NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY
WASHINGTON, D.C. 20594

June 30, 2009

Aircraft Maintenance Records Factual Report

A. ACCIDENT: DCA09MA021
LOCATION: Denver, Colorado
DATE/TIME: December 20, 2008, 1818 Mountain Standard Time (MST)
AIRCRAFT: Boeing 737-524, N18611[1], S/N 27324

B. GROUP MEMBERS:

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[1] In some but not all Continental Airlines maintenance documents N18611 is referred to as A/C 611.

C: SUMMARY

On December 20, 2008, at 1818 mountain standard time, Continental flight 1404, a Boeing 737-524 (registration N18611), equipped with CFM56-3B1 engines, departed the left side of runway 34R during takeoff from Denver International Airport (DEN). The scheduled, domestic passenger flight, operated under the provisions of Title 14 CFR Part 121, was enroute to George Bush Intercontinental Airport (IAH), Houston, Texas. There were 37 injuries among the passengers and crew, and no fatalities. The airplane was substantially damaged and experienced post-crash fire. The weather observation in effect nearest the time of the accident was reported to be winds at 290 and 24 knots with gusts to 32 knots, visibility of 10 miles, a few clouds at 4000 feet and scattered clouds at 10,000 feet. The temperature was reported as -4 degrees Celsius.

The Maintenance Records group reviewed the Continental Airlines maintenance records in Houston, Texas on January 7th and 8th of 2009.

D: DETAILS OF THE INVESTIGATION

1.0 Air Carrier Certificates

Continental Airlines, Inc., 1600 Smith Street 19th Floor, Houston, Texas 77002, Certificate Number CALA 014A, was originally issued by the Southwest Region Flight Standards District Office (FSDO) on July 11, 1938 and reissued again on February 18, 1999.

Continental Airlines also received a Part 145 Repair Station Certificate (Certificate Number VM2R245L) on February 9, 1956 and reissued again on February 5, 2007, from the FAA's Houston FSDO. The repair station, which is located at 8451 Travelair, Houston, Texas, is approved with the following ratings: Airframe, Limited Powerplant, Limited Accessory and Limited Composite Repair.

See Attachment A for additional information.

2.0 Operations Specifications (OpSpecs)[2]

Continental Airlines has a Part 121 Certificate, which included the standards, terms, conditions, and limitations contained in the FAA approved Operations Specifications (Parts D and E) were reviewed.

(a) Air carrier is authorized as a 14CFR Part 121 operation.

[2] Operations Specifications contains the authorizations, limitations, and certain procedures under which each kind of operation, if applicable, is to be conducted by the certificate holder.

(b) Per section D072 of the OpSpecs, which is the Continuous Airworthiness Maintenance Program (CAMP), authorized Continental Inc. to use the manufacturer/Continental maintenance and engine maintenance programs to maintain the airplanes.

(c) Per section D090 of the OpSpecs, Continental Airlines is authorized to utilize CASE[3] as a means of qualifying a vendor for services, parts, and materials to satisfy the requirements of 14 CFR Section 121.373.

(e) Per section D091 of the OpSpecs, Continental Airlines is authorized to make arrangement with other organizations to perform substantial maintenance.

(f) Per section D095 of the OpSpecs, Continental Airlines Air carrier is authorized to use an approved Minimum Equipment List (MEL).

(g) Per section D485 of the OpSpecs, Continental Airlines has an Aging Aircraft Inspection and Records Review.

(h) Per section E096 of the OpSpecs, Continental Airlines is authorized for a Weight and Balance Program.

See Attachment A for additional information.

3.0 Aircraft Information

The aircraft was manufactured by Boeing Aircraft Corporation in Seattle, Washington in June, 1994. The aircraft had 40,541.09 total hours and 21,511 total cycles[4] as of the previous landing at Denver International Airport and prior to the time of the accident on December 20, 2008.

[3] The Air Carriers section of the Nonprofit Coordinating Agency for Supplier Evaluations (C.A.S.E.) was organized as a means of sharing non-prejudicial supplier quality approval data among the membership airlines. This increases surveillance coverage of suppliers and thereby upgrades their quality programs. It also has an economic impact on each C.A.S.E. member by decreasing the cost of supplier surveillance and making their surveillance programs more effective.

