JAA/EASA

JOINT OPERATIONAL EVALUATION BOARD

REPORT OF CABIN CREW SUBGROUP

Embraer 170/175/190/195

Revision 1

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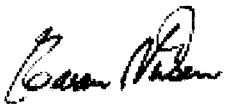

REVISION RECORD:

Issue No.	Date	Pages
- 1 (original)	02/08/2005	all
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CONTENTS

ACRONYMS

ADTs	Aeroplane Differences Tables
CAR	Canadian Aviation Regulations
CC	Cabin Crew
CJAA	Central Joint Aviation Authorities
CS	Certification Specification
DAC-CTA	Departamento de Aviacao Civil - Centro Tecnico Aerospacial (Civil Aviation Authority – Brazil)
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
JAR-OPS 1	JAR - Operations, Commercial Air Transport (Aeroplanes)
JOEB	Joint Operational Evaluation Board
MCCOM	Manufacturer Cabin Crew Operating Manual
OWE	Over Wing Exit
PSUs	Passenger Service Units
RBHA	Regulamentos Brasileiros de Homologacao Aeronautica (Brazilian Regulations)
TCCA	Transport Canada Civil Aviation

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1. PREAMBLE

1.1 In September 2004, Embraer submitted to the Central JAA, an application for a JOEB assessment for cabin crew aspects, in order to determine whether the Embraer 190 should be considered a variant, or a new aeroplane type to the Embraer 170 (as per JAR OPS 1.1030 and the associated guidance material) and consequently, to establish the training requirements for cabin crew transferring to the Embraer 190 (as per JAR-OPS 1.1010 and the associated guidance material).

1.2 As the assessment progressed, in March 2005, Embraer additionally requested a Cabin Crew Catch-up process for the Embraer 175 versus the Embraer 170, in order to make a similar determination to the one described above.

1.3 As a result, a joint operational evaluation was completed by the JOEB Cabin Crew Subgroup, for the Embraer 170, the Embraer 175 and the Embraer 190 aircraft.

1.4 The Embraer 170 was considered the “base” aircraft for this assessment.

1.5 At the end of 2005, Embraer submitted another application, for the inclusion of the Embraer 195, as part of the same JOEB assessment for cabin crew.
The purpose of this part of the assessment was to determine, whether, the Embraer 195 should be considered a variant of the Embraer 170, or a new aeroplane type, as per JAR-OPS 1.1030 and the associated guidance material. Hence, the initial JOEB CC assessment, and the resulting JOEB CC Report were augmented to include the Embraer 195.

1.6 Although the evaluation of the Embraer 195 had been completed in 2006, the revision of the initial JOEB CC Report, dated 02/08/2005, and titled “Embraer 170/175/190” became possible in August 2007 only.

1.7. The current revision (number 1), of the initial JOEB CC Report for the Embraer 170/175/190, includes the conclusions of the evaluation for the Embraer 195, is consequently titled;” Report of Cabin Crew Subgroup – Embraer 170/175/190/195”, and will replace the initial Report, dated 02/08/2005.

Note: Embraer 170 is the commercial designation of the ERJ 170-100.
Embraer 175 is the commercial designation of the ERJ 170-200.
Embraer 190 is the commercial designation of the ERJ 190-100.
Embraer 195 is the commercial designation of the ERJ 190-200.

1.8 This cabin crew joint operational evaluation has been performed by an integrated team composed of: FAA/TCCA/DAC-CTA Brasil/ EASA-JAA representatives.
However, this Report is applicable to the EASA/JAA, only.

1.9 The cabin crew joint operational evaluation was carried out in compliance with the Terms of Reference for the JOEB process; the JOEB Handbook – Part III – Draft Cabin Crew procedures Document and with the relevant requirements of JAR-OPS 1, Amendment 11, Subpart ”O”- Cabin Crew.

