to exaggerate the changes to make them more visible to the student.

Appendix 4: CRI Groundschool

Teaching & Learning

There is a requirement for the trainee instructor to have a minimum of 25 hours of **Teaching & Learning** Groundschool. A suggested breakdown is as follows:

1. The Learning Process	
Motivation for Learning	Establish why the student wants to learn. It makes a huge difference to their performance if they actually want to learn. Common motivations include: Self-improvement, Career goal, Personal achievement, Financial reward, Desire to please family or employer.
Incentives to Learning	Learning is always easier if there is some reward at the end. Find out what the student is looking forward to. Common incentives include: Self-improvement, Career advancement, Personal improvement, Financial reward, Desire to please family.
Obstacles to Learning	Find out if there are any special needs. Medical, for example dyslexia is common in trainee pilots. Disability, airsickness, vertigo, phobias. Finance and time availability can also be huge obstacles. Aptitude, or lack of aptitude can also be a considerable obstacle. Remember, students need to be physically, mentally and emotionally ready to learn.
Learning Methods	Everyone learns in a different way: Some students are happy to self-study using on-line resources and books. Some students will need more intensive one on one teaching. Most will be in the middle. Some students like to understand everything and relish formulae. Others are happy to accept certain facts and move on. Some students need visual aids and lack the ability to create mental models easily. Others are good at this.
Rates of Learning	Each student will have a natural pace of learning. Establish that pace early on and don't try to push them to accelerate too much. This is easy for one on one learning, but in a group can cause problems.
Perception & Understanding	Students will find different topics harder or easier than you did when you were learning. Remember everyone is different and learns in their own way. It is your job to harness the student's ability.
Memory and its Application	People remember things in different ways. You may need to use inventive methods to solidify a concept or routine. Acronyms can be a good way. As can cockpit flows. Others prefer to count the number of actions.
Habits & Transfer	Remember, the student will watch you like a hawk in the early days, so it is vital that you don't let them mimic any bad habits that you may have. Strive to uphold the highest standards at all times.

2. The Teaching Process	
Elements of Effective Teaching	What makes a good teacher? Think of examples from your and their history. Why are some teachers better than others? **Enthusiasm:** Keen to get on with the job and do it in a positive manner. Enthusiasm is contagious. On the other hand, a lack of enthusiasm will sow the seeds for similarly negative attitude in your students. **Patience:** Many of your students will need to have procedures and techniques explained to them time and time again. Even though you may feel that you are 'banging your head against a brick wall' you must remain patient. Patience is especially needed when dealing with inexperienced, forgetful or underconfident students. **Sincerity:** Takes an interest in his student's progress both on the ground and in the air. Having an open and honest attitude with the student which will gain respect and confidence. Lies, half-truths and false write ups will undermine trust, destroy the instructor/student relationship and obstruct the student's ability to learn. **Adaptability.** An instructor must be adaptable or flexible as every student is different and requires a different approach. **Fairness:** An instructor never shows favouritism - do not be over friendly with one student and distant with another. **Honesty:** Instructors never bluff - if you need to discipline a student or threaten to take action, then do it. Do not make threats that you have no intention of carrying out. If an instructor does not know the answer to a question, then he says so. An instructor admits to his own mistakes. He never blames others and to admit that 'you were right and I was wrong' does much to improve the relationship with your student. **Considered:** An instructor does not make quick 'on the spot' judgements. When assessing a flight, he should take some time to think it over so that good points as well as bad points are considered. A balanced view will give an assessment that is valid and reliable. **Decisive:** They consider all the factors so that they make correct decisions and then act upon them. **Interested**: A good instructor is interested in his students and lets them know this by taking an interest in their backgrounds, problems, achievements and ambitions. **Motivating:** Good teachers tend to be able to motivate well. So, the key to being an effective teacher, is often how to motivate the student (see the Learning Process).
Planning of Instructional Activity	It is important to have a well-structured plan for lessons and for the overall course. This takes time and will involve the preparation of course content and teaching aids. Avoid having multiple sessions of the same kind of instruction - mix up between flights, lectures, practice sessions and hands-on learning if possible.
Teaching Methods	There are many ways to teach, just as there are many ways to learn. Which methods are used will in part be decided by the instructor, and in part by the needs of the student.
Known to Unknown	See Appendix 1: Instructional techniques
Use of Lesson Plans	Rather than make things up as you go along, it is much better to have a lesson plan which will keep you on the correct track. Use pre-prepared documents and teaching aids.

3. Training Philosophies	
Value of a Structured (approved) **Course of Training**	A structured course of training is always better for everyone - The student knows what is coming next, and the instructor can use it to keep him on track. If training at an ATO or DTO, there should already be an approved course of training for most courses. Outside such an establishment, the instructor needs to have a framework. Time should be taken to work out a syllabus that can be followed. Basic topics can then be expanded by group discussion or examples from real life instruction. A good FIC instructor will always have a good supply of stories to share.
Importance of a Planned Syllabus	Flying training is a complex business, and the well-defined syllabus that has been developed over the years, helps everyone understand the path that needs to be followed. Use either a commercially available course book, or devise one of your own and distribute it to the students beforehand.
Integration of Theoretical Knowledge and Flight Instruction	There is no point trying to explain something in the air or in a short briefing if the student has not already studied that concept in greater detail. As such, it is important to make sure the theoretical knowledge and the air instruction are synchronised. Find out if the student has done the required reading before the flight lesson. If not, it may be appropriate to cancel the flight and do ground school. This will ensure that next time he is better prepared. It is important that the theoretical and practical sides of the training run roughly concurrently – If the student has already read a certain chapter of the book, it makes the lesson much more relevant.
3a. Instructor Standards	
Appearance & Conduct	The instructor at all times must appear smart, well groomed and professional. A sloppy or dishevelled appearance is indicative of poor personal standards and attitude towards the job.
Personal Habits	Personal habits, such as scratching, picking, mumbling etc detract from the student's experience and should be minimised where possible as they are distracting.
Food & Cleanliness	An instructor should avoid eating smelly or gas-producing foods, such as garlic or beans, in the hours before instructing. Remember you will be sharing a very small space together!
Personal Standards	The instructor should strive for the highest standard of tuition and aircraft operation throughout. He should keep himself up to date with the latest rules and regulations, as well as aircraft and flying school procedures.
Professional Standards	All instructors at a school should be standardised – ie they should all teach in the same way. This allows them to share students easily. The method your ATO uses to teach each lesson will be in the relevant ATO manual. Most ATOs maintain standardisation by regular standards meetings where such matters are routinely discussed.

4a. Techniques of Applied Instruction - Theoretical Knowledge – Classroom instruction Techniques:	
Use of Training Aids	There are a great many training aids that should be used to assist in instruction: Whiteboard, OHP, PowerPoint, Aircraft models, cockpit window cut-outs, real aircraft instruments, charts, computers etc. The importance of these visual aids cannot be overstated, and no pre-flight briefing should be given without the aircraft model being close at hand. Audio-visual presentations, such as short videos or photographs can make a theoretical knowledge lesson come alive. The CAA still value the ability of an instructor to deliver a briefing on a whiteboard.
Group Lectures	If there are several students at around the same stage in training, a group lecture can be a good way to reduce time for the instructor, but more importantly, the interaction between several students can generate positive learning benefits.
Individual Briefings	Sometimes, a one-on-one briefing can be more valuable, especially if the student has a special need or is struggling/racing ahead.
Student Participation/Discussion	As with Group Lectures, above, student participation and discussion can be a very useful tool in learning. Observing students discussing a topic can tell the instructor the level of understanding that has been gained.
4b. Techniques of Applied Instruction - In-Flight – Airborne Instruction Techniques:	
The Flight/Cockpit Environment	The cockpit environment in flight is alien to most students, and has a number of limitations when it comes to teaching and learning. The student will be under a workload – possibly overloaded, or may be anxious. The side by side seating and lack of eye contact poses challenges, which need to be overcome. The lack of a 'pause button' means that the instructor cannot go into in-depth explanations during flight. This is best dealt with by making a note on the kneeboard for later discussion. But do not forget to return to the subject after the flight.
Techniques of Applied Instruction	Nothing in the airborne lesson should be new to the student. Everything should have been discussed on the ground in either the long briefing or the short briefing. Any airborne debriefing should always involve the instructor taking control first, to allow the student to concentrate fully. Some students feel that the instructor taking control is an admission of failure on their part. A good way to do this is to say 'I have control, just so I can explain this to you'.
4c. Techniques of Applied Instruction - Post-Flight:	
Debrief	The importance of a good debrief cannot be overstated. An effective debrief cannot be conducted in the air, and it is vital that a debrief is carried out after flight to ensure the relevant messages are driven home. The debrief need not take very long, but it is a critical, and all too often forgotten part of the lesson. The debrief should include any notes you made during the flight for discussion later. Make sure the student takes notes during a debrief or the chances are, the information will be lost.
4d. Techniques of Applied Instruction - In-Flight Judgment and Decision Making	
Judgment and Decision Making	It is more or less impossible to teach judgement and decision making effectively in the classroom. The best way is to teach by example. Whenever opportunities arise during the flight (weather or technical situations), try to involve the student and allow them to see how decisions are made and solutions are found. This sets the seed for the teaching of CRM.