[4] The Aircraft Times Report is published using the data recorded in SCEPTRE. Although the information resides in SCEPTRE, the data is first collected from the ARINC Communications Addressing and Reporting System (ACARS) which is equipped on all Continental Airlines and Air Micronesia aircraft. The information is then transmitted to Flight Operations Management System (FOMS) to COSMOS or CMS (Crew Management System) and then to SCEPTRE (maintenance database). On the seventh day of each month, The Aircraft Times Report is generated from Aircraft Records using the data reported from SCEPTRE. The times reported in SCEPTRE are the OFF/ON times (wheels off / touchdown). They do not capture the OUT/IN times (on ground). If ACARS is inoperative or the Data Link / ACARS service provider network is unavailable, this information must be reported to the station via the voicefrequency for manual entry into FOMS.

The aircraft was equipped with two General Electric CFM56-3B1 engines and a Honeywell Auxiliary Power Unit (GTCP85-129H). The engines and the APU had accumulated the following operating times at the time of the accident:

		No 1 Engine	No 2 Engine	APU
Date of Manufacture		4/19/1994	11/20/97	May 1985
Date Installed		8/6/2008	12/9/2006	3/12/2007
Serial Number		857882	858761	P-60199C
Location of Engine / APU Installation		IAH	IAH	EWR
Total Time (engine / APU hours) at installation		38292	22784	32957
Total Cycles (engine / APU cycles) at installation		20124	12158	24238
Total Time of Airframe at engine / APU installation (hours)		39741	35245	35844
Total Cycles of Airframe at engine / APU installation		21083	18743	19040
Time Since last Engine Heavy Maintenance (Level C) / APU Overhaul (hours)		6747	5296	4697
Hours since last installation (cycles)		800 (428)	5296 (2768)	4697 (2471)
Total Time in hours and (cycles) as of 12/20/2008		39092 (20552)	28081 (14926)	37507 (26939)

4.0 Maintenance and Inspection Programs

Airworthiness Directives and Manufacturer Service Bulletin compliance were written into the program when applicable. Additionally, all Zonal and Structural tasks are written into the Continental Airlines maintenance program.

Continental's Maintenance Specification (CAMPS) is in a task oriented format which specifies the maximum allowable time limits for aircraft servicing, tasks, checks, restorations and inspections.

The narrow body Number 1 Service Check is accomplished at Class 3 Maintenance Stations, on aircraft routine overnight (RON). The Number 1

Service Check limit is not to exceed 7 days. The check includes the following items: Check aircraft and cabin logbooks for write-ups, tires for tread wear and inflation pressure, brakes for condition and wear, engines for leaks, oil level and foreign object damage (FOD) in inlets and exhaust areas, fuselage for cracks and loose items and sump the fuel tanks.

The 737-300/500 Number 2 Service Check is accomplished at Continental staffed maintenance stations during an aircraft RON. The Number 2 Service Check limit is not to exceed 7 days. The check includes the following items: Number 1Service Check Tasks plus: Inspect flight and passenger compartments and emergency equipment for condition, (constant speed drives) CSD's for leaks and oil quantity, hydraulic quantity, wings for cracks and loose items, wipe down landing struts and sump the fuel tanks.

The 737-300/500 Number 3 Service Check is to be accomplished at Continental staffed maintenance stations during an aircraft RON. The Number 3 Service Check limit is not to exceed 14 days. The check includes the following items: Number 1Service Check and Number 2 Service Check Tasks plus: Check galleys and lavatories for condition, starter and APU oil levels inspect for leaks and inspect indicators, escape slides, cargo door seals and lights.

The 737-300/500 Phased A Check frequency is 575 flight hours. Consisting of 6 Phases, each phase repeated within 3450 flight hours. Note, where tasks are included in this package that have driving parameters such as flight cycles or calendar limits, those limits will be utilized in the forecast as driving parameters, thereby providing a forecast safeguard. The check includes the following items: Functional and Operational Checks of: CAT II/III, Aural Warnings, Flight Controls, Crew and Pax O2, All Lighting Systems including Emergency, Eng Systems, Fire warning and Hydraulic systems. Replacement of Oil, Air and Water Filters on: Engines, Potable Water and Hydraulic Systems. Service, Clean and Lube of: Starters, APU, ACMs, CSD's Main Landing Gear and Struts, cabin and cargo doors, Leading and trailing edge flight controls, Tail section controls, flight and passenger compartments, lavatories and galleys. Zonal Inspections of Internal and External Systems, Structures, Components and Furnishings.