1.10 Consensus was achieved in terms of JAR/FAR/CAR/RBHA requirements, for cabin crew training/checking.

1.11 EASA/JAA coordinated this JOEB process.

2. PURPOSE and APPLICABILITY

This report:

2.1 Substantiates that the Embraer 175, the Embraer 190, and the Embraer 195 are variants of the Embraer 170 (as per JAR-OPS 1.1030).

2.2 Provides analysis for establishing compliance with JAR-OPS 1.1030, when considering the Embraer 170/175/190/195.

2.3 Provides recommendation for the operational approval by the NAAs, of cabin crew training programmes (as per JAR-OPS 1.1010), when operating on the Embraer 170/175/190/195.

3. EXCUTIVE SUMMARY

3.1 The following steps were taken in fulfilling the Cabin Crew operational evaluation for the Embraer 170/175/190/195:

a) Embraer and the CC Subgroup decided on the timescales for this evaluation.

b) Embraer provided the necessary documentation:
- Relevant certification documentation for the Embraer 170/175/190/195, including Special Conditions and Equivalent Safety Findings.

- Manufacturer Cabin Crew Operating Manual (MCCOM) for the Embraer 170.
- Proposed Cabin Crew Type Training Syllabus for Embraer 170/175.
- Proposed Cabin Crew Type Training Syllabus for Embraer 190/195.
- Proposed Cabin Crew Differences Training Syllabus when transferring from the Embraer 170/175 to the Embraer 190/195..
- Aeroplane Differences Tables (ADTs) for the Embraer 175, the Embraer 190, and the Embraer 195.

c) The CC Subgroup reviewed the documentation and considered certification interface issues, in liaison with the appropriate group of specialists.

d) Representatives of the CC Subgroup observed and assessed the manufacturer proposed training for the emergency evacuation demonstration required by CS 25.803, for the Embraer 190.

e) Representatives of the CC Subgroup observed the certification emergency evacuation demonstration (as per CS 25.803), for the Embraer 190.

f) Representatives of the CC Subgroup witnessed the manufacturer proposed Differences training, for the Embraer 190.

g) Representatives of the CC Subgroup performed operational aircraft inspections for the Embraer 170/175/190 and validated differences/similarities identified by the manufacturer in the Aeroplane Differences Tables (ADTs).

h) CC Subgroup members witnessed a virtual presentation of the Embraer 195 cabin interior, and validated differences/similarities identified by the manufacturer in the Aeroplane Differrences Tables (ADTs).

i) The CC Subgroup concluded as to what extent the compared aeroplanes were different/similar.

j) The CC Subgroup identified the training/checking required for cabin crew operating on the Embraer 170/175/190/195 in order to achieve compliance with JAR-OPS 1.1010.

k) The CC Subgroup determined the number of variants to the Embraer 170 that cabin crew may operate on.

l) The CC Subgroup completed the "Cabin Crew Subgroup Report for the Embraer 170/175/190/195".

4. ASSESSMENT OF THE EMBRAER 170/175/190/195 (Use of Aeroplane Differences Tables – ADTs)

4.1 The aim of this assessment was to establish whether for cabin crew, the Embraer 175, the Embraer 190, and the Embraer 195 are variants of the Embraer 170, or whether they are different aircraft types.

4.2 The guidance used for carrying out this assessment was provided by Chapter 4.1.2 - Use of Aeroplane Differences Tables (ADTs), and Chapter 4.2 – Criteria for classification of aeroplanes as a variant or a type for cabin crew, both contained in the JOEB Handbook – Part III - Draft Cabin Crew Procedures Document.

4.3 In accordance with this guidance, the following categories were assessed:

(i) aeroplane interior description;
(ii) safety equipment - type and location;
(iii) systems operation;
(iv) normal procedures;
(v) emergency procedures.

4.4 Guidance on how to assess all relevant elements belonging to each of the five categories above was taken from the JOEB Handbook – Part III- Cabin Crew Procedures Document, Appendix 3-B-Detailed information for compilation of ADT.

4.5 Based on that information, the following comparisons were performed:

A: Embraer 170 versus Embraer 175;
B: Embraer 170 versus Embraer 190;
C Embraer 170 verrsus Embraer 195.