5a. Student Evaluating & Testing - Assessment of Student Performance:	
The Function of Progress Tests	Progress Tests are important to allow both the student and instructor to gauge the student's performance. As a fundamental tenet of instruction is 'to take the student from where he is to where he needs to be', we need to know where the student is in order to be able to do this effectively. Progress tests can be written or practical.
Recall of Knowledge	The regular asking of questions during ground and flight instruction can give a good idea of the student's factual knowledge. **The Law of Exercise.** This law states that things most often repeated are best remembered. Frequently asking your student to give the answer to an important question will help him to remember it when needed. For example, every time he lines up for take-off, ask him the demonstrated crosswind. Every time he starts the engine, ask the starter duty cycle.
Translation of Knowledge into Understanding	More probing questions will be needed to make sure the student's knowledge of facts has been fully understood. Many students are good at remembering facts, but they need to be understood. For example – the student knows the crosswind limit is 13 kts. But, when the tower gives the wind for take-off, fails to understand whether or not this limit has been exceeded.
Development of Understanding into Actions	The most advanced form of learning allows the previously learned facts and their understanding to be translated into actions. For example after a simulated cabin fire in flight, the student has learned that turning off the Battery Master Switch is an item on the checklist. He is able to recall and understand this fact. However, this fact in itself is only the beginning. Once he has translated this knowledge into understanding, he should be able to realise that he has now lost the use of the radio transponder, and any electrically operated flaps. The final stage is developing this understanding into actions – the student then tells you he will have to join the airfield non-radio and perform a flapless landing.
The Need to Evaluate Rate of Progress	Every student learns at their own rate, and this rate needs to be understood by both parties. Sometimes the rate may be so slow that a serious conversation is needed. Sometimes, an enthusiastic student wants to race ahead. This also needs to be managed.
5b. Student Evaluating & Testing - Analysis of Student Errors:	
Establish the Reason for Errors	Students rarely make errors deliberately. There is always a reason why errors are made – it may be poor instructional technique or a failure to grasp a concept. The key to improving performance is identifying the reasons why an error is made. For example, on the ILS, the student always goes high on the glide slope at the FAF. The reason turned out to be that he always selected flap at the FAF. Knowing the reason can help prevent its recurrence by forewarning.
Tackle Major Faults First, Minor Faults Second	It is unrealistic to try to solve all the problems in a flight by a single debrief. It is important to prioritise the major faults first and fix them before tackling the smaller ones.
Avoidance of Over-Criticism	If too much criticism is levelled at the student, he may become despondent and this may result in demotivation. As above, tackle the major problems first (or in isolation).
The Need for Clear Concise Communication	As in all elements of flight instruction, communication is the key. The student must always understand what is required of him, and how his performance fared.

6. Training Programme Development	
Lesson Planning	Good lessons are not made up as the instructor goes along. They have well defined aims, well thought out content, with various visual aids, and a summary at the end.
Preparation	Spend time preparing the material, including any handouts or visual aids. Not only does it make your teaching job easier, but the student feels that a more professional job is being done.
Explanation & Demonstration	Be ready to explain concepts in more than one way if a student struggles to grasp it the first time – just because you understand that explanation, doesn't mean your student will.
Student Participation & Practice	Asking of questions and practical exercises will allow you to ascertain if the student understands. Less outgoing students may just nod rather than admit they don't understand something.
Evaluation	Make sure you (and your student) are happy with the student's progress before moving on to the next subject.

7. Human Performance and Limitations Relevant to Flight Instruction	
Physiological Factors	A student who is tired, hung-over or airsick will not be in a good place to learn. Get the student used to assessing his own condition before deciding to fly.
Human Information Processing	Make sure the student does not become overloaded during lessons. Often, the instructor will want to move on to the next part before the student has fully assimilated the previous section. This is counter-productive.
Behavioural Attitudes	Monitor student attitude and behaviour to see if any negative trends are developing. If they are, address them early on so that there is time to change.
Development of Judgment & Decision Making	While training your student, if decisions have to be made, involve the student – that is how he will learn to make decisions himself. Explain to him why you made the decisions you did. This is how CRM is best taught.

8. Hazards Involved in Simulating Systems Failures and Malfunctions in the Aeroplane During Flight	
Selection of a Safe Altitude	Have minimum altitudes for hazardous activities such as stalling, spinning, engine shutdowns, EFATO etc. They may be set by the training establishment, or you may need to set your own. Never be tempted to go below them as this sends the wrong message to the student.
Importance of 'touch drills'	Make it clear to the student whether the failure and subsequent drills will be real or touch drills only. Certain items can still be moved during touch drills – throttle, fuel pump etc.
Situational Awareness	Introduce the term 'Situational Awareness' and stress that it applies to Geographical environment as well as checklist status and aircraft operational state. Consider such tools as 'Plane-Path-People' to help develop awareness.
Adherence to Correct Procedures	Always use the correct procedures, and do not hesitate to refer to the appropriate checklist in flight. This sends the message to the student that it is ok to do this himself.

9. Training Administration		
General:	**Flight/Theoretical Knowledge Instruction Records:** The importance of the instructor making such student records as soon as possible after the event. **Log books:** The need to keep both instructor and student log books up to date. **Flight/Ground Curriculum:** The instructor should know the curriculum and know where to find the details. **Study Material:** The importance of knowing what material is available for instruction and study. **Official Forms:** The instructor should have a good knowledge of the required CAA and ATO/DTO forms. **AFM/PoH:** The instructor should be familiar with these publications and encourage the student to study them. **Flight Authorisation:** The instructor and the student should both be familiar with flight authorisation procedures. The student should be encouraged to take responsibility for this. **Aircraft Documents:** The instructor should be familiar with these documents and encourage the student to study them. **Licence & Rating Requirements:** Both instructor and student should understand the privileges and limitations of their licencing documents.	
The CRI(A)'s Responsibilities:	**Training Standards:** A high level of personal standards should be maintained by the instructor. **Standardisation:** A high level of commonality with other instructors should be maintained. **Preparation for Skill Tests/Proficiency Checks:** Although not primarily there to teach the student to pass the test, the instructor should be fully aware of the requirements of the relevant test the student is being prepared for. **Training Effectiveness:** The instructor must consider how effective his instruction is, and if necessary, seek to address this. **Examination & Fault Analysis:** The instructor must be effective at analyzing student faults before he can correct them. **Development of Student Responsibilities**: The instructor must strive to encourage the student to take responsibility from an early stage of training – PPR, walkarounds etc. Not only does this reduce workload on the instructor, but it makes the student feel empowered. **Instructor Continuity Training:** The instructor role is continually changing and both theoretical and flying skills need to be kept up to date.	
FCL CRI(A):	**Introduction** **General Information** **Privileges of the CRI (ME)** **Experience Requirements** **Skill Tests & Proficiency Checks** **Revalidation/Renewal of Ratings**	The instructor must have a good working knowledge of all of these pieces of legislation, and keep up to date with them as they change.

Appendix 5: Flight Training

1: General Considerations:

During FIC training, the trainee instructor may never have done 2 things that will be asked of him:

- Fly from the right hand seat. He may be particularly anxious about landing from the unfamiliar seat. Make sure he is able to land satisfactorily from the other seat before sending 2 trainees off together on a mutual. There are other difficulties in operating from the other seat, such as parallax errors. For example, if the student in the LHS sets 2300 rpm, it may look like 2200 rpm when viewed from the RHS. The trainee instructor must get used to this and take this into account. Similarly with other instruments.

2: Give and Give-Back:

The in-flight section of the FI course follows a very specific format. It involves the FIC instructor giving the lesson to the trainee instructor as though he were a PPL student. This is done in real time and will involve the trainee instructor practicing what he has been shown.

Once this is complete, the FIC instructor will ask the trainee instructor to give the lesson back to him, he now assuming the role of the PPL student. This 'give back' should again occur in real time, and the FIC instructor may make typical student errors when invited to practice. Afterwards, feedback may be offered to the trainee instructor which may involve a repeat of the give and give back.

Once this, initially odd, procedure has been learnt, it is repeated for all the exercises in the syllabus and soon becomes second nature.

Some FIC instructors give the whole lesson in one go, and then expect the 'give back' in one go also. However, a better, and more practical method is to break down the lesson into bite-sized chunks. An example for Ex10a(i) follows:

'Text in blue' indicates the FIC instructor talking to the supposed PPL Student.
'Text in green' indicates the FIC instructor talking to the Trainee Instructor.

1. The FIC instructor starts by demonstrating only, with no follow through, of the approach to a clean stall including HASELL Checks. 'I have control. I am now going to demonstrate the full stall and standard stall recovery. I just want you to watch what happens – we will break it down later'. He carries out a HASELL check and demonstrate in silence a full clean stall with SSR. 'So, by the end of this lesson, you should be able to do that.' 'Now, I'd like you to give that back to me.' The trainee instructor now repeats that chunk of the lesson.
2. 'I have control. We are now in the local area and ready to start the exercise. Remind me what we must always do before practicing a stall.' 'That's right a HASELL check. So our Height is 3000', which is sufficient to recover by 2000' agl. Airframe: We are clean, which is what we want for this stall. Security: I am secure, are you? No loose articles in the aircraft. Engine: Ts & Ps are checked OK, and I will put the Carb Heat on for 10 seconds. Location: We are not above any Airfields, Built-Up areas, Controlled Airspace or Cloud, or Danger Areas. Now the Lookout. I will do a 90 degree turn to the left followed by one to the right. Give me a hand looking for other traffic, please.'
   'OK, so we are now ready to start the approach to the stall. No need to follow me through, just watch my demonstration. So, I begin by putting on the Carb Heat to protect the engine. I close the throttle, keeping the aircraft straight with rudder. I am preventing the nose from

dropping by holding the back pressure. I am trimming some of it off. Still holding the back pressure.' You may wish to leave some power on to prolong the deceleration and allow you to better point out the signs. 'Notice the high nose attitude. I can remove this symptom of the stall by simply moving the control column centrally forwards – see. But let's say I don't do that – I keep holding the nose up. The next thing I notice is the reduced airspeed. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. But let's say I keep holding the nose up. The next thing I notice is the sloppy controls – have a feel. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. But let's say I keep holding the nose up. The next thing I notice is the stall warner sounding. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. At any time that any of these symptoms of an approaching stall occur, I can remove them by just moving the control column centrally forwards.' At this point, move the control column centrally forwards to remove all signs of the approaching stall.

3. Recover the aircraft to 3000' again. 'Now I'd like you to have a go at carrying out a HASELL check and setting the aircraft up for the approach to the stall. I want you to note each symptom and when you have seen all the symptoms, remove them by moving the control column centrally forwards. You have control.' The trainee instructor now practices this as though he were a PPL student.
4. 'I now want you to give me that section back.'' The trainee instructor now gives this section of the lesson back to the FIC instructor. When it is the FICI's turn to practice, he may make a mistake or two, such as forgetting to carry out a HASELL check. This should be addressed by the trainee instructor. The FICI will then offer feedback. Then the next section.