The 737-300/500 Number 1C Check frequency is 4000 flight hours. It only applies to aircraft which have reached the 13^{th} year of service life threshold, it must be phased-in between the 13th and 16th year of service, for each aircraft. Note: where tasks are included in this package that have driving parameters such as flight cycles or calendar limits, those limits will be utilized in the forecast as driving parameters, thereby providing a forecast safeguard. The check includes the following items: General Visual Inspections (GV) of the cockpit and passenger cabins, cargo compartments, fuselage, empennage, wings, engines and limited structural inspections in various areas. Limited Systems Operational Checks

The 737-300/500 Number 2C Check frequency is 8000 flight hours. Note: where tasks are included in this package that have driving parameters such as flight cycles or calendar limits, those limits will be utilized in the forecast as driving parameters, thereby providing a forecast safeguard. The check includes the following items: Detailed Visual Inspections (DV) of the passenger cabin, cargo compartments, fuselage empennage, main landing gear, wings and limited structural inspections in various areas. Refurbishment of Lavs and Overhead Bins (Removal Optional for restoration). Specific Systems Operational Checks

The 737-300/500 Number 4C Check frequency is 15000 flight hours. Note: where tasks are included in this package that have driving parameters such as flight cycles or calendar limits, those limits will be utilized in the forecast as driving parameters, thereby providing a forecast safeguard. The check includes the following items: detailed Visual Inspections (DV) of the passenger cabin, cargo compartments, fuselage empennage, main landing gear, wings and specific structural inspections in numerous areas. Refurbishment of Seats, Galleys, Lavs and Overhead Bins (Bin Rmvl Optional for restoration). Significant Systems Operational Checks

The 737-300/500 Number 8C Check frequency is 27500 flight hours. Note: Where tasks are included in this package that have driving parameters such as flight cycles or calendar limits, those limits will be utilized in the forecast as driving parameters, thereby providing a forecast safeguard. The check includes the following items: detailed Visual Inspections (DV) of the passenger cabin, cargo compartments, fuselage empennage, main landing gear, wings and several structural inspections in numerous areas. Refurbishment of Seats, Galleys, Lavs, Ceiling Panels and Overhead Bins (Ceiling Panel Rmvl Optional for restoration). Full Systems Operational Checks. The following checks had been accomplished;

CHECK	LIMIT	Last Accomplished	Station
Service Check #1	7 days	12/17/2008	IAH
Service Check #2	7 days	12/17/2008	IAH
Service Check #3	14 days	12/13/2008	DFW
A1 Check	575 hrs	10/22/2007	CLE
A2 Check	575 hrs	1/3/2008	CLE
A3 Check	575 hrs	3/20/2008	CLE
A4 Check	575 hrs	5/23/2008	CLE
A5 Check	575 hrs	7/28/2008	CLE
A6 Check	575 hrs	10/7/2008	CLE
1C Check	4000 hours	1 C is phased in between the 13th and 16th year of service *	
2C Check	8000 hours	7/14/2007	MCO
4C Check	15000 hours	(Prior ½ D Program) 2/18/2005	HOU
8C Check	27500 hours	(Prior Full D Program) 6/3/2000	HOU

*A/C N18611 was in its 14th year of service. The 1C Check was forecasting due June 2010.

5.0 Continued Analysis and Surveillance System (CASS)[5]

Continental Airlines maintains a comprehensive Continuing Analysis and Surveillance (CAS) Program as required by CFR 14, part 121.373. Continental Airlines General Maintenance Manual (GMM) describes the duties, responsibilities, and authorities for departments associated with the CAS program. The departments include Quality Audit, Maintenance Control, Maintenance Control / Technical Support, Aircraft Engineering, Propulsion Engineering, Reliability, Maintenance Programs, and Quality Control.

