

AW/OPS 1.1.020		Inspector Handbook
Weight and Balance Control		Revision2
		01 Dec 12

## 1. Objective

- 1.1. This directive provides guidance for evaluating an operator /applicant's weight and balance control program.
- 1.2. This is a common directive for Airworthiness and Operations.
  - 1.2.1. Close coordination between AW and OPS inspectors executing this directive is required.
  - 1.2.2. The nominated MI will be the lead inspector in executing this directive.
  - 1.2.3. Any amendments to this directive must be made to both AW Inspector Handbook and OPS Inspector Handbook

## 2. General

- 2.1. Approved weight and balance control procedures are the only means for an operator/applicant to authorize the use of other than known weights for crew, passengers, baggage, or cargo. The weight and balance control program, including loading schedules and charts, are approved in the Operations Manual by the CAAI. This program must be included in the operator/applicant's policies and procedures manual.
- 2.2. The operator/applicant may develop and submit for approval any method or procedure by which it can show that an aircraft:
  - 2.2.1. Is properly loaded according to approved configuration (loading schedules or charts)
  - 2.2.2. Will not exceed authorized weight and balance limitations during all ground and flight operations
  - 2.2.3. Will be periodically reweighed and its data reevaluated
  - 2.2.4. Will have its data recalculated, if changes necessitate
- 2.3. The operator/applicant's weight and balance control procedures may either be an independently controlled document which includes all the instructions and procedures for maintenance, operations, and baggage/cargo control, or it may be included in the policies and procedures manual.
- 2.4. During type certification, the aircraft manufacturer must flight test weight and balance under all conditions and establish center of gravity limits. These limits are approved by the State of design.

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- 2.5. If an operator/applicant proposes an unusual or complex weight and balance program, or a program substantially different from the Approved Aircraft Flight Manual or Pilot Operating Handbook, additional assistance should be requested and approved.

### **3. Reference Material, Forms & Job-Aids**

#### 3.1. Regulatory Requirements

- 3.1.1. IANR.Ops. 6A, 538, Att. 4

#### 3.2. Reference Material

- 3.2.1. AP 1.1.020 – Aircraft Mass and Balance Control

#### 3.3. Job-Aids

- 3.3.1. F 1.1.020A – Weight and Balance Control Checklist

### **4. Process**

- 4.1. Use of Average Passenger Weights. For some types of regular operations, average passenger and baggage weights may be authorized.

- 4.1.1. Average weights may be determined by actually weighing passengers and baggage and documenting the weights. Average weights must be based on acceptable data collected during actual operations.

- 4.1.2. Generally, average weights for operations in warm climates are lighter than those in colder climates. In establishing average passenger and baggage weights, operating environment must be considered. For example, clothing worn or carried in colder climates may affect the established weight.

#### 4.2. Nonstandard Weight Groups.

Average weights are not suitable for groups that tend to be heavier or lighter than the average. The operator/applicant must use actual weights for loading nonstandard weight groups and their baggage (such as athletic squads, military personnel, and children's groups).

#### 4.3. Carry-on Baggage.

Procedures must be provided for controlling carryon baggage.

- 4.3.1. Carryon baggage must be limited to articles that may be placed in overhead compartments or under seats. No article

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may be placed in an overhead compartment that causes the weight limit of the compartment to be exceeded.

4.3.2. Carryon baggage weight must either be accounted for in the same manner as checked baggage or be added to the passenger weight.

4.3.3. Operators using average weights for computing weight and balance should reevaluate carryon baggage weight at least once per year.

#### 4.4. Weighing of Aircraft

4.4.1. The frequency of weighing aircraft under operating rules may be at set intervals of 3 to 5 years depending a weight and balance program system approved by the CAAI.

4.5. Scales used to weigh passengers, aircraft, cargo, and baggage must be calibrated and traceable to a national standard. Calibration must be performed in accordance with the civil authority for weights and measures having jurisdiction over the area in which the scales are used. The frequency of testing depends on use and handling.

#### 4.6. CONTRACTORS

An operator/applicant may use a contractor to weigh items required to be weighed. However, the operator/applicant is responsible for ensuring the contractor complies with the operator/applicant's approved weight and balance control program. This includes ensuring scales are calibrated and tested in accordance with the operator/applicant's Policies and Procedures Manual.

#### 4.7. COORDINATE WITH OPERATOR/APPLICANT.

Operator/applicant must submit the following for review:

4.7.1. Manual or revision

4.7.2. Weight and Balance Program document (if not part of manual)

4.7.3. Pertinent company procedures

4.7.4. Instructions for completing forms used in aircraft weight control and aircraft loading

4.7.5. Mathematical justification for loading provisions or schedules

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#### 4.8. REVIEW THE OPERATOR/APPLICANT'S MANUAL/PROGRAM DOCUMENT.