NOTE: This can get a little confusing at times. The trainee instructor can lose track as to which role he is supposed to be playing. One way of making this easier is to assign a name to the supposed PPL student. For example, if the trainee instructor's name is Mark, he may choose David as his PPL student name. The FIC instructor's name may be Steve, but chooses Jimmy when he is a supposed PPL student. This way, when the FIC instructor says 'OK, David, I want you to show me a stall', the trainee instructor immediately knows which role to assume.

See the previous lesion section using this method:

1. Steve starts by demonstrating only, with no follow through, of the approach to a clean stall including HASELL Checks. 'OK, David, I have control. I am now going to demonstrate the full stall and standard stall recovery. I just want you to watch what happens – we will break it down later'. He carries out a HASELL check and demonstrate in silence a full clean stall with SSR. 'So, David, by the end of this lesson, you should be able to do that.' 'Now, Mark, I'd like you to give that back to me.' Mark now repeats that chunk of the lesson. 'OK, Jimmy, I have control. I am now going to demonstrate the full stall and standard stall recovery. I just want you to watch what happens – we will break it down later'. He carries out a HASELL check and demonstrate in silence a full clean stall with SSR. 'So, Jimmy, by the end of this lesson, you should be able to do that.'
2. 'I have control. We are now in the local area and ready to start the exercise. David, remind me what we must always do before practicing a stall.' 'That's right a HASELL check. So our Height is 3000', which is sufficient to recover by 2000' agl. Airframe: We are clean, which is what we want for this stall. Security: I am secure, are you? No loose articles in the aircraft. Engine: Ts & Ps are checked OK, and I will put the Carb Heat on for 10 seconds. Location: We are not above any Airfields, Built-Up areas, Controlled Airspace or Cloud, or Danger Areas. Now the Lookout. I will do a 90 degree turn to the left followed by one to the right. Give me a hand looking for other traffic, please David.'

'OK, so we are now ready to start the approach to the stall. No need to follow me through, just watch my demonstration. So, I begin by putting on the Carb Heat to protect the engine. I close the throttle, keeping the aircraft straight with rudder. I am preventing the nose from dropping by holding the back pressure. I am trimming some of it off. Still holding the back pressure.' You may wish to leave some power on to prolong the deceleration and allow you to better point out the signs. 'Notice the high nose attitude. I can remove this symptom of the stall by simply moving the control column centrally forwards – see. But let's say I don't do that – I keep holding the nose up. The next thing I notice is the reduced airspeed. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. But let's say I keep holding the nose up. The next thing I notice is the sloppy controls – have a feel. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. But let's say I keep holding the nose up. The next thing I notice is the stall warner sounding. Again, I can remove this symptom of the stall by moving the control column centrally forwards – see. At any time that any of these symptoms of an approaching stall occur, I can remove them by just moving the control column centrally forwards.' At this point, move the control column centrally forwards to remove all signs of the approaching stall.

3. Recover the aircraft to 3000' again. 'Now, David, I'd like you to have a go at carrying out a HASELL check and setting the aircraft up for the approach to the stall. I want you to note each symptom and when you have seen all the symptoms, remove them by moving the control column centrally forwards. You have control.' David now practices this.
4. 'OK, Mark, I now want you to give me that section back.'' Mark now gives this section of the lesson back to Steve. When it is Jimmy's turn to practice, he may make a mistake or two, such as forgetting to carry out a HASELL check. This should be addressed by Mark. Steve will then offer feedback. Then the next section.

3: Simulated Emergencies:

During FIC training as well as all other forms of flight training, there is a need to simulate emergencies. It is important that these 'simulated' emergencies are managed carefully so that they do not in themselves become real emergencies.

Types of Emergency:

There are two basic types of simulated emergency:

- **Life-threatening emergencies** such as engine fire, engine failure, pilot incapacitation.
- **Non-Life-threatening emergencies** such as radio failure, electrical failure, getting lost.

Simulated Engine Failures:

There are 2 ways the instructor can simulate an engine failure:

- **Closing the throttle** – ideal for an engine failure after take-off (EFATO), but not the best way in cruise flight.
- **Building a Scenario –** Far better and more realistic for engine problems in the cruise. A problem can be built up in a more realistic way by the instructor pointing out things that are not normal. For example, starting with a high oil temperature, then a strange vibration, then possibly some smoke or fumes from the engine. This may encourage the student to run the engine at lower power and carry out some diagnosis (which may fix the problem) before rushing in to the full engine failure drills. There is no time for this method during an EFATO.

During the course of the ensuing practice engine failure in single-engined aircraft, the instructor is effectively also acting as a safety pilot. In a real engine failure, the student would not be expected to 'warm the engine' periodically. If they choose to do so then that is ok, otherwise the instructor must do so since he has a 'duty of care' to the aeroplane. This is no negative reflection on the student. In a similar manner, the instructor is responsible for making sure the carb heat is on, low flying rule adherence and calling the go-around.

Simulated engine failures of single-engined aircraft may also be practiced in the circuit, but be careful not to inconvenience other airfield users.

Simulated Engine Failures (Multi-Engines Aeroplanes):
Practice EFATOs on multi-engined aircraft should always be carried out at a suitable height. Each ATO will specify a minimum height, but 500' is typical. Remember, if the student puts the full 'wrong' rudder in, would you be able to recover from the height at which you gave the failure? At some airfields, due to noise abatement restrictions, this may mean that a practice EFATO will occur on the crosswind leg rather than climbout. After completing a simulated asymmetric circuit to land, a full stop landing should always be made rather than a touch and go. This is in case the simulated failed engine is slow to respond when power is added for take-off. If further training is required, vacate the runway and taxi back to the holding point.

Touch Drills:
The student should know what touch drills are – just touching the control and saying what you would do with that control works well. It is important that the student not only touches the correct control, but also says the correct thing. For example, a student, in the feather drill in a multi-engined aeroplane may touch the left propeller control and say 'feather right'. Obviously, this is not acceptable. Neither is just touching it, or touching it and saying left. He needs to unequivocally touch the left prop control and say 'feather left'.

Some controls in some drills can actually be moved by the student: Throttle, fuel pump, carb heat, flaps etc. This should be encouraged. Imagine in an engine fire scenario if the throttle wasn't retarded.

Circuit Breakers
The instructor should not deliberately and secretly pull circuit breakers (CBs) in order to simulate a failure. It may be that that service cannot be restored.

Simulated Fires:
Many skill tests require a simulated fire to be dealt with. This can also be built up using a scenario. The instructor could start coughing, then point out a faint smokiness in the cabin. Then, slowly report worsening symptoms until the student responds by actioning the appropriate checklist.

Simulated Distress Calls:
Instructors should be encouraged to train students to make Practice PAN calls and training fixes during their training. Remember, a practice PAN can be made on any frequency, including a tower or AFIS frequency.

Intervention

It is very important to know when and how to intervene during flight training. Several accidents have occurred as a result of the instructor failing to intervene in a timely manner.

If the instructor intervenes too soon, the student misses a valuable learning point, and begins to rely on the instructor to get him out of trouble. If the instructor leaves it too late, then there is a possible safety problem.

There is also the question of how the intervention is done. There are 4 main levels of intervention, that can be summarised as shown:

1: Hint & Tip

If time is not too critical, a timely hint or tip can achieve the desired result. For example, when a student is low on the approach, a comment such as 'How do you think the vertical profile is looking?' might be enough for them to have a think about the situation. Similarly, on base leg, with a strong tailwind that has gone unnoticed: 'What do you think the wind is up here?'

2: Tell me what's wrong

If hinting and tipping haven't worked, a more direct approach may be needed. For the student low on approach: 'We're a bit low'. This still gives the student a chance to consider the problem and work out how to resolve it.

3: Tell me how to fix it

If pointing out the problem doesn't work, it may be that the student cannot think how to resolve the problem. They may need you to say something like 'add more power now' or 'raise the nose now'.

4: Fix it for me.

The last level occurs when all other avenues have been exhausted. You will need to say 'I have control' and fix the problem.

Appendix 6a: Trainee Needs

It is important when training a student that their needs are covered. Not every student is the same and they each have differing needs. These needs can be summarised as follows:

- **Start from where I am.**
- **Let me know where I am going.**
- **Give me a reason to want to get there.**
- **Let me know how I am doing.**
- **Use *MY* experience.**
- **Progress at *MY* pace.**
- **Let me make the knowledge and skill my own.**
- **I acknowledge responsibility for my own learning.**

Appendix 6b: Instructor Competencies

According to CAA Standards Document 10: **All instructors shall be trained to achieve the following competences:**

These will de dealt with in turn:

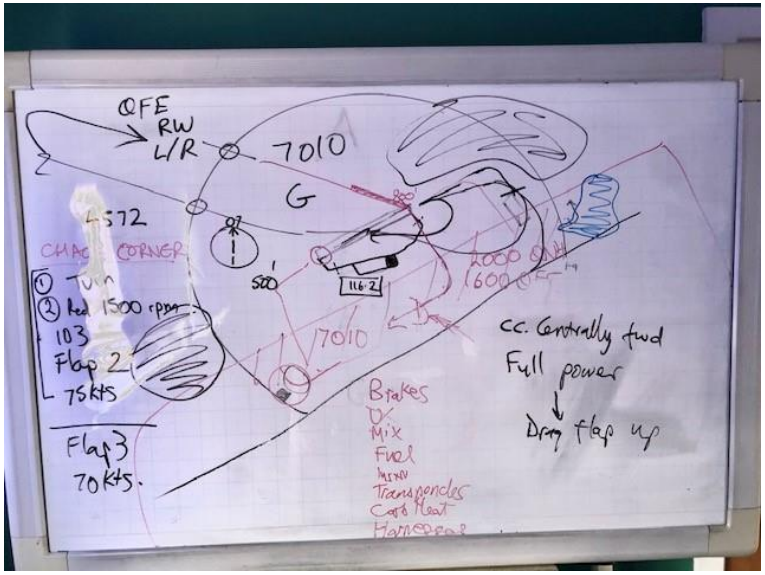
Prepare Resources

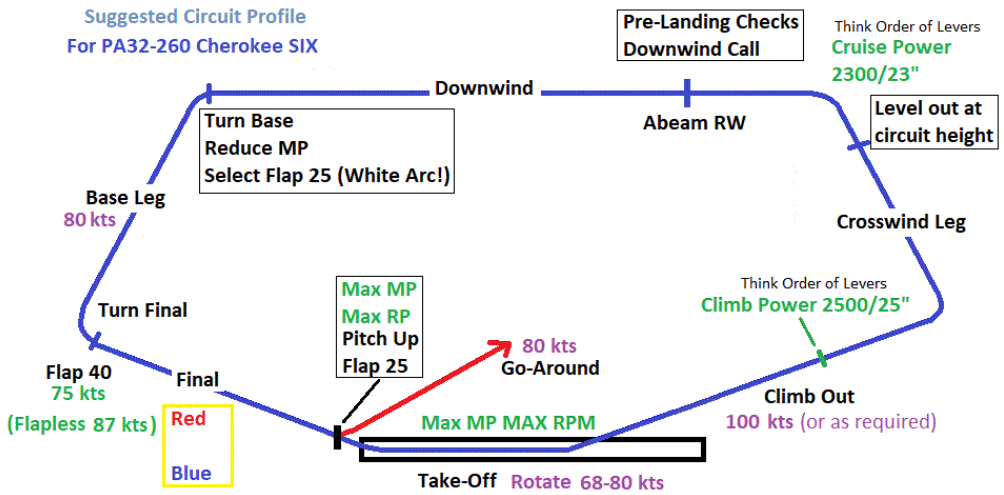
A lesson, be it ground or in the air requires considerable preparation on the part of the instructor. It will require:

- **A Framework:** The lesson should be structured in order to keep it concise and on track. This will usually begin with an aim, and then continue into the body of the lesson. At the end there should be a summary and time for questions.
- **Teaching Aids:** On the ground, these might include an aircraft model, a white board and pens, aircraft instruments, video clips etc. There use should be integrated into the lesson. In the air, such items as IMC goggles, instrument covers, maps etc should all be ave to the instructed as and when needed. It does not inspire the student with confidence if the instructor cannot find or has forgotten to bring these items along.

- **Course Books:** It may be appropriate for the student to have been recommended or given a book, or other prepared documents (such as checklists or flight profiles) to guide them through a coure or lesson.

It is important to make sure any resiurces you use are effective. Consider the following example.





Which of these 2 teaching aids would you use?!

Create a Climate Conducive to Learning

The learning environment is very important. This has several aspects:

- **Instructor Manner:** The instructor must be patient, approachable and unhurried in his behaviour. Many instructors allow insufficient time for lessons or briefings, and the result comes across negatively to the student who feels they are under pressure to learn and understand quickly. The general nature of the instructor here is also importance – appearance, professionalism and sense of humour are important.
- **Physical Climate:** The place where teaching is to take place (classroom, aeroplane or simulator) must be suitable in terms of temperature, light and other facilities needed. Briefing or teaching should never take place at a table in a crowded café.

Present Knowledge

It sounds obvious, but learning is much about the transfer of knowledge (and skill) from instructor to student. It is important that this transfer happens.

Integrate TEM & CRM

- **TEM:** It is a CAA requirement now to integrate Threat and Error Management into all aspects of aviation instruction. This begins in the classroom, and pre-flight briefings should already contain this element. One way to introduce this is to colour code as follows:

  Aim: To learn how to safely perform one engine inoperative turns, descents & climbs.
  Threats: Other aircraft, Terrain, Engine overheat.
  Errors: Loss of control, Infringement, fuel mismanagement
  Management: Lookout, Speed & bank angle awareness, Checklist discipline, Pre-flight planning, Altimeter checks.

  In this way, once the aim of the lesson has been established, there can follow a discussion about what the possible threats and errors are associated with that exercise. This then allows another discussion on how to manage those threats. It is not sufficient to just list the threats and then not continue to the management phase. Later in the flight, these threats, errors and management techniques should be pointed out as they occur to underline their importance.
- **CRM:** Crew Resource Management should be encouraged at all times, but it is particularly important in the aeroplane. The use of interactive briefings, verbalization and open questions will help guide the student in this matter. CRM is something that is best led by example. As an instructor, always try to display high levels of CRM at all times. Explain why you make the decision you did.

Manage time to achieve Training Objectives

During the lesson, there is usually only a limited time available. This may be due to aircraft or instructor availability, airport operating hours etc. It is important that the time available is used to best manage the training requirements. If a student needs more practice, it may become necessary to drop a later exercise in order to properly practice the troublesome section.

Facilitate Learning

Not all students learn in the same way. Some grasp ideas quickly, others need more time. Some students are very 'visual' and rapidly understand concepts when diagrams are used. Sime like mathematical formulae – others don't! It is your job as an instructor to find a way to make that student learn as best he can.

Assess Trainee Performance

Obviously, the student's performance must be continually assessed in order to ensure that progress is being made. This assessment is important to the student, the instructor and the training establishment. This is done partly in the post flight debrief, but should also be recorded in student records. Traditionally, such records were handwritten, but increasingly, ATOs are using on-line training records. Such records should also be available to the student.

Report writing is an integral part of any instructor's daily activity. It is a skill that may require development. This section offers suggestions for use by instructors as guidance material to produce accurate reports.
All reports must reflect the debrief. Instructors should avoid writing comments that have not been discussed during the debrief.

An accurately written report can serve the following purposes:

- As a written hand-over to the next instructor
- To provide the trainee with an overview of how the training is progressing
- To provide the trainee with tips for improvement
- To allow the HoT to analyse progress or areas for development
- To allow the HoT to deal with poor performance in a structured and fair manner

Use CAP (Commentary, Appraisal, Pointers):

Commentary

Detail how much of the lesson has been completed and to what overall standard has been achieved. Phrases to describe the standard might include; "to standard, below standard, good standard, very good standard and excellent standard".

Appraisal

Write a phrase or phrases to discuss where the student is in more detail. For example; "X continues to overbank in turns, 30 degrees AoB as a maximum! S&L flight is improving now that X trims effectively. Checklist usage needs further study though.

Pointers

List a couple of Main Points and a couple of Minor Points for improvement going forward. The Main Points would have formed the main part of the debrief. The exact number of Pointers is unimportant but would probably be between 1 and 4. Pointers can of course be positive! Ensure that remedies are offered where possible.

Signing Off the Report

Instructors should remember that student confidence is vital. Positive reinforcement is more powerful and aim to leave them with a word of encouragement. For example: “X is a pleasure to teach, keep up the hard work”

Comments:

```
Set course overhead. Nav to Chinnor - Abingdon Diversion to Newbury. Diversion to EGLK
Very well flown. Do not check instruments on taxi when in close proximity to other a/c.
Headings accurately flown. Diversions well flown. Do not change heading or alt without explanation.
Go-around due RW blocked. Good decision and well handled.
Navigation coming along very nicely.
```

Recommendations:

```
More navigation practice
```

Giving positive feedback is a task most instructors enjoy. However, it is equally important to deliver negative feedback too. Negative feedback can be hard to handle and, when poorly delivered, unhelpful. We have all been on the receiving end of criticism - it is neither easy to give nor take. And yet, if appropriate, timely, and well wrapped, feedback can be a positive experience. While negative feedback might suggest a focus on the worst, it creates an immense opportunity for improvement when viewed in the right light. After all, an insightful critique provides a chance to grow and excel.

There are several points to think about before giving a student feedback:

- Harsh feedback may be counterproductive. Deliver feedback carefully and respectfully. If given too frequently and without regard to feeling, the student may revert to defense mode – possibly losing confidence, self-esteem, and motivation.
- Feedback isn’t always negative. Don’t persistently focus on what isn’t working or isn’t being done right. Attending to what is going well can support a student’s growth and steer their development in the right direction.
- Feedback isn’t always positive. On the other hand, don’t always focus on strengths. If you only address the positives, the student will return to what they were doing, believing they have nothing to improve. Nevertheless, they will be delighted as they appear to be doing almost everything right. The balance between the points above is essential.
- Providing a fix may not be the answer. Ask facilitative questions that encourage reflection. Such open support can lead the student to understand what they did well, or poorly.
- Avoid wrapping negative feedback in praise. The feedback sandwich (there are more colloquial names for it), while popular, may not always be appropriate. The standard compliment/critique/compliment can give a false view of how someone is performing. Two positives outweigh one negative and, therefore, might suggest successful performance.
- Constructive criticism. Identifying the problem, then coming up with a plan to fix it is a powerful development tool. Help the student find ways to avoid making the same mistake while learning a new skill.
- Be honest and sincere. Students are often aware of their underperformance, so the feedback should not be a surprise. Make it clear you are keen to help them improve, rather than find fault.

- Be direct and clear. At the end of the feedback, don't let the student walk out of the room thinking 'what just happened?' State the feedback clearly and directly, without being rude or uncaring.
- Be specific. Don't overgeneralize or drift into other issues. Focus on the point(s) of feedback.
- Don't become personal. Do not confuse the person with their actions. Being personal may lead the student to shut down. They will be less likely to act on, or learn from, the points shared.
- Be consistent. Depending on the feedback frequency, the student shouldn't be surprised by what you have to say. Regular interaction can help avoid lengthy, negative, and unexpected feedback.
- Keep feedback fresh. Avoid a long gap between the lesson and providing feedback. The discussion should be current so that no one is trying to remember what happened.
- Always provide feedback in private, rather than in a public area.
- Always make a note of the feedback given so that any trends can be identified early.

Monitor and Review Progress

In much the same way as assessing trainee performance (above), the instructor should conduct a longer-term review of the student's progress to check for any undesirable trends. These should be communicated to the student as soon as possible.

Evaluate Training Sessions

It is important to find out if the training has been successful as soon as possible afterwards, or even during the training. Ask questions to find out if the lesson objectives and aims have been met.

Report Outcome

Make it clear to the student whether or not they have met the aims and objectives of the lesson using the same techniques as for feedback.

Appendix 7: CAA Forms & Documents (Click to visit)

Example forms are shown on the following pages, with guidance notes. Visit links for latest versions

SRG 5018: Course Completion Certificate for an Instructor Course
SRG 2159: On-line Form for Application, the issue, renewal, revalidation or variation of an instructor certificate.
SRG 1169: Examiner's Record - FI(R)/FI/CRI/IRI/FIC Authorisation Test/Check

Other Useful Documents

CAA Standards Document 10: Assessment of Competence for Instructor Certification
CAP 804: Flight Crew Licensing - For Guidance Only

Full List of CAA Forms (Click to visit)

SRG 5018: Course Completion Certificate for an Instructor Course

CAA5018 Instructor Training Course Completion Certificate in Accordance with Part-FCL

This form is intended for use in the provision of evidence in support of an application made to the CAA using the CAA's online application service. Once completed the form should be scanned or photographed and uploaded by the applicant as part of an online application to the CAA.