The Continental Airlines CAS Program primarily encompasses two basic functions:

(1) The first function consists of the Quality Audit program that provides for the continuing surveillance of the administrative and supervisory aspects of the Continuous Airworthiness Program, including work performed by contract arrangements. The Quality Audit Policies and Procedures Manual provides a detailed description of the auditing program, including the administration of the C.A.S.E supplier surveillance program, and includes the guidelines for the auditors.

(2) The second function consists of monitoring the mechanical performance of aircraft, engines, and components with a data collection / analysis system as a part of the FAA approved Reliability Program. The Continuous Maintenance Performance Audit (CMPA) Manual provides a detailed description of the reliability program and includes the guidelines for the reliability analysts and engineers.

The analysis and surveillance program shares data and actions between the various Technical Operations Departments. This is accomplished during monthly Reliability Control Board / Safety Meetings, Audit Reports, and other meetings and correspondence.

[5] As established by 14 CFR Part 121.373, each certificate holder shall establish and maintain a system for the continuing analysis and surveillance of the performance and effectiveness of its inspection program and the program covering other maintenance, preventative maintenance and alterations and for the correction of any deficiency in those programs, regardless of whether those programs are carried out by the certificate holder or by another person.

The following source documents are considered a part of the Continental Manual System.

Documents:	Revision Status
General Maintenance Manual	Revision 567 – 12/15/2008
Quality Audit Policies and Procedures Manual	Revision 94 – 4/15/2008
Continuous Maintenance Performance Audit	Revision 79 – 11/5/2008

6.0 Minimum Equipment List (MEL)[6]

Continental Airlines is authorized to use an approved MEL on its B737 fleet per its OPS-SPECS.

At the time of the accident, there were two open MEL item in the airplane logbook. The two cell life vests were replaced by single cell on October 22, 2008 per Engineering Authorization (EA) 2560-02132. The other MEL item was for the aft left lavatory water. Both items were documented in the aircraft log books with the appropriate aircraft placards.

7.0 Supplemental Type Certificates (STC)[7]

The Supplemental Type Certificates (STC), supplied by air carrier, were reviewed with no findings.

ST01219SE – Installation of winglets, wing structural reinforcement and and related system changes on Boeing 737-300 and 737-500 airplanes. Fabrication and installation of parts must be accomplished in accordance with the FAA approved Aviation Partners Boeing Master Drawing Lists.

See Attachment B for additional information.

8.0 Airworthiness Directive (AD)[8] and Service Bulletin (SB) Summary

The air carrier provided AD summaries, which were reviewed. Total AD's for this 737 aircraft were 296. All AD's had been complied with to terminating action

[6] The FAA approved Minimum Equipment List contains a list of equipment and instruments that may be inoperative on a specific aircraft for continuing flight beyond a terminal point.
[7] The FAA issues Supplement Type Certificates, which authorize a major change or alteration to an aircraft, engine or component that has been built under an approved Type Certificate.
[8] Airworthiness Directive (AD) is a regulatory notice sent out by the FAA informing the operator of an action that must be taken for the aircraft to maintain its airworthiness status.

except 39 recurring AD's which were scheduled and being accomplished as required, of those the following are of note to this accident:

AD 2005-20-39 - This AD results from twelve reports of severe corrosion on one or more of three components of the main landing gear (MLG). We are issuing this AD to prevent collapse of the MLG, or damage to hydraulic tubing or the aileron control cables, which could result in possible departure of the airplane from the runway and loss of control of the airplane.

AD 2003-24-08 - To detect and correct cracked, corroded, or fractured carriage spindles and to prevent severe flap asymmetry, which could result in reduced control or loss of controllability of the airplane.

AD 2003-07-12 - To prevent failure of landing gear parts, which could lead to landing gear collapse.

AD 99-10-12 - To detect and correct corrosion and cracking of the actuator beam arm of the main landing gear (MLG), which could result in damage to the control cables of the aileron and spoiler and consequent reduced controllability of the airplane.

