

EUROPEAN AVIATION SAFETY AGENCY Joint Aviation Authorities

Joint Operational Evaluation Board



BELL 412EP

Final Report, dated 05 May 2011

European Aviation Safety Agency
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Revision Record

| Revision No. | Section | Date | Publication |
|---------------------|----------------|-------------|--------------------|
| Original | All sections | 21/05/08 | JOEB Draft Report |
| Final Report | All sections | 11/05/11 | JOEB Final Report |

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Appendices are available on request to the National Aviation Authorities or to the manufacturer.

JOEB Team Members

| Name | Organisation |
|------------------------|--|
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Preamble

This Joint Operational Evaluation has been performed by EASA/JAA JOEB members under the JOEB EASA/JAA Catch up procedures. This report specifies the JAA recommendation as specified in JAR-FCL and JAR-OPS 3.

The JOEB recommends the approval of the Bell Helicopter 412EP proposed.

The JOEB recommends the licence endorsement will be **Bell 212/412**

Note on JOEB transfer from JAA to EASA:

In accordance with the JOEB Transfer Action Plan agreed in 2005, responsibility for the JOEB Management has been transferred to EASA in February 2006.



Evan Nielsen

Head of Certification Flight Standards

EASA

Date: 210508

Final Report : 11 05 2011

Executive Summary

1. Introduction

BELL Helicopters requested a JOEB “Catch-up” procedure for their 412EP model in November 2007 following a meeting between representatives from Bell Helicopters and EASA Flight Standards Certification staff in Cologne.

Bell's objective was to provide European operators with a 412EP JAR-OPS 3 compliant aircraft with the relevant required data and information. Also, to achieve JAA/EASA recognition of JAR OPS 3 operational compliance for the Bell 412EP

Bell's expectations were to understand the JAA/EASA requirements and to achieve agreement on:

- o the JOEB Process and associated costs
- o the deliverables and items to be evaluated – (focusing only on the items required to achieve JAR-OPS 3 compliance)
- o the Programme Duration (aiming for 4 months from the date of the November 2007 meeting)
- o Ensuring that the JOEB deliverables would achieve full endorsement once operational responsibility is transitioned to EASA.

2. Specific Requirements

Based on their objectives it was agreed that Bell needed evaluations in three areas:

- o Type Rating Course determination
- o JAR-OPS 3 Subparts K & L compliance
- o MMEL

This report covers the first two items only.

3. Process

The Team met at Aviation House, Gatwick at meeting rooms provided by CAA UK from 28 – 30 January 2008. Their prime purpose was to derive an acceptable minimum standard for a type training course for the Bell 412EP based on existing material from organisations already conducting such training. A secondary purpose was to consider the JAR-OPS 3 compliance aspects.

4. Subject Material and Conclusions

For an initial multi-engine, single Pilot helicopter training course all students must fulfil the pre-entry requirements in JAR-FCL 2 and hold a valid Helicopter Pilot license plus a Single-Engine Piston or Turbine Pilot Type Rating.

All students must fulfil the requirements of JAR-FCL 2.261 Type Ratings – Knowledge and Flight instruction and of Appendix 1 to JAR-FCL 2.261 (a) Theoretical knowledge instruction requirements for skill test/proficiency checking for type ratings & Appendix 1 to JAR-FCL 2.261 (b) Flight Instruction and Skill Test.

Appendix 1 to JAR FCL 2.261(b) requires for an initial type rating on a Single Pilot Helicopter (SPH), Multi Engine Turbine (MET) (H) JAR/FAR 27 and 29, an approved flight instruction of :

8 flight hours in the helicopter. (Excluding skill test)

or

10 flight hours, including 8 hours on qualify Full Flight Simulator and 2 hours in the helicopter. (Excluding skill test)

The minimum course requirement recommended by the JOEB is based on Initial Type Rating Training Course Syllabus provided by (BELL HELICOPTER CUSTOMER TRAINING ACADEMY) for the BELL 412EP and attached at Appendix 1 to the report.

OEB recommend Initial pilot training syllabus divided into the following phases for approval Approved Training Organisations, like FTO and TRTO and also for operator specific training, provided the operator specific documentation is used throughout the course:

- Theoretical knowledge instruction syllabus and test summary
- Helicopter Flight training courses
- Skill test

Other training courses including both, qualified Full Flight Simulator and helicopter could be acceptable. NAA's will approved such training courses based on the minimum training course of this report.

Note:

These requirements have to be considered as the bare minimum, additional training could be necessary depending on:

- *complexity of the aircraft type, handling characteristics, level of technology*
- *previous experience of the applicant*
- *The availability of FSTD.*

The Team considered the JAR-OPS 3 Subparts K & L compliance task. Given the ongoing EASA Certification validation activity in this area, they recommend that the evaluation of the equipment modifications and fit be delegated to EASA Certification for their confirmation and report of satisfaction in due course. An appropriately fitted aircraft is to be made available at Mirabel (Montreal) from 12 – 19 February 2008.