4.6 *A: Embraer 170 versus Embraer 175:*

Findings:

The only differences reside with the Embraer 175 having a stretched fuselage, to accommodate full seating capacity for 86 passengers, versus 78 passengers, for the Embraer 170.

As a result, the Embraer 175 is provided with:

- a higher number of PSUs, and consequently, of drop-down oxygen masks;

- a higher number of ceiling lights

- a 3rd cabin crew seat is optional in the rear galley (operator-specific element).

These differences do not impact on the type and location of safety equipment/systems operation/normal procedures/emergency procedures.

Conclusion: For cabin crew, the Embraer 175 is a variant of the Embraer 170, as per JAR-OPS 1.1030 and the associated guidance material.

4.7 *B: Embraer 170 versus Embraer 190:*

The successful certification emergency evacuation demonstration (as per CS 25.803) for the Embraer 190, witnessed by representatives of the CC Subgroup, referred to a full seating capacity of 116, with a cabin crew complement of three.

Findings:

The following differences were identified on the Embraer 190:

- as a result of the stretched fuselage, a higher number of PSUs and drop-down oxygen masks, as well as ceiling lights are installed;

- a 3rd cabin crew seat is optional, either in the rear galley, or adjacent to the forward galley (operator-specific element);

- The Embraer 190 is provided with two “type III” overwing exits (OWEs), one on each side of the fuselage, that are marked with visual indications and directions, inside the passenger cabin;

- the OWEs are provided with life-lines and hooks for attaching the life-rafts;

- if operation over water is required, the Embraer 190 allows for storage of rafts in the overwing area overhead

bins, as opposed to the Embraer 170, where the location of the two rafts is in the forward overhead bins.

As a result of the differences listed above for the Embraer 190:

a) the aeroplane interior description shows differences referring to:

- exit location and environment, given the existence of the overwing exits;

b) the type and location of safety equipment shows differences referring to the carriage of life-rafts on board;

The rest of the portable safety equipment may differ in location depending on the layout and is not expected to impact on procedures.

c) systems operation is identical to the Embraer 170;

d) normal procedures show differences that will require the incorporation of a check by the cabin crew that suitable passengers are seated in the overwing exit rows, and a revision of the passenger safety briefing announcement to include the location of the overwing exits.

e) emergency procedures show differences referring to:

- over-wing exit operation/evacuation; and
- ditching

After assessing the two aeroplanes,, the CC Subgroup agreed with the differences identified by the manufacturer in the ADT for the Embraer 190.

Conclusion: The evaluation of the differences listed above led to the conclusion that, for cabin crew, the Embraer 190 is a variant of the Embraer 170 as per JAR-OPS 1.1030 and the associated guidance material.

4.8 C: Embraer 170 versus Embraer 195:

The Embraer 195 has a stretched fuselage, to accommodate full seating capacity for up to 118 passengers, with a minimum cabin crew complement of three, versus a full seating capacity for up to78 passengers, with a minimum cabin crew complement of two, in the case of the Embraer 170.

Findings:

The following differences were identified on the Embraer 195:

- as a resultof the stretched fuselage, a higher number of PSUs and drop-down oxygen masks, as well as ceiling lights are installed;

- a 3rd cabin crew seat is optional, either in the rear galley, or adjacent to the forward galley (operator-specific element);

- The Embraer 195 is provided with two “type III” overwing exits (OWEs), one on each side of the fuselage, that are marked with visual indications and directions, inside the passenger cabin;

- the OWEs are provided with life-lines and hooks for attaching the life-rafts;

- if operation over water is required, the Embraer 195 allows for storage of rafts in the overwing area overhead bins, as opposed to the Embraer 170, where the location of the two rafts is in the forward overhead bins.