In addition to manuals, service letters and other technical documents, Continental's Technical Publications department receives Service Bulletins from various manufactures. Concurrently, Service Bulletin document accountability tracking is initiated within Continental's SCEPTRE system, and the Service Bulletins are routed to the Sr. Director of Engineering for further distribution, to the appropriate discipline within Engineering. Engineering (in concert with Reliability and Quality Assurance) determines applicability, disposition, priority, launches kit acquisition, and writes the adopting Engineering Authorization (EA); for those service bulletins containing alterations desiring to be incorporated. Such EA's are tracked and reported within the SCEPTRE tracking system, with compliance documentation retained in the Aircraft Records ARDocs imaging system. If service bulletin accomplishment is mandated by AD, such EA's are accomplished and tracked, with status provided by the AD/EA Status Report. Engineering does not publish, what would be a non-regulatory requirement, service bulletin status report.

See Attachment C for additional information.

9.0 Aircraft Maintenance Logbook

The Airplane Maintenance Logbooks contain daily flight and maintenance information. The logbook pages for all ATA sections were reviewed from June 20, 2008 through December 20, 2008 and from January 1, 2008 through June 20, 2008 for ATA section 32 (Landing Gear). The review indicated that the maintenance check records were up to date and complete. No discrepancies were

noted. Four log book entries and one hangar non routine were retained for possible future reference. They include log numbers 8076810 dated 11/18/08, 8062323 dated 7/26/08, 8062326 dated July 7/27/08 and hangar non routine 5623275 dated 11/19/08.

Log number 8076810 (11/18/08) – Winglet Installation

Discrepancy: Accomplish Engineering Authorization (EA) 5730-02222 Rev. F.

Corrective Action: Complied with EA 5730-02222 Rev. F.

Log number 8062323 (7/26/08)

Discrepancy: On takeoff roll lost ability to control nose wheel steering. Turned left on to runway, pushed power up, left engine spooled up first. Aircraft was straight at start of roll. Aircraft pulled to the right and steering tiller turned right. Unable to center tiller until power was reduced.

Corrective Action: Removed and replaced nose landing gear metering valve assy. Ops test normal per AMM 32-51-11 And 32-51-00, NLG steering system ops checks normal.

Log number 8062326 (7/27/08)

Discrepancy: Ref: LP 8062323. Aircraft still steers/pulls right on power application on takeoff roll. Pulling reduced with rudder application.

Corrective Action: Adjusted nose wheel steering system per AMM 32-51-11. Ops checked normal.

In addition the Airplane Maintenance Hangar Non Routine and Line Non Routine repair item cards were reviewed. The Non Routines cards for all ATA sections 12, 27, 29, 32 and 70 thru 80 were reviewed from June 20, 2008 through December 20, 2008 and from January 1, 2008 through June 20, 2008 for ATA section 32 (Landing Gear). The review indicated that the maintenance check records were up to date and complete. No discrepancies were noted. One hangar non routine entry, 5623275 dated 11/19/08 was retained for possible future reference.

Hangar Non Routine 5623275 (11/19/08)

Discrepancy: Evidence of leak at nose landing gear metering valve.

Corrective Action: Removed and replaced NLG metering valve per AMM 32-51-11. Performed adjustment test per AMM 32-51-00.

See Attachment D for additional information.

10.0 Weight and Balance Summary

Per the Continental Maintenance Program, the airplanes are to be weighed every thirty-six (36) calendar months.
The last documented weight and balance job was performed on April 7, 2006 by Continental Airlines, IAH maintenance. The last weight and balance calculation was performed on November 29, 2008 after winglet installation.

Basic Empty Weight:	69,153 pounds
Arm:	650.20 inches
Moment:	44,962,918 inch-pounds

Operating Empty Weight:	72,485 pounds
Arm:	650.99 inches
Moment:	47,186,991 inch-pounds

See Attachment E for additional information.

11.0 Service Difficulty Reports (SDR)[9]

From January 2008 through December 2008, Continental Airlines made one Operational/Structural Difficulty Report to the FAA for aircraft N18611. Upon touchdown and thrust reverser activation the A-loop number 2 aft cargo smoke detector light illuminated. Subsequently the A-loop was removed and replaced and the A3 detector system checked out good.

See Attachment F for additional information.

12.0 Major Repairs and Alterations

The aircraft major repair records were reviewed with no relevant findings. However the accomplishment of the winglet installation STC ST01219SE is also considered a major repair and alteration. For more information refer to Section 7.0, Supplemental Type certificates, of this report.

See Attachment G for additional information.

