SECTION 2 – ACCEPTABLE MEANS OF COMPLIANCE (AMC)/ INTERPRETATIVE AND EXPLANATORY MATERIAL (IEM)

1 General

1.1 This Section contains Acceptable Means of Compliance and Interpretative/Explanatory Material that has been agreed for inclusion in JCAR-FCL 4.

1.2 Where a particular JCAR paragraph does not have an Acceptable Means of Compliance or any Interpretative/Explanatory Material, it is considered that no supplementary material is required.

2 Presentation

2.1 The Acceptable Means of Compliance and Interpretative/Explanatory Material are presented in full page width on loose pages, each page being identified by the date of issue or the Change number under which it is amended or reissued.

2.2 A numbering system has been used in which the Acceptable Means of Compliance or Interpretative/Explanatory Material uses the same number as the JCAR paragraph to which it refers. The number is introduced by the letters AMC or IEM to distinguish the material from the JCAR itself.

2.3 The acronyms AMC and IEM also indicate the nature of the material and for this purpose the two types of material are defined as follows:

Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met. It should however be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) will be amended into the document following consultation under the NPA procedure.

Interpretative/Explanatory Material (IEM) helps to illustrate the meaning of a requirement.

2.4 Explanatory Notes not forming part of the AMC or IEM text appear in a smaller typeface.

AMC/IEM A

GENERAL REQUIREMENTS

IEM FCL 4.001
Abbreviations

A	Aeroplane
A/C	Aircraft
AMC	Acceptable Means of Compliance
AMC	Aeromedical Centre
AME	Authorised Medical Examiner
AMS	Aeromedical Section
ATC	Air Traffic Control
ATP	Airline Transport Pilot
ATPL	Airline Transport Pilot Licence
CFI	Chief Flying Instructor
CGI	Chief Ground Instructor
CP	Co-pilot
CPL	Commercial Pilot Licence
CRE	Class Rating Examiner
CRI	Class Rating Instructor
CQB	Central Question Bank
JCAR-FCL	Flight Crew Licensing
FE	Flight Examiner
F/E	Flight Engineer
F/EL	Flight Engineer Licence
FI	Flight Instructor
FIE	Flight Instructor Examiner
FNPT	Flight and Navigation Procedures Trainer
FS	Flight Simulator
FSTD	Flight Synthetic Training Device
FTO	Flying Training Organisation
H	Helicopter
HT	Head of Training
ICAO	International Civil Aviation Organisation
IEM	Interpretative and Explanatory Material
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IR	Instrument Rating
IRE	Instrument Rating Examiner
IRI	Instrument Rating Instructor
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
LOFT	Line Orientated Flight Training
MCC	Multi Crew Co-operation
ME	Multi-engine
MEL	Minimum Equipment List

MEP	Multi-engine Piston
MET	Multi-engine Turbo-prop
MPA	Multi-pilot Aeroplane
MPH	Multi-pilot Helicopter
nm	Nautical Miles
OML	Operational Multicrew Limitation
OSL	Operational Safety Pilot Limitation
OTD	Other Training Devices
PF	Pilot Flying
PIC	Pilot-In-Command
PICUS	Pilot-In-Command Under Supervision
PNF	Pilot Not Flying
PPL	Private Pilot Licence
R/T	Radiotelephony
SE	Single-engine
SEP	Single Engine Piston
SET	Single-engine Turbo-prop
SFE	Synthetic Flight Examiner
SFI	Synthetic Flight Instructor
SFI(E)	Synthetic Flight Instructor (Flight Engineer)
SPA	Single-pilot Aeroplane
SPH	Single-pilot Helicopter
SPIC	Student Pilot-In-Command
TMG	Touring Motor Glider
TR	Type Rating
TRE	Type Rating Examiner
TRE(E)	Type Rating Examiner (Flight Engineer)
TRI	Type Rating Instructor
TRI(E)	Type Rating Instructor (Flight Engineer)
TRTO	Type Rating Training Organisation
TTC	Technical Training Course
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

IEM FCL to JCAR-FCL 4.055

Training and Operations Manual for TRTOs
See Appendix 1 to JCAR-FCL 4.055

TRAINING MANUAL
Training Manuals for use at a TRTO conducting approved training courses include the following:

Part 1 – The Training Plan

The aim of the course (ATP, CPL, F/E as applicable) — A statement of what the student is expected to do as a result of the training, the level of performance, and the training constraints to be observed.

