NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

September 10, 2015

Maintenance Records Factual

DCA15FA085

A. ACCIDENT

Operator:	Delta Air Lines
Location:	LaGuardia Airport, New York
Date:	March 5, 2015
Time:	11:02 AM Eastern Standard Time[1]
Airplane:	Boeing MD-88, Registration Number: N909DL, Serial Number: 49540

B. MAINTENANCE RECORDS FACTUAL

Group Chairman:	Gregory Borsari National Transportation Safety Board Washington, DC
Group Member:	Kevin Johnson Federal Aviation Administration Irving, TX

[1] All times are Eastern Standard Time (EST) based on a 24-hour clock, unless otherwise noted. Actual time of incident is approximate.

Group Member: Robin Connolly
Delta Air Lines
Atlanta, GA

Group Member: Michael T. Schilz
Airline Pilots Association, International
Herndon, VA

C. SUMMARY

On March 5, 2015, about 1102 eastern standard time (EST), a Boeing MD-88, N909DL, operating as Delta Airlines flight 1086, was landing on runway 13 at LaGuardia Airport, New York, New York, and exited the left side of the runway, contacted the airport perimeter fence, and came to rest with the airplane nose on an embankment next to Flushing Bay. The 129 passengers received either minor injuries or were not injured, and the 3 flight attendants and 2 flight crew were not injured. The airplane was substantially damaged. Flight 1086 was a regularly scheduled passenger flight from Hartsfield-Jackson Atlanta International Airport (ATL) operating under the provisions of 14 Code of Federal Regulations (CFR) Part 121. Instrument meteorological conditions (IMC) prevailed, and an instrument flight rules (IFR) flight plan was filed.

D. DETAILS OF THE INVESTIGATION

1.0 Air Carrier Certificates

The Federal Aviation Administration (FAA) Southern Region issued an Air Carrier Certificate (Certificate Number DALA026A, dated September 30, 1988) to Delta Air Lines Inc., Hartsfield-Jackson Atlanta International Airport, Atlanta, GA 30354.

See attachment 1 for more information

The Federal Aviation Administration (FAA) Southern Region, Certificate Management Office issued an approved Repair Station Certificate (Certificate Number DALR026A, dated December 23, 1983) to Delta Air Lines, Inc., d/b/a Delta TechOps and/or DTO whose business address is 1775 M. H. Jackson Service Road Hartsfield-Jackson International Airport, Atlanta, GA 30354 with the following ratings: Airframe, Powerplant, Radio, Instrument, Accessory, Limited Non-Destructive Inspection, Testing and Processing (July 21, 2003) and Limited-Emergency Equipment (April 20, 2000).

The Federal Aviation Administration (FAA) Southern Region, Certificate Management Office issued an approved Satellite Repair Station Certificate (Certificate Number DAL2026A, dated January 5, 2011) to Delta Air Lines, Inc., d/b/a Delta TechOps and/or DTO whose business address is 7500 Airline Drive, Minneapolis, MN 55450 with the following ratings: Limited Airframe, Limited Engine, Limited Instrument, Limited Radio, Limited Non-Destructive Test, and Limited Accessory.

2.0 Operations Specifications (OpSpecs)[2]

Delta Air Lines has a Part 121 Air Carrier Certificate, which includes the standards, terms, conditions, and limitations contained in the FAA approved Operations Specifications (Parts D and E).

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

(b) Per section D072 of the OpSpecs, the Continuous Airworthiness Maintenance Program (CAMP) authorized Delta Air Lines to use the Technical Operations Policies and Procedures (TOPP) Manual 20-20-01 to maintain the airplanes.

(c) Per section D074 of the OpSpecs, Delta Air Lines was authorized to use a maintenance reliability program for its fleet of aircraft per the TOPP 20-40-05 Reliability Document D074 dated 9/10/2014. The Time Limitations for the overhaul, inspections and checks of the aircraft related systems including appliances and components controlled by the program are contained in Delta's TOPP 20-20-21 (MD-88)Manual.

(d) Per section D085 of the OpSpecs, Delta Air Lines have 117 MD-88, 65 MD-90, 57 A319-100, 69 A320-200, 11 A330-200, 21 A330-300, 59 B717-200 , 10 B737-700, 73 B737-800, 33 B737-900ER, 16 B747-400, 124 B757-200, 16 B757-300, 16 B767-300, 58 767-300ER, 21 767-400ER, 8 B777-200, and 10 B777-200LR , aircraft in its fleet. Fleet total of 784 aircraft.