FALSE REPRESENTATION STATEMENT
It is an offence under the UK Air Navigation Order to make, with intent to deceive, any false representation for the purpose of procuring the grant, issue, renewal or variation of any certificate, licence, approval, permission, or other document. This offence is punishable on summary conviction by a fine and on conviction on indictment with an unlimited fine or imprisonment or both.

GUIDANCE NOTES

GUIDANCE NOTE 1: Authorised signatories

An authorised signatory acts as a representative of the Head of Training, authorised by the Head of Training or through approved procedures to confirm that the stated training has been conducted by the Approved Training Organisation (ATO). The ATO must maintain a record of those so authorized.

GUIDANCE NOTE 2: Which sections of the course completion to complete

You are only required to complete and print the sections relevant to your application.

Application applied for	Sections to be fully completed
FI initial issue	1, 2, 3, 5
FI/CRI/IRI variation	FI - 1, 6(i) or 6(ii) / CRI - 1, 6(vi) / IRI - 1, 6 (vii)
FI/CRI/IRI renewal or revalidation	1, 5(v), 5(vi)
CRI/IRI/FTI initial issue	1, 2, 5(ii), 5(ii), 5(iii), 5(iv)
MCCI initial issue or renewal	1, 4, 7
MCCI revalidation	1, 7
MCCI variation	1, 6(v), 7
FTI revalidation	1, 5(v)
FTI renewal	1, 5(v)
Mountain rating instructor initial issue	1, 2, 3, 5
TRI / SFI / STI initial issue	1, 2, 5
TRI / SFI renewal	1, 2, 5
TRI / SFI revalidation	1, 5
TRI / SFI variation	1, 2, 6
STI renewal	1, 5

1. APPLICANT DETAILS — **To be completed by the Training Provider**

CAA Personal Reference number (if known): ..... Date of Birth: .....

Title: ..... Forename(s): ..... Surname: .....

This application is for (please select all that apply): Initial issue ☐ Renewal ☐ Revalidation ☐ Variation ☐

2. PRE-REQUISITES — **To be completed by the Training Provider**

I certify that (name) ..... has met the pre-requisites for (certificate(s)) .....

I further certify that I have examined the Pilot's logbook and confirm they have met the pre-requisite hours requirements: Yes ☐ No ☐ N/A ☐

The following hours have been flown and verified in the pilot's logbook (please provide a summary of total hours as per the requirements in the regulation):

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date: .....

3. Flight or Mountain Rating Instructor (FI/MI) Pre-Entry Flight Test — **To be completed by the Instructor**

I confirm the pilot has satisfactorily completed a pre-entry flight test on (date): .....

I recommended the pilot for the specified course (select one): Flight Instructor (FI) ☐ Mountain Rating Instructor (MI) ☐

Name of FI/MI who conducted the flight test: .....

Instructor reference number: ..... Competent authority issuing certificate: .....

Signature of Instructor: ..... Date.....

4. MCCI Course Instructor (if applicable) — **To be completed by the Training Provider**

I can confirm that I have reviewed the pre-entry requirements alongside the applicant's experience and can confirm that the applicant meets Part-FCL.915.MCCI pre-entry requirements and FCL.930.MCCI a1) + a2) and/or FCL.940.MCCI (where appropriate) and therefore propose that the applicant proceed to formal observation by CAA or a nominated deputy.

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable) : .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date.....

5. TRAINING COURSE DETAILS — **To be completed by the Training Provider**

5)i) Theoretical knowledge — **To be completed by the Training Provider**

..... hours of theoretical knowledge (TK) instruction

The applicant has satisfactorily completed: *(select one)*: Full TK training ☐ Reduced TK training ☐ Not applicable ☐

The applicant has completed reduced course of TK training on the basis of: (if applicable)

5)ii) Teaching and learning — **To be completed by the Training Provider**

..... hours of teaching and learning completed

The applicant has satisfactorily completed: *(select one)* Full teaching and learning ☐ Reduced teaching and learning ☐ Not applicable (exempt) ☐

The applicant has completed a reduced course of teaching and learning in accordance with FCL.915(c)(1) on the basis of: (if applicable)

5)iii) Technical training (IRI, CRI initial issue) — **To be completed by the Training Provider**

The applicant has satisfactorily completed ..... hours of technical theoretical training

5)iv) Flight training — **To be completed by the Training Provider**

I confirm the pilot has satisfactorily completed an approved course of training in accordance with Part-FCL for the following:

i) FI(A) ☐ FI(H) ☐ FI(AS) ☐ FCL.900C FI(A) ☐ FCL.900C FI(H) ☐

ii) Class Rating Instructor CRI SE ☐ ME ☐

iii) Instrument Rating Instructor IRI(A) ☐ IRI(H) ☐ IRI (AS) ☐

iv) Flight Test Instructor ☐

v) Mountain Rating Instructor (FCL.930.MI(a)) ☐

vi) Type Rating Instructor TRI(A) (Please specify type): .....

vii) Type Rating Instructor TRI(H) (Please specify type): .....

viii) Type Rating Instructor TRI(PL) (Please specify type): .....

ix) Type Rating Instructor issued in accordance with FCL.725(e) (Please specify type) .....

x) Synthetic Flight Instructor SFI (Please specify type): .....

xi) Synthetic Flight Instructor SFI (SPA) ☐ (MPA) ☐ (H) ☐ (PL) ☐

xii) Synthetic Training Instructor STI A ☐ H ☐

Course start date: ..... Course end date: .....

The applicant has satisfactorily completed: (select one) Full flight training ☐ Reduced flight training ☐ Not applicable ☐

The applicant has completed a reduced course of flight training on the basis of: (if applicable)

The course consisted of ..... hours of flight instruction of which ..... hours instrument ground time in a FTD 2/3 or FNPT I or FNPT II/III or FFS.

FSTD identification number of simulator used (which must be issued in accordance with UK Regulation No. 1778/2011) .....

Competent Authority issuing qualification certificate for the simulator: .....

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable) : .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date.....

5)v) Instructor refresher training course — **To be completed by the Training Provider**

I confirm the pilot has satisfactorily completed the instructor refresher training course on ..... (date).

For the revalidation ☐ or renewal ☐ of an instructor Certificate in accordance with Part-FCL

Training Provider Details

Name of Approved Training Organisation (ATO): (if applicable) ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature (Head of Training): ..... Date: .....

5)vi) Instructor revalidation/renewal information — **To be completed by the Examiner**

I can confirm that the pilot has met the requirements of Part-FCL for the revalidation/renewal of the following Instructor:

FI(A) ☐ FI(H) ☐ FI(As) ☐ CRI ☐ IRI ☐ SFI ☐ STI ☐ TRI ☐ MCCI ☐ MI ☐

The Certificate of Revalidation has been signed and the rating/certificate is valid until (date) .....

Examiner's Name: ..... Examiner's Number: .....

Competent Authority issuing Examiner's Certificate: .....

Signature (Examiner): ..... Date: .....

6. Training Course/Information Details — **To be completed by the Training Provider**

6)i) Flight instructor variation (course)

I certify that the pilot has satisfactorily met the variation hours requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905.FI(h) IR ☐ FCL.905.FI(h) IR(R) ☐ FCL.905.FI(i) SPA ME ☐

Please note section 5 iv) must be completed with the relevant course information

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)ii) Flight instructor variation (other) — **To be completed by the Instructor**

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905.FI(c) Flying multi-pilot operations on a single pilot aircraft ☐ FCL.905.FI(e) CPL ☐ FCL.905.FI(j) FI, IRI, CRI, STI or MI ☐

Signature of Instructor: ..... Date .....

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905(k)(1) MPL ☐

I certify that the pilot has satisfactorily completed at least 500 hours of flight time as a pilot in aeroplanes, including at least 200 hours of flight instruction

Signature of Instructor: ..... Date .....

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905(k)(2) MPL ☐

I certify the pilot holds a multi-engine aeroplane IR and the privilege to instruct for an IR ☐ And

I confirm the pilot has satisfactorily completed at least 1500 hours of flight time in multi-crew operations ☐ or

Is already an FI qualified to instruct on ATP(A) or CPL(A)/IR integrated courses and has completed a structured course consisting of the following training ☐ :

MCC qualification

Observation of five sessions of flight instruction in Phase 3 of an MPL course

Observation of five session of flight instruction in Phase 4 of an MPL course

Observation of five operator recurrent line-oriented flight training sessions

The content of the MCCI course

Signature of Instructor: ..... Date .....

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

FCL.905.FI(f) Night ☐ FCL.905.FI(g) Banner Towing ☐ FCL.905.FI(g) Glider Towing ☐ FCL.905.FI(g) Aerobatic ☐

Date of demonstration flight: .....

Name of Instructor: ..... Instructor Reference Number: .....

Competent Authority issuing Instructor's Certificate: .....

Signature of Instructor ..... Date .....

6)iii) TRI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of TRI in accordance with Part-FCL for the following:

FCL.905.TRI(2) ☐ FCL.905.TRI(3) (SPH PA) SP to MP ☐

FCL.910.TRI(b)/(c) (please specify type): .....

FCL.910.TRI(a) FSTD ☐ FCL.910.TRI(a) Line Flying (LIFUS) ☐ FCL.910.TR (b) Aircraft ☐

FCL.910(c)(2) TRI SPH to MPH ☐ FCL.910.TRI(a) Aircraft Takeoffs and Landings only ☐

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)iv) SFI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of SFI in accordance with Part-FCL for the following:

FCL.905.SFI(b) (SPHPA) SP to MP ☐

FCL.910.SFI (please specify type): .....

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)v) MCCI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of MCCI in accordance with Part-FCL for the following:

FCL.910.MCCI (please specify type): .....

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)vi) CRI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of CRI in accordance with Part-FCL for the following:

FCL.905.CRI (Please specify class or type): .....