As a result of the differences listed above for the Embraer 195:

a) the aeroplane interior description shows differences referring to:

- exit location and environment, given the existence of the overwing exits;

b) the type and location of safety equipment shows differences referring to the carriage of life-rafts on board;

The rest of the portable safety equipment may differ in location depending on the layout and is not expected to impact on procedures.

c) systems operation is identical to the Embraer 170;

d) normal procedures show differences that will require the incorporation of a check by the cabin crew that suitable passengers are seated in the overwing exit rows, and a revision of the passenger safety briefing announcement to include the location of the overwing exits.

e) emergency procedures show differences referring to:

- over-wing exit operation/evacuation; and
- ditching

After assessing the two aeroplanes, the CC Subgroup agreed with the differences identified by the manufacturer in the ADT for the Embraer 195.

Conclusion: The evaluation of the differences listed above led to the conclusion that, for cabin crew, the Embraer 195 is a variant of the Embraer 170 as per JAR-OPS 1.1030 and the associated guidance material.

5. SPECIFICATIONS FOR CABIN CREW TRAINING/CHECKING

5.1 Apart from establishing if for cabin crew, the compared aircraft can be classified as variants or new types, the result of applying the ADTs also serve the purpose of identifying what Differences training may be required when transferring to the candidate aeroplanes..

5.2 Based on the conclusions provided by the application of the ADTs and on the guidance existing in Chapter 4 – Differences Levels for Training and Checking, and Chapter 4.3 – Difference Levels Summary of the JOEB Handbook – Part III, the following assessments were carried out to highlight the specifications for cabin crew training/checking, when transferring from the Embraer 170 to the Embraer 175, to the Embraer 190, and to the Embraer 195.

A: Embraer 170 versus Embraer 175;
B: Embraer 170 versus Embraer 190;
C: Embraer 170 versus Embraer 195.

5.3 *A: Embraer 170 versus Embraer 175 :*

Findings:

For cabin crew training/checking purposes, the Embraer 175 is a variant of the Embraer 170.
As no differences that may affect cabin crew knowledge, skills and performance were identified, no Difference Levels of training/checking are assigned or applicable.

Conclusion: Cabin crew may operate on the Embraer 170 and the Embraer 175 without additional training between the two variants.

5.4 *B: Embraer 170 versus Embraer 190*

Findings:

For cabin crew training/checking purposes, the Embraer 190 is a variant of the Embraer 170.

Based on the differences identified in the ADT for the Embraer 190, Level 3 Differences applies, when transferring from the Embraer 170 to the Embraer 190.

Level 3 Differences for cabin crew training/checking is presented below.

Level 3: is applicable to differences training that can only be accomplished through use of devices capable of systems training (hand-on- training). It is applicable to aeroplanes having "part task" differences that affect skills or abilities, as well as knowledge. Training objectives focus on mastering individual systems, procedures, or tasks. Level 3 may also require self-instruction or aided instruction of a crewmember, but cannot be adequately addressed by a knowledge requirement alone. Training devices are required to supplement instruction to ensure attainment or retention of crew skills and abilities to accomplish the more complex tasks, usually related to operation of particular aeroplane systems. Typical training devices for Level 3 would be door and slide mock-ups, attendant panel trainers, etc. When dedicated trainers are not available, Level 3 would require hand-on-training using the aeroplane.

Difference Levels are summarised in the table below for training and checking.

As shown by the table, checking is applicable to Level 3 Differences.

Difference level	Training	Checking
1	Self Instruction (written information)	Not applicable
2	Aided Instruction (CBT, Video..)	Applicable as required
3	Hand-on Instruction (trainers, or aeroplane)	Applicable

Level 3 Differences applies to cabin crew training defined by the requirements of JAR-OPS 1.1010, with regard to:

- overwing exit operation
- evacuation procedures:
  - -overwing exit evacuation
  - -ditching
- safety equipment – life-raft
- passenger briefing/safety demonstration

Conclusion a): As Level 3 Differences training/checking provides for tasks and procedures related to cabin crew knowledge, skills and performance which, if left uncovered, may affect flight safety, additional training is required when transferring from the Embraer 170 to the Embraer 190.