(e) Per section D090 of the OpSpecs, Delta Air Lines was authorized to utilize CASE[2] as a means of qualifying a vendor for services, parts, and materials to satisfy the requirements of 14 CFR Section 121.373.

(f) Per section D091 of the OpSpecs, Delta Air Lines was authorized to make arrangements with other organizations to perform substantial maintenance on its fleet of aircraft.

(g) According to Section D095 of the OpSpecs, Delta Air Lines was authorized to use an approved Minimum Equipment List (MEL).

(h) According to Section D097 of the OpSpecs, the FAA has approved sections of Delta Air Lines maintenance program for the compliance of Repairs Assessment for Pressurized Fuselages (121.1107), Supplemental Inspections (121.1109), Fuel Tank Systems Maintenance Program (121.1113), Flammability Reduction Means (121.1117) and Electrical Wiring Interconnection Systems (EWIS) Maintenance Program (121.1111).

---

[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.

[2] 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 Air Lines. 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.

(i) Per section D485 of the OpSpecs, N909DLhad an initial Aging Aircraft Inspection and Records Review on January 2005. Repetitive Aging Aircraft inspections were then accomplished in December 2010 and next due in September 2015.

(j) Per section E096 of the OpSpecs, Delta Air Lines was authorized for a Weight and Balance Program (TOPP 20-10-25). Delta Air Lines was authorized under 14 CFR Part 121 subpart 121.153(b) to use fleet aircraft weights outlined in their Weight and Balance Program. The Weight Sampling Program was every 36 months.

3.0 Type Certificate Data Sheet

The Type Certificate Data Sheet (A6WE) prescribes conditions and limitations under which the product for which the Type Certificate (TC) was issued meets the airworthiness requirements of the Federal Aviation Regulations. According to the document, The Boeing Company is the holder of the TC.

4.0 Aircraft Information

The Boeing Airplane Company manufactured the airplane on July 22, 1987. It was then delivered to Delta Air Lines on December 30, 1987. Delta Air Lines was the original owner of the airplane. The airplane had 71,195.54 total hours with 54,865 total cycles at the time of the accident.

The airplane was equipped with two Pratt & Whitney engines and a Honeywell Auxiliary Power Unit (APU). The engines and APU had accumulated the following operating times at the time of the accident:

Table 1 - Engine and APU Information

		No.1 Engine	No.2 Engine	APU
Manufacturer		Pratt & Whitney	Pratt & Whitney	Honeywell
Part Number		JT8D219	JT8D219	GTCP36-280D
Manufacture Date		6/1/1990	1/13/1993	1/28/1993
Date Installed		10/25/2013	8/21/2014	12/13/2014
Serial Number		725552	726934	P80499
Location of Engine/APU Installation		Atlanta, GA	Miami, FL	Windsor Locks, CT
Time Since Overhaul (Engine /APU hours) at installation		34509.36	30022.25	0
Total Cycles Since Overhaul (Engine/APU cycles) at installation		24300	20804	0
Total Days Since Overhaul at installation		414	755	0

		No.1 Engine	No.2 Engine	APU
Time Since Overhaul (hours)		37671.12	31157.37	600.18
Cycles Since Overhaul		26570	21640	392
Days Since Overhaul		911	955	83
Engine Total Time Hours		61336.24	50308.24	48190.24
Engine Total Cycles		45859	37609	26496
Total Time of Airframe during engine/APU installation (hours)		68038.36	70060.42	70603.24
Total Cycles of Airframe during engine/APU installation		52598	54029	54478

5.0 Maintenance and Inspection Programs

The maintenance program was developed using the Maintenance Steering Group (MSG-2)[3] analysis logic. All Maintenance Planning Documents (MPD) were incorporated into the Delta Air Lines Maintenance Program. Airworthiness Directives and Manufacturer Service Bulletin compliance were written into the program as applicable. Additionally, all Zonal and Structural tasks were written into the Delta Air Lines maintenance program.