Appendix 1 – Initial Type Rating Training Course Syllabus BELL 412EP JOEB Report

GENERAL OPERATIONAL SUBJECTS MODULES **TOTAL HOURS 4.0**

Weight and Balance Module
 Performance Module
 Flight Planning Module
 Approved Rotorcraft Flight Manual Module
 Crew Resource Management (CRM) Module

AIRCRAFT SYSTEMS MODULES **TOTAL HOURS 26.0**

Aircraft General
 Powerplant
 Fire Protection
 Fuel System
 Electrical
 Lighting
 Caution / Warning System and IIDS (As Applicable)
 Power train
 Main Rotor
 Tail Rotor
 Flight Controls / AFCS
 Hydraulic Power
 Environmental Systems
 Ice and Rain Protection
 Avionics
 Kits and Accessories
 Pre-flight
 Systems Review, Examination, and Critique

SYSTEMS INTEGRATION **TOTAL HOURS 1.5**

Systems Integration Module
 Aircraft Checklists

TOTAL GROUND SCHOOL HOURS 31.5

BRIEFING HOURS **TOTAL HOURS 5.0**

FLIGHT TRAINING COURSE

| | |
|-----------------|-----------|
| Flight Period 1 | 1.3 HOURS |
| Flight Period 2 | 1.2 HOURS |
| Flight Period 3 | 1.3 HOURS |
| Flight Period 4 | 1.2 HOURS |
| Flight Period 5 | 1.3 HOURS |
| Flight Period 6 | 1.2 HOURS |
| Flight Period 7 | 1.3 HOURS |
| Flight Period 8 | 1.2 HOURS |

TOTAL FLIGHT TRAINING HOURS : 10 HOURS

Practical Skills Test In addition 1.5 HOURS

GROUND COURSE Syllabus

Bell 412EP Initial Type Rating Training

COURSE OBJECTIVE

To provide pilots with the theoretical knowledge and practical training required to attain a Pilot in Command (PIC) qualification in the Bell Model 412EP.

Theoretical Knowledge – Type Technical Training

[Instructor guided classroom discussions using PowerPoint Presentation to present subjects as follows:]

GENERAL OPERATIONAL SUBJECTS MODULES

WEIGHT AND BALANCE MODULE

General, Principles and Methods of Weight and Balance Determination
(Loading and C of G calculations)

PERFORMANCE MODULE

Use of charts, Tables, Tabulated Data, and
Other Related Material

FLIGHT PLANNING MODULE

Factors Relating to Flight Planning
(Fuel planning; practical application of Performance information)

APPROVED ROTORCRAFT FLIGHT MANUAL (RFM) MODULE

Applicability and Description and Organization
Normal, Abnormal, and Emergency Procedures
Sections
Systems Description
Bulletins and Supplements

CREW RESOURCE MANAGEMENT (CRM) MODULE

(If not covered separately under Operator training)
Situational Awareness and the Error Chain
Stress
Communications
Synergy and Crew Concept
Workload Management
Decision Making

GROUND COURSE Syllabus

Bell 412EP Initial Type Rating Training

AIRCRAFT SYSTEMS MODULES

AIRCRAFT GENERAL MODULE

Major Aircraft Sections, Dimensions and Structures
Crew & Passenger Seating and Emergency Exits
Servicing
Parking, Mooring and Towing

POWERPLANT MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

FIRE PROTECTION MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

FUEL SYSTEM MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

ELECTRICAL MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

LIGHTING MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

CAUTION / WARNING SYSTEM AND INTEGRATED INSTRUMENT DISPLAY SYSTEM (IIDS) MODULE (As Applicable)

General
Operation
Limitations
Emergency/Malfunctions Procedures

GROUND COURSE Syllabus

Bell 412EP Initial Type Rating Training

POWERTRAIN MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

MAIN ROTOR MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

TAIL ROTOR MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

FLIGHT CONTROLS / AFCS MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

HYDRAULIC MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

ENVIRONMENTAL SYSTEMS MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

ICE AND RAIN PROTECTION MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

AVIONICS MODULE

General
Operation
Limitations
Emergency/Malfunctions Procedures

GROUND COURSE Syllabus

Bell 412EP Initial Type Rating Training

KITS AND ACCESSORIES MODULE

(NOTE: Only the Customer's Optional equipment need be discussed)

General
Operation
Limitations
Emergency/Malfunctions Procedures

PRE-FLIGHT MODULES

External Checks
Internal Checks

SYSTEM REVIEW, EXAMINATION, and CRITIQUE

Written Examination multi-choice with a Pass Mark of 75%

SYSTEMS INTEGRATION MODULE

The training modules presented in the Systems Integration subject area provides the pilots with instruction on aircraft systems interrelationships with respect to normal, abnormal and emergency procedures. Pilots will be introduced to, and will exercise in, the elements of Crew Resource Management as part of the integration process, including, but not limited to such elements as: Situational Awareness and the Error Chain, Synergy and Crew Concept, and Workload Assessment and Time Management. Pilots will become familiar with the cockpit layout, checklists, manoeuvres, and procedures. Lessons would normally be conducted in a cockpit procedures mock-up, cockpit procedures trainer, or flight training device covering:

Aircraft Checklists
Normal Procedures
Abnormal Procedures
Emergency Procedures

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period One

1.3(1.3)

I. Objective

Perform pre-start, run-up, and systems checks in accordance with aircraft checklist procedures. Perform hovering flight, normal takeoff, traffic patterns, normal approaches, and acceleration/deceleration manoeuvres.