Pre-entry requirements	Minimum age, educational requirements (including language), medical requirements. Any individual State requirements.
Credits for previous experience	To be obtained from CARC before training begins.
Training Syllabi	The flying syllabus (multi-engine), the synthetic flight training syllabus and the theoretical knowledge training syllabus.
The time scale and scale, in each syllabus	Arrangements of the course and the integration of syllabi time.weeks, for
Training programme	The general arrangements of daily and weekly programmes for flying, ground and synthetic flight training. Bad weather constraints. Programme constraints in terms of maximum student training times, (flying, theoretical knowledge, synthetic) e.g. per day/week/month. Restrictions in respect of duty periods for students. Maximum flying hours in any day/night; maximum number of training flights in any day/night. Minimum rest period between duty periods.
Training records	Rules for security of records and documents. Attendance records. The form of training records to be kept. Persons responsible for checking records and students' log books. The nature and frequency of record checks. Standardisation of entries in training records. Rules concerning log book entries.
Safety training	Individual responsibilities. Essential exercises. Emergency drills (frequency). Dual checks (frequency at various stages).
Tests and examinations	Flying (a) Progress checks (b) Skill tests Theoretical Knowledge (a) Progress tests (b) Theoretical knowledge examinations

	Authorisation for test. Rules concerning refresher training before retest. Test reports and records. Procedures for examination paper preparation, type of question and assessment, standard required for 'Pass'. Procedure for question analysis and review and for raising replacement papers. Examination resit procedures.
Training effectiveness	Individual responsibilities. General assessment. Liaison between departments. Identification of unsatisfactory progress (individual students). Actions to correct unsatisfactory progress. Procedure for changing instructors. Maximum number of instructor changes per student. Internal feedback system for detecting training deficiencies. Procedure for suspending a student from training. Discipline. Reporting and documentation.
Standards and Level of Performance at various Stages	Individual responsibilities. Standardisation. Standardisation requirements and procedures.
Application of test criteria.	

Part 2 – Briefing and Air Exercises

Air Exercise	A detailed statement of the content specification of all the air exercises to be taught, arranged in the sequence to be flown with main and sub-titles. This should normally be the same as the air exercise specification for the flight instructor rating course.
Air exercise reference List	An abbreviated list of the above exercises giving only main and sub-titles for quick reference, and preferably in flip-card form to facilitate daily use by flight instructors.
Course structure - Phase of training	A statement of how the course will be divided into phases, indication of how the above air exercises will be divided between the phases and how they will be arranged to ensure that they are completed in the most suitable learning sequence and that essential (emergency) exercises are repeated at the correct frequency. Also, the syllabus hours for each phase and for groups of exercises within each phase shall be stated and when progress tests are to be conducted, etc.
Course structure – integration of syllabi	The manner in which theoretical knowledge, synthetic flight training and flying training will be integrated so that as the flying training exercises are carried out students will be able to apply the knowledge gained from the associated theoretical knowledge instruction and synthetic flight training.
Student progress	The requirement for student progress and include a brief but specific statement of what a student is expected to be able to do and the standard of proficiency he must achieve before progressing from one phase of air exercise training to the next. Include minimum experience requirements in terms of hours, satisfactory exercise completion, etc. as necessary before significant exercises, e.g. night flying.
Instructional methods	The TRTO requirements, particularly in respect of pre- and post-flying briefing, adherence to syllabi and training specifications, authorisation of solo flights, etc.

Progress tests	The instructions given to examining staff in respect of the conduct and documentation of all progress tests.
Glossary of terms	Definition of significant terms as necessary.
Appendices	Progress test report forms. Skill test report forms. TRTO certificates of experience, competence, etc. as required.

Part 3 – Synthetic Flight Training
Structure generally as for Part 2.

Part 4 – Theoretical knowledge instruction
Structure generally as for Part 2 but with a training specification and objectives for each subject. Individual lesson plans to include mention of the specific training aids available for use.