13.0 Vendors

The Maintenance Records Group reviewed the Approved Vendor List provided by Continental Airlines The Continental audit program is based upon a calendar schedule and basic risk analysis. Special audits will be conducted on an as-needed basis or on request. Continental Airlines is a member of CASE and component

[9] A Service Difficulty Report (SDR) is a report of the occurrence or detection of each failure, malfunction, or defect as required by 14 CFR 135.415.

repair suppliers are audited every twenty-four (24) months with a maximum limit of thirty (30) months. The audits are performed by Continental auditors or CASE auditors. All initial repair agency audits are performed by Continental auditors. Repair agencies listed in the Operations Specification have a much shorter audit time interval from six (6) months to twelve (12) months dependant upon the type of repair/overhaul agency. Purchasing provides a list of top 50 repair agencies by volume once a year. These agencies are reviewed / visited by a Continental auditor more frequently even though a CASE audit was performed.

Continental internal audits are performed every twelve (12) months with a fifteen (15) month maximum limit. These audits review Station Operations, Fuel, Maintenance, and specific Technical Operations Systems / Department Audits. The overall program is defined in the Quality Assurance Policy and Procedures Manual.

Audit Type	Audit Interval
Major Airframe Maintenance Suppliers	6 months, not to exceed 8
Major Engine Maintenance Suppliers	8 months, not to exceed 10
Engine Repair Suppliers	12 months, not to exceed 15
Emergency Equipment Suppliers	12 months, not to exceed 15
Base Maintenance (Hangars), Line Maintenance, and Shops	12 months, not to exceed 15
Station, Aircraft Fueling, On-call Maintenance, and Contract Maintenance	12 months, not to exceed 15
Technical Operations Department / System Audits	12 months, not to exceed 15
Component Repair Suppliers	24 months, not to exceed 30

14.0 Method of Record Keeping

The Continental Airlines Aircraft Records Department is an FAA required support department, within the Technical Services organization charged with: receipt, accountability, audit, disposition, retention and retrievability of official Aircraft, Engine and Component maintenance documentation & records, as required by applicable FAR's (especially 121.380)

In addition, Aircraft Records is responsible for creation of the forecast, update and audit of inspection and component control mechanisms in the SCEPTRE

maintenance tracking and information system, as defined in the Maintenance Specification (CAMPS) and Engineering directives. As a result, Aircraft Records plays an integral role in maintaining the integrity of the SCEPTRE database by monitoring compliance of inspections, Engineering Action Authorizations (EA's, FCD's, ECRA's), and component change transactions.

Aircraft Records utilizes, and is consistently developing, multiple computer tracking, storage, and automation systems to assist in accomplishing the mission outlined above. ARdocs (PARIS) is an FAA approved document imaging system, which permanently stores official Aircraft Maintenance Documents on magnetic media. SCEPTRE (System Computerized for Economic Performance, Tracking, Reporting and Evaluation) is a mainframe system used to provide status and decision support reports through Web Based Reporting.

SCEPTRE contains the ability to generate an electronic notification to various pre-determined recipients of selected SCEPTRE input resulting from maintenance and inspections actions. Examples of events in SCEPTRE that can be programmed to initiate alerts include; Maintenance sign-off of work accomplished (ie Checks, Inspections, Engineering Authorizations etc.), component installations, components clearing Receiving Inspection, establishment of new rotables into the database, etc. In cases of Aircraft Records, these alerts are often received as notification of SCEPTRE entries made outside of Aircraft Records. By receiving and tracking these alerts, Aircraft Records is able to either react accordingly or hold the alert monitoring for later receipt of hardcopy maintenance documents via traceable couriers.

15.0 Manuals

Continental Airlines uses the following manual to maintain the airworthiness of its fleet and management of the airline.

General Maintenance Manual (GMM) Revision 567 dated 12/15/2008:

The General Maintenance Manual sets forth the administrative policies, procedures, rules, and regulations required to standardize and guide the actions of the departments within Technical Operations. Each employee is required to observe and comply with these instructions. (Ref. 14CFR 121.133, 121.135, and 121.369.)