II. Preflight Briefing

1. Review traffic pattern and communications procedures
2. Review manoeuvres to be performed

III. Flight Manoeuvres

1. Perform Cockpit Inspection
2. Conduct Pre-Start procedures
3. Engine Start procedures
4. Systems checks
5. Hover Manoeuvres (SAS Mode)
 - a. Take-off to hover
 - b. Landing from hover
 - c. Hovering turns
6. Perform normal take-off and approach
7. Perform max performance take-off and steep approach
8. Conduct accelerations/decelerations (Quick Stops)

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Two

1.2(2.5)

I. Objective

Review and practice systems checks and flight manoeuvres conducted in Period One. Conduct normal manoeuvres without SAS and practice hover procedures in Attitude Mode. Perform run-on landing.

II. Preflight Briefing

1. Review manoeuvres to be performed

III. Flight Manoeuvres

1. Hover manoeuvres without SAS
 - a. Take-off to hover
 - b. Landing from hover
 - c. Hovering turns
2. Normal Take-off without SAS
3. Normal Approach without SAS
4. Maximum Performance Take-Off without SAS
5. Steep Approach without SAS
6. Perform hover manoeuvres in Attitude mode
7. Perform run-on landings.

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Three

1.3(3.8)

I. Objective

Review normal procedures. Perform the following emergency manoeuvres: Single-Engine landing rejected takeoff, hydraulic number 1 failure and dual engine failures.

II. Preflight Briefing

1. Review manoeuvres to be performed

III. Flight Manoeuvres

1. Perform run-on landing
2. Perform single engine approach and landing
3. Conduct hydraulic No. 1 failure procedures
4. Demonstrate and perform straight-in autorotation (Termination to a hover).
5. Demonstrate and perform 180 degree autorotation (Termination to a hover).

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Four

1.2(5.0)

I. Objective

Review single engine procedures and normal procedures. Perform forced landing procedures. Discuss tail rotor failure procedures and loss of tail rotor effectiveness (LTE). Review governor failure procedures.

II. Preflight Briefing

1. Discuss governor failure procedures
2. Review engine fire procedures
3. Review hydraulic failure procedures
4. Discuss tail rotor malfunction procedures
5. Discuss LTE

III. Flight Manoeuvres

1. Review normal flight manoeuvres
2. Conduct forced landing procedures
3. Perform hydraulic number 1 failure procedures
4. Perform single engine procedures

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Five

1.3(6.3)

I. Objective

Introduce Flight Director operations and AFCS failures. If the aircraft is equipped with EFIS system, system operations will be covered. Review straight-in and 180 degree autorotation procedures.

II. Preflight Briefing

1. Review manoeuvres to be performed
2. Discuss Flight Director operations and EFIS operations (In Aircraft) if installed.
3. Review any weak areas

III. Flight Manoeuvres

1. Demonstrate Flight Director Operations and EFIS interface operations if equipped.
 - a. Altitude Hold Mode
 - b. Airspeed Hold Mode
 - c. Vertical Speed Mode
 - d. Heading Hold Mode
 - e. Navigation Mode
2. With Flight Director engaged perform the following:
 - a. Generator 1 and 2 failures
 - b. Inverters 1 and 2 failures
3. Review normal manoeuvres as necessary

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Six

1.2(7.5)

I. Objective

Introduce the navigation and approach functions using the Flight Director. Perform VOR interception and tracking using the Navigation mode. Conduct ILS approach.

II. Preflight Briefing

1. Review Autopilot procedures to be used.

III. Flight Manoeuvres

1. Perform VOR navigation
2. Perform ILS approach
3. Review AFCS failures

Note:

Should the pilot not be instrument rated, Instrument Tasks will not be trained or tested , and be replaced by VFR radio navigation and review AFCS procedures , normal, abnormal and emergency procedures.

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Seven

1.3(8.8)

I. Objective

Review normal and emergency flight procedures as necessary. Introduce confined area and slope operations. Category A Take-off and Landing profiles One Engine Inoperative.

II. Preflight Briefing

1. Review any weak areas
2. Discuss confined area procedures
3. Discuss slope landing procedures

III. Flight Manoeuvres

1. Perform confined area procedures
2. Conduct slope landings
3. Review normal and emergency manoeuvres as necessary

FLIGHT TRAINING COURSE

Bell 412EP Initial Type Rating Training

Flight Period Eight

1.2(10.0)

I. Objective

This last flight period will be used to review any weak areas or areas requiring extra practice. If required.

II. Preflight Briefing

1. Review manoeuvres as required

III. Flight Manoeuvres

1. As required