OPERATIONS MANUAL

Operations Manual for use at an TRTO conducting approved integrated or modular flying training courses include the following:

(a) General
- A list and description of all volumes in the Operations Manual
- Administration (function and management)
- Responsibilities (all management and administrative staff)
- Student discipline and disciplinary action
- Approval/authorisation of flights
- Preparation of flying programme (restriction of numbers of aeroplanes in poor weather)
- Command of aeroplane
- Responsibilities of pilot-in-command
- Carriage of passengers
- Aeroplane documentation
- Retention of documents
- Flight crew qualification records (licences and ratings)
- Revalidation (medical certificates and ratings)
- Flying duty period and flight time limitations (flying instructors)
- Flying duty period and flight time limitations (students)
- Rest periods (flying instructors)
- Rest periods (students)
- Pilots'/Flight Engineers' log books
- Flight planning (general)
- Safety (general) – equipment, radio listening watch, hazards, accidents and incidents (including reports), safety pilots etc.

(b) Technical
- Aeroplane descriptive notes
- Aeroplane handling (including checklists, limitations, aeroplane maintenance and technical logs, in accordance with relevant JCARs, etc.)
- Emergency procedures
- Radio and radio navigation aids
- Allowable deficiencies (based on MMEL, if available)

(c) Route
- Performance (legislation, take-off, route, landing etc.)
- Flight planning (fuel, oil, minimum safe altitude, navigation equipment etc.)
- Loading (loadsheets, mass, balance, limitations)
- Weather minima (flying instructors)
- Weather minima (students – at various stages of training)
- Training routes/areas

(d) Staff Training
- Appointments of persons responsible for standards/competence of flying staff

- Initial training
- Refresher training
- Standardisation training
- Proficiency checks
- Upgrading training
- TRTO staff standards evaluation

AMC/IEM F

TYPE RATINGS

IEM FCL 4.240(b)
F/EL/type rating/training/skill test and proficiency check form on multi-engine multi-crew aeroplanes
See JCAR-FCL 4.240

Applicant's last name:		First names:	
Type of licence:		Number:	
State:	Type rating as pilot-in-command/co-pilot*	Signature of applicant:	
Multi-engine aeroplane:		Proficiency check:	
Training record:		Type rating:	
Skill test:		F/EL:	

Satisfactory completion of Type rating - training according to requirements is certified below:

1	**Theoretical training for the issue of a type rating performed during period**				
From:	to:	at:			
	% (Pass mark 75%):	Type and number of licence:			
Mark obtained:		Name in capital letters:			
Signature of instructor:					

2	**Simulator (aeroplane type):**	Three or more axes: motion / system:	YES*	NO*	Ready for service and used
		Visual aid:	YES*	NO*	
Simulator manufacturer:					
Simulator operator:					
Total training time at the controls:					
Instrument approaches at aerodromes:					
To a decision altitude/height of:					
Location/date/time:		Signature of type rating instructor/examiner (E)*:			
Type and No of licence:		Name in capital letters:			

3	**Intentionally left blank**:		

Skill test/Proficiency Check
Remark: if the applicant failed the examiner shall indicate the reasons why

Location and date	Type and number of licence	
Signature of authorised examiner*	Name in capital letters	

**delete as necessary*

AMC FCL 4.261(d)
Multi-crew co-operation course (Aeroplane)
See JCAR-FCL 4.261(d)
See Appendix 1 to JCAR-FCL 4.261(d)

MULTI-CREW CO-OPERATION TRAINING

1 The objectives of MCC training are optimum decision making, communication, division of tasks, use of checklists, mutual supervision, teamwork, and support throughout all phases of flight under normal, abnormal and emergency conditions. The training emphasises the development of non-technical skills applicable to working in a multi-crew environment.

2 The training should focus on teaching students the basics on the functioning of crew members as teams in a multi-crew environment, not simply as a collection of technically competent individuals. Furthermore, the course should provide students with opportunities to practice the skills that are necessary to be effective team leaders and members. This requires training exercises which include students as crew members in the PF and PNF and F/E roles.

3 Students should be made familiar with inter-personal interfaces and how to make best use of crew co-operation techniques and their personal and leadership styles in a way that fosters crew effectiveness. Students should be made aware that their behaviour during normal circumstances can have a powerful impact on crew functioning during high workload and stressful situations.

4 Research studies strongly suggest that behavioural changes in any environment cannot be accomplished in a short period even if the training is very well designed. Trainees need time, awareness, practice and feedback, and continual reinforcement to learn lessons that will endure. In order to be effective, multi-crew co-operation training should be accomplished in several phases spread over a period.