Table 2 - Maintenance Check Intervals

Check	Time Limit
Tire Pressure	3 Day
Transit Check (Oil/Hydraulics/Oxygen)	4 Day
Service Check	9 Day
A-Check	600 Flight Hour
B-Check	2200 Flight Hour
C-Check	760 Day
C2-Check	1520 Day (50 Month)
H-Check	15,000 Flight Hour, 2190 Day (6 year)
H2-Check	30,000 Flight Hour, 4566 Day (12 year)

[3] The MD-88 maintenance program was originally developed using MSG-2 methodology. Delta Air Lines adopted and converted the MD-88 fleet to MSG-3 methodology in phases starting with systems and powerplants. The MSG-2 to MSG-3 conversion including the structures was completed around the 2008 timeframe. The MSG-3 process establishes the initial minimum maintenance and inspection requirements for operators to use when developing an approved continuous airworthiness maintenance program for airframe, engines, systems, and components.

Check	Time Limit
H1-4 Structural Inspection*	Initial 50,000 Flight Cycle, Repeat 15,000 Flight hour, 2190 Day (6 year)
H1-5 Structural Inspection	Initial 67,000 Flight Cycle, Repeat 15,000 Flight hour, 2190 Day (6 year)
H1-6 Structural Inspection	Initial 75,000 Flight Cycle, Repeat 15,000 Flight hour, 2190 Day (6 year)
H1-7 Structural Inspection	Initial 89,000 Flight Cycle, Repeat 15,000 Flight hour, 2190 Day (6 year)
H1-8 Structural Inspection	Initial 100,000 Flight Cycle, Repeat 15,000 Flight hour, 2190 Day (6 year)
Standalone Items	Individual intervals as required
Life Limited Parts	Individual intervals as required

***Note –** H1-4 thru H1-8 Structural Inspections are packaged with C2, H or H2 checks

The following is a listing of the previous inspections accomplished on airplane N909DL. This information was retrieved from the airplane maintenance records:

Table 2 - Maintenance Checks

Check	Last Check Date	Location	Total Time	Total Cycles
Tire Pressure Check	3/2/2015	Tampa, FL	71195.30	54845
Transit Check	3/2/2015	Tampa, FL	71195.30	54845
Service Check	3/2/2015	Tampa, FL	71195.30	54845
A-Check (1A&7A)	2/11/2015	Savannah, GA	71024.42	54763
B-Check	9/22/2014	Jacksonville, FL	70114.18	54068
C-Check	9/22/2014	Jacksonville, FL	70114.18	54068
C2-Check	3/30/2013	Minneapolis, MN	66651.12	51630
H-Check	12/31/2010	Dothan, AL	61568.8	48134
H2-Check	12/31/2010	Dothan, AL	61568.8	48134
H1-4 Initial	12/31/2010	Dothan, AL	61568.8	48134

The Aging Aircraft Maintenance Inspection Program for N909DL showed the following:

The airplane is part of the Supplemental Structural Inspection Document (SSID) program with the initial inspection threshold at the 50,000 flight cycle and a six year / 15,000 flight hours repeat interval.

6.0 Continuing Analysis and Surveillance System (CASS)[4] and Reliability Program

The CASS program was in place to provide surveillance and analysis of the Delta Air Lines Continuous Airworthiness Maintenance Program (CAMP) for performance and effectiveness of the Inspection and Maintenance Programs, to include maintenance, preventative maintenance and alterations. Delta Air Lines conducted monthly CASS meetings, which according to Delta representatives; the FAA representatives are invited to attend.

Additionally, Delta Air Lines has an FAA approved Reliability Program. The Program monitors the operations to ensure established reliability levels are achieved. The Program is intended to fulfill the long-term mechanical performance monitoring functions of CASS. The Reliability Program defines the time limitations or standards for determining intervals between restoration, inspections, inspections and checks of airframes, powerplants, appliances and emergency equipment and serves to satisfy the requirements of 14 CFR Part 119.49(a)(8), 119.5, and 121.135. The Reliability Program has implemented adequate controls such as the systems used to collect the data, methods used to analyze the data, and their application to maintenance controls, development and maintenance of performance standards, implementation of corrective actions, etc.(TOPP 20-40-05).

CASS and Reliability Reports were generated from each program on a monthly basis. The reports typically contain Airline Operational Performance metrics, Organizational metrics, Fleet Engine and Component dispatch reliability metrics, Delay and Cancellations, Airline project status and Quality Assurance Audits etc.

7.0 Minimum Equipment List (MEL)[5]

Delta Air Lines was authorized to use an approved MEL on its airplanes per its OpSpecs. At the time of the accident, there were no open MEL items in the airplane logbook and electronic records.