FCL.905.CRI(a) Banner Towing ☐ FCL.905.CRI(a) Glider Towing ☐ FCL.905.CRI(a) Aerobatic ☐

FCL.905.CRI(ba) Flying multi-pilot operations on a single pilot (please specify class or type): .....

Date of demonstration/assessment flight: .....

Name of Instructor/Examiner ..... Instructor/Examiner reference number .....

Signature of Instructor/Examiner ..... Date .....

6)vii) IRI variation		To be completed by the Training Provider
I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of IRI in accordance with Part-FCL for the following:		
FCL.905.IRI(b) (upgrade to MPL) ☐	FCL.915.IRI(a) (adding ME privileges in aeroplanes) ☐ **Note: Must also complete section 5(iv)**	FCL.915.IRI(b) (adding ME privileges in helicopters) ☐ **Note: Must also complete section 5(iv)**
Training Provider Details:		
Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable):		
Competent Authority issuing approval (if applicable):		
Name of Head of Training (or authorised signatory):		
Signature of Head of Training or authorised signatory: ..... Date.....		

6)viii) Mountain Rating Instructor variation	To be completed by the Training Provider
I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges in accordance with Part-FCL for the following:	
FCL.930.MI(a) Mountain Rating Instructor (wheels) ☐	
FCL.930.MI(a) Mountain Rating Instructor (skis) ☐	
FCL.930.MI(a) Mountain Rating Instructor (wheels and skis) ☐	
Training Provider Details:	
Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable):	
Competent Authority issuing approval (if applicable) :	
Name of Head of Training (or authorised signatory):	
Signature of Head of Training or authorised signatory: ..... Date.....	

7) Observation Report Form for Multi-Crew Co-Operation Instructor (A/H/PL)		To be completed by the Examiner
FSTD Qualification Number: ..... Aircraft Represented:		
Date: ..... Start time: ..... Finish time:..... Duration:		
Assessment		**Remarks**
a)	Prepare Resources ☐	
b)	Create a climate conducive to learning ☐	
c)	Present knowledge ☐	
d)	Integrate threat and Error management (TEM) and crew resource management ☐	
e)	Manage time to achieve training objectives ☐	
f)	Facilitate learning ☐	
g)	Assess trainee performance ☐	
h)	Monitor and review progress ☐	
i)	Evaluate training sessions ☐	
j)	Report outcome ☐	
I confirm that the Applicant detailed in Section 1 above has conducted at least 3 hours of flight / MCC instruction under my supervision and to my satisfaction, in accordance with Part-FCL.920, Part-FCL.930.MCCI and / or Part-FCL.940.MCCI and should therefore be issued with the following authorisation.		
Initial Authorisation ☐ Revalidation/Renewal ☐ Variation ☐		
Multi-Crew Co-Operation Instructor (A) ☐		
Multi-Crew Co-Operation Instructor (H) ☐		
Multi-Crew Co-Operation Instructor (PL) ☐		
Examiner Details		
Name of Examiner: ..... Examiner reference number:		
Competent Authority issuing Examiner's Certificate:		
Signature of Examiner: ..... Date.....		

SRG 1169: Examiner's Record - FI(R)/FI/CRI/IRI/FIC Authorisation Test/Check

This form is used by the examiner for recording of an AOC for an instructor. It is a useful guide to the instructor as it shows what will be tested during the AoC.

Sections 1-2: Self-explanatory.

Section 3: Filled out by the ATO.

Sections 4 & 5: Self-explanatory.

Examiner's Record - FI(R)/FI/CRI/IRI/FIC Authorisation Test/Check Schedules - Aeroplane

Please complete this form online (preferred method) then print, sign and submit as instructed. Alternatively, print, then complete in BLOCK CAPITALS using black or dark blue ink.

Civil Aviation Authority

Unique No. (to be completed by CAA)

Please read attached Guidance Notes before completing this form.

FALSE REPRESENTATION STATEMENT
It is an offence under Article 256 of the Air Navigation Order 2016 to make, with intent to deceive, any false representation for the purpose of procuring the grant, issue, renewal or variation of any certificate, licence, approval, permission or other document. This offence is punishable on summary conviction by a fine up to £5000, and on conviction on indictment with an unlimited fine or up to two years imprisonment or both.

1. Applicant Details — **To be completed by the Applicant**

Surname ..... Forename(s) .....

CAA reference number: ☐☐☐☐☐☐☐

2. Test/Check Details — **To be completed by the Applicant**

Type of Test: ..... Location: ..... Date: .....

A/C or STD reg & type: ..... Off blocks: ..... On blocks: .....

A/C or STD reg & type: ..... Off blocks: ..... On blocks: .....

Type (including variants): .....

FSTD Identification Number of simulator used (which must be approved in accordance with Commission Regulation (EU) 1178/2011 as amended): .....

Competent Authority issuing Qualification Certificate for the simulator: .....

Date flying training complete: .....

SECTION 1: Theoretical Knowledge	Pass	Fail	Observations/Reasons for Failure
Long Briefing Title			
a. Air law			
b. Aircraft general knowledge			
c. Flight performance and planning			
d. Human performance and limitations			
e. Meteorology			
f. Navigation			
g. Operational procedures			
h. Principles of flight			
i. Training administration			

SECTION 2: Pre Flight Briefing	Pass	Fail	Observations/Reasons for Failure
a. Visual presentation and content			
b. Technical accuracy			
c. Clarity of explanation			
d. Clarity of speech			
e. Instructional technique including TEM/CRM			
f. Use of model and aids			
g. Student participation			

4 copies required. Copies of the report shall be submitted to (1) The Applicant (2) The Applicant's Competent Authority (3) The Examiner (4) The Examiner's Competent Authority (if different)

SECTION 3: Flight	Pass	Fail	Observations/Reasons for Failure
a. Arrangement of demonstration			
b. Synchronising of speech/demo			
c. Assessment and correction of student faults			
d. Aeroplane handling			
e. Instructional technique			
f. General airmanship/safety			
g. Positioning and use of airspace			
h. Risk assessment including TEM/CRM			
Main Exercise Title and No.			
i			
j			

SECTION 4: Mandatory Exercises and other exercises at Examiner's discretion	Pass	Fail	Observations/Reasons for Failure
a. Spin avoidance (SE aeroplane)			
b. Safety module			
c. Take-off and climb, engine failure after take-off (SE aeroplane)			
d. Approach, landing, missed approach			
e. Forced landing without power (SE aeroplane)			
Additional exercises Title and No.			
f			
g			

SECTION 5: Multi engine (Aeroplane) - may be conducted in FNPT 2 or Simulator	Pass	Fail	Observations/Reasons for Failure
a. Engine failure (simulated) after take-off or on go-around			
b. Asymmetric approach and go-around			
c. Asymmetric approach and landing			

SECTION 6: Instrument Exercises - give exercise Title and No. in space provided	Pass	Fail	Observations/Reasons for Failure
a. Basic instrument flight			
b. Applied instrument flight			
c. Instrument approach			
d. Limited panel and unusual attitudes			

SECTION 7: Post Flight Debriefing	Pass	Fail	Observations/Reasons for Failure
a. Visual presentation and content			
b. Technical accuracy			
c. Clarity of explanation			
d. Clarity of Speech			
e. Instructional technique and facilitation			
f. Use of model and aids			
g. Student participation			

3. APPROVED TRAINING ORGANISATION

Approved Training Organisation (ATO): ..... ATO Approval No: .....

Competent Authority issuing approval: .....

Head of Training (block capitals): .....

Signature (Head of Training): ..... Date: .....

PLEASE REFER TO FALSE REPRESENTATION STATEMENT ON PAGE 1

4. RESULT

Tick appropriate box

Pass ☐ Fail ☐ Partial ☐

Retest Requirement: ..... Rating Revalidated Until (if applicable): .....

I have received information from the applicant regarding their experience and instruction and certify that this complies with the requirements of EASA Part-FCL.

I have assessed the ICAO English Language Proficiency of the Applicant at Level 6: Yes ☐ No* ☐ Not Assessed ☐

(*I have advised the Applicant to complete Form SRG 1199 and be assessed by an appropriate organisation, see CAP 804, Section 4, Part M.) Assessment is not required if Applicant holds Level 6.

Examiner's Name (block capitals): ..... Examiners Number: .....

Authorising Competent Authority: ..... Date of Examiners Briefing (if applicable): .....

Signature (Examiner): ..... Date: .....

PLEASE REFER TO FALSE REPRESENTATION STATEMENT ON PAGE 1

5. TEST, CHECKS AND ASSESSMENTS OF COMPETENCE – NOTICE OF FAILURE

To be completed by examiner

You are hereby notified that you have failed the ..... for the following reasons:

.....

.....

In accordance with Part FCL an Approved Training Organisation shall determine and deliver the required refresher/ remedial training prior to the applicant reattempting the skill test, proficiency check or assessment of competence. The applicant must provide evidence of this training to the examiner who conducts the next test, check or assessment of competence.

Minimum training recommended by the Examiner:

.....

I understand that I have failed the items notified above.

I understand that I may not exercise the privileges of my..... following the failure of this test, check or assessment of competence until the successful completion of training and a further test, check or assessment of competence.

Received (Applicant) Signature: ..... Date: .....

PLEASE REFER TO FALSE REPRESENTATION STATEMENT ON PAGE 1

Civil Aviation Authority Regulation 6

Regulation 6(5) of the Civil Aviation Authority Regulations 1991 as follows: Any person who has failed any test or examination which he is required to pass before he is granted or may exercise the privileges of a personnel licence may within 14 days of being notified of his failure request that the Authority determine whether the test or examination was properly conducted. In order to succeed you will have to satisfy the Authority that the examination or test was not properly conducted. Mere dissatisfaction with the result is not sufficient reason for appeal.

SRG 2159 Application for the issue, renewal, revalidation or variation of an instructor certificate (on-line form)

Below is a screen-shot of what can be applied for using this on-line form.