This Manual provides a summary of the objectives, policies, organizational structures, and responsibilities for Continental Airlines Technical Operations. Contains general information pertaining to general maintenance and practices. Specific aircraft application, usage, and substitution are found in the individual aircraft maintenance manual. It furnishes the mechanic and inspector a source of information about how to perform various maintenance practices used on Continental aircraft.

Maintenance Time Limits Manual:

Continental Airlines' maintenance time limitations manual is known as the Continental Airlines Maintenance Program System (CAMPS) is maintained by Maintenance Programs. Within CAMPS resides the Maintenance Schedule and Limits for each airplane model operated by Continental Airlines. The Maintenance Schedule is controlled by Continental's FAA approved Reliability Program, titled Continuous Maintenance Performance Audit (CMPA). The Maintenance Schedule is in a task oriented format; it resides in electronic format. It sets out the what, how, and when of the scheduled maintenance effort. The CAMPS listing of time limits and inspection frequencies is managed by Maintenance Programs, and amended progressively as a result of Maintenance Specification Ammendments (MSA's), approved by Reliability board members. The CAMPs spec has no formal revision dates, however each line item contains a history of revisions.

Job Instruction Cards:

Technical Writers create and revise customized job cards that provide a detailed, efficient procedure to perform maintenance on Continental Airlines aircraft and components. There are five types of job cards that Methods and Standards controls

- Primary - Job cards that comply with the intent of CAMPS specifications
- Support - Job cards that provide access and/or accomplish other tasks related to a primary task.
- Administrative - Job cards which support GMM requirements and other non-maintenance specification tasks.
- Open and Close - Job cards which contain panel access requirements.
- Shop Cards – Job cards which assist in the shop environment

Minimum Equipment List (MEL) Revision 73 dated 9/1/2008:

In compliance with FAR 121.628 (a), a Minimum Equipment List (MEL) is published for each type of aircraft in scheduled service. The MEL is used to determine whether an aircraft may continue to be operated with a given airworthiness item out of service. Duplication of aircraft components, instruments, and systems provides jet-transport aircraft with several degrees of redundancy. With detailed engineering analysis of modes of failure, certain items are legally allowed to be inoperative without adversely affecting the aircraft's safety or reliability. A list of these items is summarized in each Air Carriers "FAA Approved Minimum Equipment List". By following the limitations specific equipment can be inoperative while still preserving an acceptable level of airworthiness.

Weight and Balance Manual Revision 10, August 18, 2008:

Weight and Balance procedures to be followed by maintenance and flight operations personnel on all aircraft operated by Continental Airlines. The purpose of the Weight and Balance Manual is to establish Weight and Balance processes and procedures that are FAA approved. The processes described in this report result in a Weight & Balance Control System that when used in conjunction with the FAA Approved Fleet Substantiation Reports, complies with applicable Federal Aviation Regulations (FAR), and is in accordance with FAA Advisory Circular AC 120-27E.

C.A.S.E. Air Carrier Section Policies and Procedures Manual:

Coordinating Agency for Supplier Evaluation (CASE) has been established by certified air carriers in order to share non-prejudicial vendor monitoring and surveillance information. Air carriers are required to have an ongoing continuous surveillance program to meet the CFR criteria delineated by FAR121-373. The FAA has indicated the CASE Program is an acceptable means of complying with surveillance requirements for vendor/suppliers.

The CASE policy and procedures are outlined in the latest revision of the CASE Air Carrier Section Policies and Procedures Manual. Since Continental has become sustaining member with voting authority at to the organization's function, the CASE Policy and Procedures Manual has now become part of Continental's manual system. Continental's Operations Specifications have been revised to reflect the CASE Program. The Quality Assurance Department is responsible to provide the basis for approving outside sources that accomplish overhaul/repair; modification, alteration, and test of aircraft related components and appliances. FAA authorization for Continental Airlines to participate in the CASE Program is outlined in Continental's Operations Specifications.

Manufactured Supplied Manuals:

Aircraft Maintenance Manuals, Structural Repair Manuals, Wiring Diagrams, Overhaul Manuals, Illustrated Parts Catalog. Unless otherwise specified (i.e., by Engineering Authorizations, Engineering Report Build Standards / Repair Specifications, or AMM / IPC / WDM Supplements), OEM Manuals shall be part of Continental Airlines' Maintenance Manual system.

Brian K. Murphy
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