Conclusion b): When transferring from the Embraer 190 to the Embraer 170, Level 1 Differences applies.

Level 1 Differences for cabin crew training/checking is presented below. See also, associated Difference Levels Table, in chapter 5.4.

As shown by the table, checking is not applicable to Level 1 Differences.

Level 1: Applicable to aeroplanes with differences that can adequately be addressed through self-instruction. Level 1 training represents a knowledge requirement such that, once appropriate information is provided, understanding and compliance can be assumed to take place. Compliance with Level 1 training is typically achieved by methods such as issuance of operating manual page revisions, dissemination of cabin crew operating bulletins or differences handouts to describe minor differences between aeroplanes.

Level 1 training is normally limited to situations such as the following:

- The change introduces a different version of a system/component for which the cabin crew member has already shown the ability to understand and use (e.g. an updated version of the entertainment system or cabin lighting controls).

- The change results in minor or no procedural changes and does not result in adverse safety effects if the information is not reviewed or is forgotten (e.g. slight differences in door dimensions, seat pitch or exterior lighting).

- Information highlighting a difference that, once called to the attention of the cabin crew member, is self-evident, inherently obvious and easily understood (e.g. location of the communication system (public address and interphone), location of water and waste indicators or location of circuit breakers).

As revealed by the use of the ADT, Level 1 Differences applies, with regard to:

- crew evacuation procedures (given the absence of the overwing exits)
- passenger briefing/safety demonstration (given the absence of the overwing exits)
- type, layout and quantity of equipment (operator specific)

5.5 *C: Embraer 170 versus Embraer 195*

Findings:

For cabin crew training/checking purposes, the Embraer 195 is a variant of the Embraer 170.

Based on the differences identified in the ADT for the Embraer 195, Level 3 Differences applies, when transferring from the Embraer 170 to the Embraer 195.

See presentation of Level 3 Differences for cabin crew training/checking, and associated Difference Levels Table, in chapter 5.4.

As shown by the table, checking is applicable to Level 3 Differences.

Level 3 Differences applies to cabin crew training defined by the requirements of JAR-OPS 1.1010, with regard to:

- overwing exit operation
- evacuation procedures:
  - -overwing exit evacuation
  - -ditching
- safety equipment – life-raft
- passenger briefing/safety demonstration

Conclusion a): As Level 3 Differences training/checking provides for tasks and procedures related to cabin crew knowledge, skills and performance which, if left uncovered, may affect flight safety, additional training is required when transferring from the Embraer 170 to the Embraer 195.

Conclusion b): When transferring from the Embraer 195 to the Embraer 170, Level 1 Differences applies.

See presentation of Level 1 Differences for cabin crew training/checking, and associated Difference Levels Table, in chapter 5.4.

As shown by the table, checking is not applicable to Level 1 Differences.

As revealed by the use of the ADT, Level 1 Differences applies, with regard to:

- crew evacuation procedures (given the absence of the overwing exits)
- passenger briefing/safety demonstration (given the absence of the overwing exits)
- type, layout and quantity of equipment (operator specific)

6. CONCLUSIONS

6.1 For cabin crew, the Embraer 175, the Embraer 190, and the Embraer 195 are variants of the Embraer 170.

6.2 For training/checking purposes:

- Cabin crew can operate on the Embraer 170 and the Embraer 175 without additional training when transferring from one to the other (both ways).

- Cabin crew can operate on the Embraer 190 and the Embraer 195 without additional training when transferring from one to the other (both ways).

- When transferring from the Embraer 170/175, to the Embraer 190/195 Level 3 Differences for training/checking is required in order to achieve compliance with JAR-OPS 1.1010 for the elements identified as such in the ADTs.

- When transferring from the Embraer 190/195, to the Embraer 170/175, Level 1 Differences for training is required, in order to achieve compliance with JAR-OPS 1.1010 for the elements identified as such, from the use of the ADTs.
  Level 1 Differences training can adequately be addressed through self-instruction, and is likely to be achieved at the operator level.

-End-