APPENDIX G

DIFFERENCES TRAINING
ALL TRAINING CATEGORIES

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G.1 General

This section contains information, direction, and guidance to be used by inspectors when evaluating an operator's differences training program in all categories of training.

G.2 Background

Due to differences in instrumentation, systems, and installed equipment, the skills and knowledge required to maintain two aircraft of the same make and model can differ. The range of differences between variations of a basic aircraft model has become extremely wide in recent years with the introduction of computerized guidance systems, electronic instrument displays, and two crewmember flight crews. Maintenance engineers qualified on one variant of an aircraft may require additional training to safely and efficiently carry out maintenance tasks on other variants of that aircraft. It is required that maintenance organizations and maintenance training centers conduct "differences" training in all categories of training when the maintenance engineer is to be licensed or approved authorized on more than one variant of an aircraft.

G.3 Terminology

The following terminology is defined as it applies to differences training:

*** *Base Aircraft:***

The aircraft or group of aircraft designated by the operator for use as a reference to compare differences with other aircraft within the operator's fleet. Operators designate base aircraft by the airline tail number (such as "aircraft 801 - 820"), the make/model/series (such as "A320-200"), and/or other classifications which can uniquely distinguish between the operator's different aircraft pertaining to the different configurations, handling characteristics, performance procedures, limitations, controls, instruments, indicators, systems, equipment, options or modifications. A base aircraft may either be a single aircraft or a group of aircraft with the same features and may be re-designated at the discretion of the operator. Base aircraft are typically those aircraft within a fleet which the flight crews are first trained in, which the airline has the most number of, or which represent a target configuration for the operator to eventually use as a standard.

* ***Variant Aircraft:***

An aircraft or a group of aircraft with the same features, that have pertinent differences from a base aircraft. Typical pertinent differences are those relating to configuration, handling qualities, performance, procedures, limitations, controls, instruments, indicators, systems, equipment, options, or modifications. Variants exist within a model or series, due to differences in installed equipment. For example, a B737-200 ADV with a performance data computer system, Omega, SP-177 auto-pilot, dual cue flight director, and auto-land is a different variant than another B737-200 ADV with a single cue flight director, SP-77 auto-pilot, and basic VOR/DME navigation equipment. An operator may have a number of variants, in addition to a base aircraft within a fleet.

G.4 Methods For Accounting For Differences

There are several acceptable methods operators may use to account for differences. Inspectors should be knowledgeable of the following acceptable methods.

A. Standardized Configurations. The simplest and most traditional method for operators to use when dealing with differences is to avoid them by installing common instruments and equipment in each aircraft in the fleet.

B. Separate Fleets. Some operators treat variants of an aircraft as if they were different aircraft by developing separate curriculums for each variant.

C. Integrated Training. An operator can conduct differences training as an integral part of each of the defined categories of training. When the operator chooses to use this method, ECAA inspectors must ensure that an analysis of the differences between the variants of aircraft in the operator's fleet has been made and that instructional elements have been provided in each curriculum segment to account for the identified differences. ECAA inspectors may approve this method when systems differences between the aircraft are minor. Approval of integrated differences training is accomplished in conjunction with the approval of the curriculum of which it is a part. When the operator chooses this method, a differences evaluation should be submitted as supporting documentation for the initial curriculum outline.

D. Separate Differences Curriculum Segments. The operator may choose to limit instruction throughout a curriculum to one specific "base" aircraft and then conduct training as to the differences present in variations of the aircraft as a separate and distinct curriculum segment. For example, an operator might designate the 100 series aircraft as the base aircraft in a B-737 transition course. At an appropriate point in the instruction, a distinct segment of training would be presented to cover differences in the 200, 300, or 400 series aircraft. This method is advantageous when the operator operates numerous variants of an aircraft.

G.5 Specific Situations Requiring Differences Training

Inspectors should be knowledgeable in the several situations in which differences training may be required, as follows:

A. When an operator contracts for training from another party or from a training center who provides a courseware different from the aircraft operated by the operator.

B. When an operator generates a need for differences training by introducing a variation of an aircraft into an existing fleet or by creating a variant aircraft by modifying one or more aircraft in the fleet

C. When airline mergers and acquisitions generate the need for fleets to be merged in operations

G.6 Differences Evaluation

Differences training must be based on an accurate analysis of the differences in systems, equipment, and maintenance procedures of the aircraft involved. An operator preparing a training program must submit a difference analysis conducted by the operator or other qualified party (such as a manufacturer or another operator). The analysis may take any form as long as it accurately identifies all differences. One acceptable way of constructing a differences analysis, but not the only means, is to construct a curriculum outline for the base aircraft and to identify each curriculum item in which there is a difference.

DIFFERENCES EVALUATION WORKSHEET

BASE AIRCRAFT	VARIANT AIRCRAFT
Aircraft Systems Subject Areas	
Hydraulic Systems	
* Pumps	Pneumatic pump deleted
	Electric pump added
* Supply	Same
* System A components	Same
* System B components	Yaw damper added
* RAT	Deleted
* Limitations	Electrical pump time
	Yaw damper off below 100'
Electrical System Module	Same
Air Conditioning Module	Same
Etc.	

Figure 1
EXAMPLE OF DIFFERENCES WORKSHEET

G.7 Degrees Of Differences

ECAA inspectors must ensure that the methods and devices used to conduct differences training are appropriate to the degree of difference between the base aircraft and the variant aircraft. For purposes of describing degrees of difference and for defining acceptable training methods, five levels of differences have been defined (Levels A - E).

A. Level A Differences. Level A differences are those differences which the maintenance engineer needs to be aware of, but which have little effect on systems operations. For example, an engine starter on one variant aircraft has different time limits but does not have differences in controls, indicators, function, or procedures. Self instruction methods such as highlighted pages of training manuals, training bulletins, or computer based training (CBT) are acceptable for these differences. At the Level A of differences, testing may not be required.

B. Level B Differences. Level B differences are those differences in systems, controls, and indicators that have only minor differences. Level B differences are of great enough degree to require formal training in aircraft systems. An example of a Level B difference might be a fuel system with additional fuel tanks, pumps, and gauges. Procedural differences are limited to the operation of transfer valves and pumps while an aircraft is on ground. Appropriate instructional methods for Level B differences include, but are not limited to, tape slide/presentations, lectures, and CBT. At the Level B of differences, testing may not be required.

C. Level C Differences. Level C differences are those differences of great enough degree to require formal training in aircraft systems. An example of a Level C difference is the installation of a flight management system (FMS) computer. Appropriate instructional methods for Level C differences include, but are not limited to, tape slide/presentations, lectures, and CBT. At the Level C of differences, testing is required.

G.9 Approval Process

The approval process for differences training follows the five step process. The operator or training organization must submit an outline of the differences training program. This outline should contain appropriate modules and elements. Before the ECAA inspector may grant initial approval of the training program, the operator must also submit documentation supporting the differences analysis. The documentation may also be a differences analysis prepared by the operator, training organization, or other qualified party. When the operator chooses to use the integrated method of training, differences training appears in the outline as differences modules in the appropriate curriculum segment. When the operator conducts differences training as a separate and distinct curriculum segment, all differences modules are grouped in that segment. In either case, the ECAA inspector's approval should be predicated on the applicant meeting the following required criteria:

* Differences analysis is complete and accurate (but not necessarily in great detail)
* Outline contains the appropriate instructional elements to account for the differences identified in the analysis
* The appropriate modes of instruction and devices to conduct the training.