APPLICATION - VARIATION (FI)

Do not use the browser back button, as it will restart the form and lose of any unsaved form data. Use the forms "Continue" and "Ba

Fields marke

Application

Please select the privileges you are applying for: *

Aeroplanes

- ☐ FCL.905.FI (c) Flying multi-pilot operations on a single pilot
- ☐ FCL.905.FI(g) Aerobatic
- ☐ FCL.905.FI(g) Banner Towing
- ☐ FCL.905.FI(g) Glider Towing
- ☐ FCL.905.FI(h) IR(R)
- ☐ FCL.905(k)(1) MPL
- ☐ FCL.905(k)(2) MPL
- ☐ FCL.945 Obligations for Instructors
- ☐ Removal of LAPL only restriction

Aeroplanes and/or helicopters

- ☐ FCL.905.FI(e) CPL
- ☐ FCL.905.FI(f) Night
- ☐ FCL.905.FI(h) IR
- ☐ FCL.905.FI(i) SPA ME
- ☐ FCL.905.FI(j) FI, IRI, CRI, STI or MI
- ☐ FCL.910.FI Removal of Supervisory Restriction

Appendix 10: Typical Instructor Assessments of Competence

2: A Typical CRI (ME) AoC

Date of Test: **07 Aug 19**
Examiner **Zahural Islam**
Aircraft **Be-76 G-GPAT**

The subjects chosen for the test by the examiner were as follows:

Long Briefing: Asymmetric Blade Effect
Flight Exercise: Asymmetric 1

Mr Islam arrived on time and went straight into the long briefing on Asymmetric Blade Effect. This was done on a white board, with the help of some pre-printed diagrams. It lasted about 30 mins and a few questions followed.

Then we moved onto the pre-flight briefing for Asymmetric 1, which was given with little input from the examiner.

The flight consisted of the full engine shutdown followed by 'student' general handling. Then a restart. Mr Islam suggested I didn't shut the engine down over Aldermaston restricted area as this may cause concern below.

We then returned to the circuit. I was told to patter an EFATO, simulated asymmetric circuit and go around, followed by simulated asymmetric landing.

There were few debrief points or oral questions.

Typical CRI(ME) Theoretical Knowledge Questions

Air Law

What classes of airspace are there in the UK? Where would you find each type?
What airspace class is the Heathrow CTR and what must I do to enter. What does that class of airspace mean?
List the airworthiness documents for a typical light aircraft and add some detail.
What are the revalidation and renewal requirements for an SEP (land) rating?
What are the dimensions of an ATZ and MATZ. What rules surround their use?
If you have been unable to contact the tower/info due to a busy radio frequency, may you enter an ATZ anyway?
What does the * mean next to the symbol for a danger area?
Explain 'differences' and 'familiarisation' training in relation to SEP aircraft.
What are the rules concerning flight near congested areas and open air assemblies?
How long does a CRI certificate remain valid. How can it be revalidated or renewed?

Aircraft General Knowledge

Show with the use of a diagram how an ASI and VSI work.
State the properties of a gyroscope. Show how they are used in the principles of operation of the aircraft gyroscopic instruments.
Why does an AI gyro spin at around 20 000 rpm whereas a turn co-ordinator gyro spins at around 9000 rpm?
Explain how and why carburettor ice occurs.
Explain spark retard and impulse coupling during engine start.
In an aircraft with a low drag line and a high thrust line, how is the couple balanced?
What is the purpose of differential ailerons?

Flight Performance & Planning

What calculations should be made for take-off in a SEP aeroplane?
Show how to calculate the mass and balance for a typical SEP aeroplane.
Must a calculation be performed before every flight?
Without making any calculations, how would the take-off C of G position change if a heavy bag was placed in the rear?
What fuel requirements are required for a VFR flight?

Human Performance and Limitations

What causes a pilot to suffer from hypoxia? How can this be remedied?
What causes a pilot to suffer from hyperventilation? How can this be remedied?
Explain why a highly motivated student is more likely to succeed than a disinterested one.
What personal factors should a pilot consider before flight?
What is the difference between a threat and an error?

Meteorology
State the ISA.
Explain how a sea breeze occurs by day.
What happens to the surface wind following the passage of a cold front?
State the hazards of a thunderstorm to aviation.
Navigation
Describe the principles of operation of a VOR.
Explain the Standard Closing Angle method of track adjustment.
Principles of Flight
Why does an aircraft in S&L flight slow down when the nose is pitched up?
Draw a graph of lift vs angle of attack for a basic wing. Then for the addition of flaps. Then slats.
Why is there low pressure on the upper surface of an aerofoil?
Explain the forces on a propeller.
How can a wing designer reduce induced drag?
When does an aircraft suffer a sudden loss of induced drag?
What does it mean when the balance ball is in the middle?
What is the difference between thrust and power?
Does flight at Vy require flight at maximum excess power or maximum excess thrust?
Training Administration
State the pre-entry requirements for an MEP (land) course.
State the hours required for an MEP course. What is the solo/dual breakdown?
State the test profile for an MEP skill test or proficiency test.
State the training required for an MEP (land) course in terms of flight training and ground instruction. Is there a written test?

MEP Specific Questions
What calculations should be made for take-off in an MEP aeroplane?
What are the revalidation and renewal requirements for an MEP (land) rating?
Explain 'differences' training in relation to MEP aircraft.
Explain asymmetric blade effect in relation to MEP aircraft.
Does this aircraft have a critical engine? Explain.
Explain the meaning of 'asymmetric committal height' ACH in relation to MEP aircraft.
Why is it so important to maintain Vyse following an EFATO? What happens if the speed is reduced below Vyse?
What does it mean when the balance ball is in the middle? Should this always be the case in asymmetric flight?

Advice to Applicants for an CRI (ME) AoC

4. Have the necessary paperwork signed and ready: **SRG 5018** (Course completion certificate, see below) & **SRG 1169** (Examiner's Report).
5. **Note:** Both of these forms require a signature from the head of training of the ATO. Make sure hours are completed in Section 2.

CAA5018 Instructor Training Course Completion Certificate in Accordance with Part-FCL

This form is intended for use in the provision of evidence in support of an application made to the CAA using the CAA's online application service. Once completed the form should be scanned or photographed and uploaded by the applicant as part of an online application to the CAA.

FALSE REPRESENTATION STATEMENT
It is an offence under the UK Air Navigation Order to make, with intent to deceive, any false representation for the purpose of procuring the grant, issue, renewal or variation of any certificate, licence, approval, permission, or other document. This offence is punishable on summary conviction by a fine and on conviction on indictment with an unlimited fine or imprisonment or both.

GUIDANCE NOTES

GUIDANCE NOTE 1: Authorised signatories
An authorised signatory acts as a representative of the Head of Training, authorised by the Head of Training or through approved procedures to confirm that the stated training has been conducted by the Approved Training Organisation (ATO). The ATO must maintain a record of those so authorized.

GUIDANCE NOTE 2: Which sections of the course completion to complete
You are only required to complete and print the sections relevant to your application.

Application applied for	Sections to be fully completed
FI initial issue	1, 2, 3, 5
FI/CRI/IRI variation	FI - 1, 6(i) or 6(ii) / CRI - 1, 6(vi) / IRI - 1, 6 (vii)
FI/CRI/IRI renewal or revalidation	1, 5(v), 5(vi)
CRI/IRI/FTI initial issue	1, 2, 5(i), 5(ii), 5(iii), 5(iv)
MCCI initial issue or renewal	1, 4, 7
MCCI revalidation	1, 7
MCCI variation	1, 6(v), 7
FTI revalidation	1, 5(v)
FTI renewal	1, 5(v)
Mountain rating instructor initial issue	1, 2, 3, 5
TRI / SFI / STI initial issue	1, 2, 5
TRI / SFI renewal	1, 2, 5
TRI / SFI revalidation	1, 5
TRI / SFI variation	1, 2, 6
STI renewal	1, 5

1. APPLICANT DETAILS — To be completed by the Training Provider

CAA Personal Reference number (if known): 123456A Date of Birth: 01/05/1997
Title: Ms Forename(s): Ellie Surname: Vaytor
This application is for (please select all that apply): Initial issue [X] Renewal [ ] Revalidation [ ] Variation [ ]

2. PRE-REQUISITES — To be completed by the Training Provider

I certify that (name) Ellie Vaytor has met the pre-requisites for (certificate(s)) CRI (ME)
I further certify that I have examined the Pilot's logbook and confirm they have met the pre-requisite hours requirements: Yes [X] No [ ] N/A [ ]

The following hours have been flown and verified in the pilot's logbook (please provide a summary of total hours as per the requirements in the regulation):

300 hours total time on aeroplanes.
30 hours PIC on MEP (land).

Training Provider Details:
Name of Approved Training Organisation (ATO) (if applicable): M Pennage Flying School ATO number (if applicable): 6666
Competent Authority issuing approval (if applicable) : UK CAA
Name of Head of Training (or authorised signatory): A Vulture
Signature of Head of Training or authorised signatory: Date: 24/04/2023

3. Flight or Mountain Rating Instructor (FI/MI) Pre-Entry Flight Test — To be completed by the Instructor

I confirm the pilot has satisfactorily completed a pre-entry flight test on (date):
I recommended the pilot for the specified course (select one): Flight Instructor (FI) [ ] Mountain Rating Instructor (MI) [ ]
Name of FI/MI who conducted the flight test:
Instructor reference number: Competent authority issuing certificate:
Signature of Instructor: Date

Applicant's CAA Personal Reference number: 123456A

4. MCCI Course Instructor (if applicable) — To be completed by the Training Provider

I can confirm that I have reviewed the pre-entry requirements alongside the applicant's experience and can confirm that the applicant meets Part-FCL.915.MCCI pre-entry requirements and FCL.930.MCCI app. a2) and/or FCL.940.MCCI (where appropriate) and therefore propose that the applicant proceed to formal observation by CAA or a nominated deputy.