The manual must include procedures, levels of authority, and information appropriate to CAAI Requirements. In addition, the following must be included:

- 4.8.1. Manual introduction, to include
  - 4.8.1.1 Description of the philosophy and the goals of the manual
  - 4.8.1.2 Description of the division of contents between volumes, if more than one volume
  - 4.8.1.3 List of effective pages, including dates
- 4.8.2. Manual revision and distribution procedures, to ensure
  - 4.8.2.1 Current information is provided to all manual holders
  - 4.8.2.2 Manuals are available to maintenance, operations and ground personnel and are furnished to the CAAI
- 4.8.3. Definitions of all significant terms used in the program. The definitions must reflect their intended use. Acronyms or abbreviations unique to the manual must also be defined.
- 4.8.4. Description of the organizational unit responsible for the control and maintenance of the weight and balance program, to include:
  - 4.8.4.1 Definitions of lines of authority
  - 4.8.4.2 Description of the support structure
- 4.8.5. Job descriptions for all elements
- 4.8.6. Training programs that include the following:
  - 4.8.6.1 Maintenance personnel
  - 4.8.6.2 Operations and dispatch personnel
  - 4.8.6.3 Ground handling personnel
- 4.8.7. A means of documenting and retaining individual training records
- 4.8.8. Procedures for:
  - 4.8.8.1 Determining standards and schedules for calibration of aircraft scales
  - 4.8.8.2 Pre weighing instructions and requirements
  - 4.8.8.3 Determining weighed which aircraft are to be.
  - 4.8.8.4 Establishing and maintaining lists for each aircraft equipment
  - 4.8.8.5 Recording the type and serial number for each scale used, airplane weight, residual fluids, and scale tare weights
  - 4.8.8.6 Initial weighing of aircraft

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- 4.8.8.7 Monitoring and adjusting individual aircraft or fleet, empty weight and center of gravity
- 4.8.8.8 Periodic reweighing of aircraft
- 4.8.8.9 Ensuring aircraft are configured accordance with approved data.
- 4.8.9. A loading schedule consisting of graphs/tables or a special loading schedule for a calculator or computerized program. These schedules must ensure pertinent data is available concerning all probable weight and balance conditions of the aircraft
- 4.8.10. A load manifest on which all required loading information shall be entered by personnel responsible for weight and balance control, including procedures for:
  - 4.8.10.1 Completing the load manifest
  - 4.8.10.2 Ensuring load manifest is carried on the aircraft
  - 4.8.10.3 Retaining the load manifest for the time periods specified in the ANR's.
  - 4.8.10.4 Distribution of the load accordance with the IANR's manifest.
- 4.8.11. Procedures to be used by crew members, cargo handlers , and other personnel concerned with aircraft loading, for the following:
  - 4.8.11.1 Distribution of passengers
  - 4.8.11.2 Distribution of fuel
  - 4.8.11.3 Distribution of cargo
  - 4.8.11.4 Verification and acceptance of actual cargo weights as listed on a bill of lading
  - 4.8.11.5 Restriction of passenger movement during flight, if applicable
  - 4.8.11.6 Hazardous applicable material requirements.
- 4.8.12. A drawing of each cargo and/or passenger configuration to include emergency equipment locations
- 4.8.13. Mathematical justification for loading provisions or schedules. This may be included under separate cover and not as part of the company manual.
- 4.8.14. An alternate procedure for allowing manual computations, if a computerized weight and balance program fails.
- 4.8.15. Procedures for a weight range system, if applicable, that ensures:
  - 4.8.15.1 The range is typical of passengers carried on similar operations

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- 4.8.15.2 Computations for critical load considerations support the ranges
- 4.8.15.3 Personnel responsible for loading the aircraft are required to prepare appropriate loading records
- 4.8.15.4 The system includes methods for loading passengers whose weights are outside the range
- 4.8.15.5 Loading records indicate the number of passengers within the stated range and account for passengers that do not fall within the range
  
- 4.8.16. A system for loading nonstandard weight groups, such as athletic squads or military groups and their baggage, which must utilize actual weights for both passengers and baggage
  
- 4.8.17. Procedures to verify actual weight of cargo
  
- 4.8.18. Standards and schedules for calibration of commercial scales used to determine baggage/cargo weights
  
- 4.8.19. Procedures to ensure that carry on baggage is limited to articles which may be placed in overhead compartments or under seats. Carryon baggage weight must be accounted for in the same manner as checked baggage or added to the average passenger weight.
  
- 4.9. Review Operator/Applicant's Operations Specifications includes the following:
  - 4.9.1. Aircraft make/model/series
  - 4.9.2. Type of loading schedule
  - 4.9.3. Loading schedule instructions for:
    - 4.9.3.1 Passenger and crew (average or actual weight)
    - 4.9.3.2 Baggage (average or actual weight) and cargo (actual)
    - 4.9.3.3 Nonstandard weight groups
  - 4.9.4. Weight and balance control procedures

NOTE: The above items must be referenced by indicating the locations of the same items in the operator/applicant's manuals, e.g., volume, chapter, etc.

## 5. Task Outcomes

### 5.1. Analyze the Results.

Upon completion of review, analyze the results and determine

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whether the operator/applicant's manuals meet all requirements.