BASIC MULTI-CREW CO-OPERATION COURSE

5 The contents of the basic MCC course should cover theoretical knowledge training, practice and feedback in:

a. interfaces
- examples of software, hardware, environment and liveware mismatches in practice

b. leadership/"followership" and authority
- managerial and supervisory skills
- assertiveness
- barriers
- cultural influence
- PF and PNF roles
- professionalism
- team responsibility

c. personality, attitude and motivation
- listening
- conflict resolution
- mediating
- critique (pre-flight analyses and planning, ongoing-review, postflight)
- team building

d. effective and clear communication during flight
- listening

- feedback
- standard phraseologies
- assertiveness
- participation

e. crew co-ordination procedures
- flight techniques and cockpit procedures
- standard phraseologies
- discipline

6 The use of checklists is of special importance for an orderly and safe conduct of the flights. Different philosophies have been developed for the use of checklists. Whichever philosophy is used depends on the complexity of the aircraft concerned, the situation presented, the flight crew composition and their operating experience and the operator's procedures as laid down in the Flight Operations Manual.

7 Mutual supervision, information and support.

a. Any action in handling the aircraft should be performed by mutual supervision. The pilot responsible for the specific action or task (PF or PNF) should be advised when substantial deviations (flight path, aircraft configuration etc.) are observed.
b. Call-out procedures are essential, especially during take-off and approach, to indicate progress of the flight, systems status etc.
c. Operation of aircraft systems, setting of radios and navigation equipment etc. should not be performed without demand by the PF or without information to the PF and his confirmation.

8 The contents of paragraphs 3 and 4 can best be practised by performing the exercises in IEM FCL 1.261(d) in simulated commercial air transport operations.

9 Practice and feedback of MCC with regard to the L-L (liveware-liveware) interface should also make provision for students for self and peer critique in order to improve communication, decision making and leadership skills. This phase is best accomplished through the use of flight simulators and video equipment. Video feedback is particularly effective because it allows participants to view themselves from a third-person perspective; this promotes acceptance of one's weak areas which encourages attitude and behavioural changes.

EXERCISES

10 The exercises should be accomplished as far as possible in a simulated commercial air transport environment. The instruction should cover the following areas:
a. pre-flight preparation including documentation, and computation of take-off performance data;
b. pre-flight checks including radio and navigation equipment checks and setting;
c. before take-off checks including powerplant checks, and take-off briefing by PF;
d. normal take-offs with different flap settings, tasks of PF and PNF and F/E, call-outs;
e. rejected take-offs; crosswind take-offs; take-offs at maximum take-off mass; engine failure after V_1;
f. normal and abnormal operation of aircraft systems, use of checklists;
g. selected emergency procedures to include engine failure and fire, smoke control and removal, windshear during take-off and landing, emergency descent, incapacitation of a flight crew member;
h. early recognition of and reaction on approaching stall in differing aircraft configurations;
i. instrument flight procedures including holding procedures; precision approaches using raw navigation data, flight director and automatic pilot, one engine simulated inoperative approaches, non-precision and circling approaches, approach briefing by PF, setting of navigation equipment, call-out procedures during approaches; computation of approach and landing data;
j. go-arounds; normal and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.
k. landings, normal, crosswind and with one engine simulated inoperative, transition from instrument to visual flight on reaching decision height or minimum descent height/altitude.

Where MCC training is combined with training for an initial type rating on a multi-pilot

aeroplane, the exercises (a), (b), (c), (f), (g) and (j) may be conducted in a FTD as part of an approved course.

REINFORCEMENT

11 No matter how effective the classroom curriculum, interpersonal drills, LOFT exercises, and feedback techniques are, a single exposure during the multi-crew co-operation course for the initial issue of a multi-pilot aeroplane type rating will be insufficient. The attitudes and influences which contribute to ineffective crew co-ordination are ubiquitous and may develop over a pilot's lifetime. Thus it will be necessary that the training of non-technical skills will be an integral part of all recurrent training for revalidation of a multi-pilot aeroplane type rating as well as of the training for the issue of further multi-pilot type ratings.