Training Provider Details:
Name of Approved Training Organisation (ATO) (if applicable): ATO number (if applicable) :
Competent Authority issuing approval (if applicable) :
Name of Head of Training (or authorised signatory):
Signature of Head of Training or authorised signatory: Date

5. TRAINING COURSE DETAILS — To be completed by the Training Provider

5)i) Theoretical knowledge — To be completed by the Training Provider

10 hours of theoretical knowledge (TK) instruction
The applicant has satisfactorily completed: *(select one)*: Full TK training [X] Reduced TK training [ ] Not applicable [ ]
The applicant has completed reduced course of TK training on the basis of: (if applicable)

5)ii) Teaching and learning — To be completed by the Training Provider

25 hours of teaching and learning completed
The applicant has satisfactorily completed: *(select one)* Full teaching and learning [X] Reduced teaching and learning [ ] Not applicable (exempt) [ ]
The applicant has completed a reduced course of teaching and learning in accordance with FCL.915(c)(1) on the basis of: (if applicable)

5)iii) Technical training (IRI, CRI initial issue) — To be completed by the Training Provider

The applicant has satisfactorily completed 10 hours of technical theoretical training

5)iv) Flight training — To be completed by the Training Provider

I confirm the pilot has satisfactorily completed an approved course of training in accordance with Part-FCL for the following:

i) FI(A) [ ] FI(H) [ ] FI(AS) [ ] FCL.900C FI(A) [ ] FCL.900C FI(H) [ ]
ii) Class Rating Instructor CRI SE [ ] ME [X]
iii) Instrument Rating Instructor IRI(A) [ ] IRI(H) [ ] IRI (AS) [ ]
iv) Flight Test Instructor [ ]
v) Mountain Rating Instructor (FCL.930.MI(a)) [ ]
vi) Type Rating Instructor TRI(A) (Please specify type):
vii) Type Rating Instructor TRI(H) (Please specify type):
viii) Type Rating Instructor TRI(PL) (Please specify type):
ix) Type Rating Instructor issued in accordance with FCL.725(e) (Please specify type)
x) Synthetic Flight Instructor SFI (Please specify type):
xi) Synthetic Flight Instructor SFI (SPA) [ ] (MPA) [ ] (H) [ ] (PL) [ ]
xii) Synthetic Training Instructor STI A [ ] H [ ]

Course start date: 12 Apr 2023 Course end date: 24 Apr 2023

The applicant has satisfactorily completed: (select one) Full flight training [ ] Reduced flight training [X] Not applicable [ ]
The applicant has completed a reduced course of flight training on the basis of: (if applicable)

Holder of unrestricted FI(A)

The course consisted of 6 hours of flight instruction of which 0 hours instrument ground time in a FTD 2/3 or FNPT I or FNPT II/III or FFS.
FSTD identification number of simulator used (which must be issued in accordance with UK Regulation No. 1778/2011)
Competent Authority issuing qualification certificate for the simulator:

Training Provider Details:
Name of Approved Training Organisation (ATO) (if applicable): M Pennage Flying School ATO number (if applicable) : 6666
Competent Authority issuing approval (if applicable) : UK CAA
Name of Head of Training (or authorised signatory): A Vulture
Signature of Head of Training or authorised signatory: Date 24/04/2023

Applicant's CAA Personal Reference number: 123456A

5)v) Instructor refresher training course — **To be completed by the Training Provider**

I confirm the pilot has satisfactorily completed the instructor refresher training course on ..... (date).

For the revalidation ☐ or renewal ☐ of an instructor Certificate in accordance with Part-FCL

Training Provider Details

Name of Approved Training Organisation (ATO): (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable): .....

Name of Head of Training (or authorised signatory): .....

Signature (Head of Training): ..... Date: .....

5)vi) Instructor revalidation/renewal information — **To be completed by the Examiner**

I can confirm that the pilot has met the requirements of Part-FCL for the revalidation/renewal of the following Instructor:

FI(A) ☐ FI(H) ☐ FI(As) ☐ CRI ☐ IRI ☐ SFI ☐ STI ☐ TRI ☐ MCCI ☐ MI ☐

The Certificate of Revalidation has been signed and the rating/certificate is valid until (date): .....

Examiner's Name: ..... Examiner's Number: .....

Competent Authority issuing Examiner's Certificate: .....

Signature (Examiner): ..... Date: .....

6) Training Course/Information Details — **To be completed by the Training Provider**

6)i) Flight instructor variation (course)

I certify that the pilot has satisfactorily met the variation hours requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905.FI(h) IR ☐ FCL.905.FI(h) IR(R) ☐ FCL.905.FI(i) SPA ME ☐

Please note section 5 iv) must be completed with the relevant course information

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)ii) Flight instructor variation (other) — **To be completed by the Instructor**

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905.FI(c) Flying multi-pilot operations on a single pilot aircraft ☐ FCL.905.FI(e) CPL ☐ FCL.905.FI(j) FI, IRI, CRI, STI or TRI ☐

Signature of Instructor: ..... Date .....

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905(k)(1) MPL ☐

I certify that the pilot has satisfactorily completed at least 500 hours of flight time as a pilot in aeroplanes, including at least 200 hours of flight instruction

Signature of Instructor: ..... Date .....

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

Extend privileges to flight instructor certificate to include:

FCL.905(k)(2) MPL ☐

I certify the pilot holds a multi-engine aeroplane IR and the privilege to instruct for an IR ☐ And

I confirm the pilot has satisfactorily completed at least 1500 hours of flight time in multi-crew operations ☐ or

Is already an FI qualified to instruct on ATPL(A) or CPL(A)/IR integrated courses and has completed a structured course consisting of the following training ☐ :

MCC qualification

Observation of five sessions of flight instruction in Phase 3 of an MPL course

Observation of five sessions of flight instruction in Phase 4 of an MPL course

Observation of five operator recurrent line-oriented flight training sessions

The content of the MCCI course

Signature of Instructor: ..... Date .....

Applicant's CAA Personal Reference number: 123456A

I certify that the pilot has satisfactorily met the variation requirement(s) in accordance with Part-FCL for the following:

FCL.905.FI(f) Night ☐ FCL.905.FI(g) Banner Towing ☐ FCL.905.FI(g) Glider Towing ☐ FCL.905.FI(g) Aerobatic ☐

Date of demonstration flight: .....

Name of Instructor: ..... Instructor Reference Number: .....

Competent Authority issuing Instructor's Certificate: .....

Signature of Instructor: ..... Date .....

6)iii) TRI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of TRI in accordance with Part-FCL for the following:

FCL.905.TRI(2) ☐ FCL.905.TRI(3) (SPHPA) SP to MP ☐

FCL.910.TRI(b)/(c) (please specify type): .....

FCL.910.TRI(a) FSTD ☐ FCL.910.TRI(a) Line Flying (LIFUS) ☐ FCL.910.TRI(b) Aircraft ☐

FCL.910(c)(2) TRI SPH to MPH ☐ FCL.910.TRI(a) Aircraft Takeoffs and Landings only ☐

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)iv) SFI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of SFI in accordance with Part-FCL for the following:

FCL.905.SFI(b) (SPHPA) SP to MP ☐

FCL.910.SFI (please specify type): .....

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)v) MCCI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of MCCI in accordance with Part-FCL for the following:

FCL.910.MCCI (please specify type): .....

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable) : .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

6)vi) CRI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of CRI in accordance with Part-FCL for the following:

FCL.905.CRI (Please specify class or type): .....

FCL.905.CRI(a) Banner Towing ☐ FCL.905.CRI(a) Glider Towing ☐ FCL.905.CRI(a) Aerobatic ☐

FCL.905.CRI(ba) Flying multi-pilot operations on a single pilot (please specify class or type): .....

Date of demonstration/assessment flight: .....

Name of Instructor/Examiner ..... Instructor/Examiner reference number .....

Signature of Instructor/Examiner ..... Date .....

Applicant's CAA Personal Reference number: 123456A

b)(vi) IRI variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges of IRI in accordance with Part-FCL for the following:

FCL.905.IRI(b) (upgrade to MPL) ☐	FCL.915.IRI(a) (adding ME privileges in aeroplanes) ☐ **Note: Must also complete section 5(iv)**	FCL.915.IRI(b) (adding ME privileges in helicopters) ☐ **Note: Must also complete section 5(iv)**

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable): .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

b)(vii) Mountain Rating Instructor variation — **To be completed by the Training Provider**

I certify that the pilot has satisfactorily met the variation requirement(s) to extend privileges in accordance with Part-FCL for the following:

FCL.930.MI(a) Mountain Rating Instructor (wheels) ☐

FCL.930.MI(a) Mountain Rating Instructor (skis) ☐

FCL.930.MI(a) Mountain Rating Instructor (wheels and skis) ☐

Training Provider Details:

Name of Approved Training Organisation (ATO) (if applicable): ..... ATO number (if applicable): .....

Competent Authority issuing approval (if applicable): .....

Name of Head of Training (or authorised signatory): .....

Signature of Head of Training or authorised signatory: ..... Date .....

c) Observation Report Form for Multi-Crew Co-Operation Instructor (A/H/PL) — **To be completed by the Examiner**

FSTD Qualification Number: ..... Aircraft Represented: .....

Date: ..... Start time: ..... Finish time: ..... Duration: .....

	Assessment		Remarks
a)	Prepare Resources	☐	
b)	Create a climate conducive to learning	☐	
c)	Present knowledge	☐	
d)	Integrate threat and Error management (TEM) and crew resource management	☐	
e)	Manage time to achieve training objectives	☐	
f)	Facilitate learning	☐	
g)	Assess trainee performance	☐	
h)	Monitor and review progress	☐	
i)	Evaluate training sessions	☐	
j)	Report outcome	☐	

I confirm that the Applicant detailed in Section 1 above has conducted at least 3 hours of flight / MCC instruction under my supervision and to my satisfaction, in accordance with Part-FCL.920, Part-FCL.930.MCCI and/or Part-FCL.940.MCCI and should therefore be issued with the following authorisation.

Initial Authorisation ☐ Revalidation/Renewal ☐ Variation ☐

Multi-Crew Co-Operation Instructor (A) ☐

Multi-Crew Co-Operation Instructor (H) ☐

Multi-Crew Co-Operation Instructor (PL) ☐

Examiner Details

Name of Examiner: ..... Examiner reference number: .....

Competent Authority issuing Examiner's Certificate: .....

Signature of Examiner: ..... Date .....

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6. Make sure the aircraft is available and ready. Check weather minima.
3: Make sure your long briefing is ready and all visual aids are on hand.
4: Make sure you have a briefing room available for several hours.
5: Make sure your theoretical knowledge is good. Some examiners will go into great detail, other less so. See Standards Document 10.

GOOD LUCK!