Appendix 1 to AMC FCL 4.261(d)
Multi-crew co-operation course (Aeroplane) – Certificate of completion of MCC training

See JCAR-FCL 4.261(d)

Applicant's last name:	First names:	
Type of licence:	Number:	State:
Issued on:	passed on:	
	Signature of applicant:	

The satisfactory completion of MCC-Training according to requirements is certified below:

TRAINING			
Multi-crew co-operation training received during period:			
from:	to:	at:	FTO /TRTO / operator*
Location and date:		Signature of Head of TRTO/FTO or authorised instructor*:	
Type and number of licence and State of issue:		Name in capital letters of authorised instructor:	

** Delete as appropriate*

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AMC/IEM H

INSTRUCTOR RATING

AMC FCL 4.365
Course for the type rating instructor rating for Flight Engineer (TRI(E))
See JCAR-FCL 4.365

COURSE OBJECTIVE

The aim of the course is to give adequate training to the applicant in theoretical knowledge instruction, flight instruction and synthetic flight instruction in order to instruct for the issue of a F/EL and any type rating for which the applicant is qualified (see JCAR-FCL 4.365).

PART 1

TEACHING AND LEARNING

Item No.

1. 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

2. THE TEACHING PROCESS

Elements of effective teaching
Planning of instructional activity
Teaching methods
Teaching from the "known" to the "unknown"
Use of "lesson plans"

3. TRAINING PHILOSOPHIES

Value of a structured (approved) course of training
Importance of a planned syllabus
Integration of theoretical knowledge and flight instruction

4. TECHNIQUES OF APPLIED INSTRUCTION

(a) Theoretical knowledge - Classroom instruction techniques
Use of training aids
Group lectures
Individual briefings
Student participation/discussion

(b) FLIGHT - Airborne instruction techniques
The flight/cockpit environment
Techniques of applied instruction
Post flight and inflight judgement and decision making

5. STUDENT EVALUATION AND TESTING

(a) Assessment of student performance

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

(b) Analysis of student errors

Establish the reason for errors
Tackle major faults first, minor faults second
Avoidance of over criticism
The need for clear concise communication

6. TRAINING PROGRAMME DEVELOPMENT

Lesson planning
Preparation
Explanation and demonstration
Student participation and practice
Evaluation

7. HUMAN PERFORMANCE AND LIMITATIONS RELEVANT TO FLIGHT INSTRUCTION

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

8. HAZARDS INVOLVED IN SIMULATING SYSTEMS FAILURES AND MALFUNCTIONS IN THE AEROPLANE DURING FLIGHT

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

9. TRAINING ADMINISTRATION

Flight/theoretical knowledge instruction records
Pilot's personal flying log book
The flight/ground curriculum
Study material
Official forms
Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks
Flight authorisation papers
Aircraft documents
The private pilot's licence regulations

PART 2

TECHNICAL TRAINING

1. The course should be related to the type of aeroplane on which the applicant wishes to instruct. A training programme should give details of all theoretical knowledge instruction.

2. Identification and application of human factors (as set in the ATPL syllabus 040) related to multi-crew co-operation aspects of the training.

3. The content of the instruction programme should cover training exercises as applicable to the aeroplane type.

Training Exercises

4. Flight Simulator (items marked * should be performed in an aeroplane if a simulator is not available)

(a) use of checklist, setting or radios/navigation aids and panels, power setting calculation/derating, fuel calculation, weather information, performance;

(b) starting engines normal/abnormal;

(c)* take-off checks normal/abnormal;

(d)* aborted take-off prior reaching V_1;

(e)* engine failure during take-off between V_1 and V_2;

(f) climb check, normal/abnormal;

(g) cruise check normal/abnormal;

(h)* descent check, normal/abnormal;

(i)* pre-landing check normal/abnormal;

(j)* system monitoring/handling, emergency situations during all phases of flight;

(k) instrument approach to required minimum decision height or minimum descent height/altitude, manual one engine simulated inoperative during approach and landing or go around, two engines out approach (if applicable);

(l) rejected landing and go around; and

(m) on ground emergency.

Category II and III operations, if applicable

5. (a) precision approaches, automatic with auto-throttle and flight director go-around caused by aircraft or ground equipment deficiencies;

(b) go around caused by weather conditions;

(c) go around at DH caused by offset position from centreline; and

(d) one of the CAT II/CAT III approaches must lead to a landing.

Aeroplane (not applicable for SFI(E) authorisation or zero flight time training by a TRI(E))

6. (a) familiarisation with controls during outside checks;

(b) use of checklist, setting of radios and navigation aids, starting engines;

(c) taxiing;

(d) take-off;

(e) engine failure during take-off shortly after V_2, after reaching climb out attitude;

(f) other emergency procedures (if necessary);

(g) instrument approach to required minimum DH, manual one engine out during approach and landing or go around;

(h) one engine simulated inoperative go around from required minimum DH; and

(i) one engine (critical) simulated inoperative landing.