8.0 Supplemental Type Certificates (STC)[6]

Supplemental Type Certificates (STCs), supplied by air carrier, were reviewed. A total of 43 STCs were documented and installed by the operator. There were no STCs that affected the spoilers, landing gear braking / steering or thrust reverser systems.

[4] 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.
[5] 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.
[6] 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.

9.0 Airworthiness Directives (AD)[7] and Service Bulletins (SB)

Delta Air Lines provided an AD summary for review. The AD summary contained the applicable Service Bulletins. A review of Airworthiness Directive status lists for the airplane, powerplants and appliances were conducted. All ADs applicable to this airplane were implemented. No discrepancies were found during the review.

10.0 Aircraft Flight Logs

Electronic Aircraft Flight Logs were reviewed from January 1, 2015, to March 5, 2015. The review focused on aircraft braking, steering, thrust reversers, and air data discrepancies on the incident airplane.

There were 20 write-ups that affected the flight controls, engines, landing gear, and brakes. The flight control write-up within the date range was limited to the right hand hinge door to the horizontal stabilizer being damaged. It was deferred and subsequently repaired.

The engines had three write-ups. Engine number two had two write-ups regarding the thrust reverser unlock light remaining on after landing. Both of the write ups were cleared after Maintenance ran the engines and tested the reversers. Engine number one had an engine run to check for oil leaks at idle and high power due to high oil consumption.

The landing gear had 14 write-ups in that same period. Two of the write-ups were for tire pressure checks that needed to be accomplished. The nose gear tires were replaced, both right main gear tires were replaced, and the left main gear tires were replaced twice within the 64 days prior to the accident. The left outboard and right hand inboard brake assemblies were also replaced in that same time period.

11.0 Weight and Balance Summary

Per the Delta Air Lines OpSpecs, the airplanes were to be weighed every thirty-six (36) calendar months using a fleet sampling program. The last actual weight and balance on the airplane was accomplished on June 6, 2007 by Delta Air Lines at the Atlanta maintenance facility. The aircraft was maintained in compliance with the Fleet Average Weight program defined in the Weight and Balance Manuals. The figures for the last weight and balance are shown below:

Basic Operating Weight:	82,057	pounds
Arm:	941.66	inches
Moment:	77,270,221	lb-inches

[7] 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.

12.0 Service Difficulty Reports (SDR)[8] and Mechanical Interruption Summary Report (MISR)[9]

The Maintenance Records Group analyzed the Service Difficulty Reports for the accident aircraft for the date range June 1, 2014 to March 5, 2015. There were six SDRs on file. Two reports dealt with emergency lights. One report was for a structural dent in the aircraft skin near the main entry door. Two reports were for structural cracks found in the left and right horizontal stabilizers that were found during an inspection. The date on both reports is September 19, 2014. The final report was for an air turn back which occurred January 1, 2015. The crew reported excessive control pressures on the elevator and stabilizer trim, nose down to maintain intended flight path. Maintenance found the right elevator power boost cylinder was not connected to the elevator. The securing nut lost the cotter pin and had backed off. The cotter pin was replaced; and the damage to the bracket and access door was repaired. The rigging was inspected and ops checked, and the aircraft was returned to service. Delta confirmed that no other SDRs had been filed.

From August 7, 2014 to March 5, 2015 Delta Air Lines reported zero Mechanical Interruption Summary Reports to the FAA for aircraft N909DL.

13.0 Major Repairs and Major Alterations

Major repairs and major alterations for the aircraft, engines and APU were documented and reviewed. 31 major repairs were accomplished on N909DL. No major repairs for the hydraulics, braking and spoiler systems as well as the thrust reversers were accomplished on the airplane.

The major alteration listing revealed 100 major alterations on the accident airplane. There were eight major alterations for Flight Controls and three major alterations for Wheels. There were no major alterations accomplished to the hydraulic, braking, spoiler systems or the thrust reversers on the accident airplane.

14.0 Time Limit Components

Time Limit component status for the airplane, the two installed powerplants and the APU were reviewed.

The review included time limited rotable components installed on N909DL. During the review it was discovered that the anti-skid control valves (MPD task 32-045-02) were not being scheduled

[8] As required under 14 CFR 121.703, each scheduled operator is to report the occurrence or detection of each failure, malfunction or defect concerning (a) fires during flight, (b) false fire warning during flight, (c) engine exhaust system that causes damage during flight, (e) an aircraft component that causes accumulation or circulation of smoke, vapor, or toxic or noxious fumes during flight, (f) engine shutdown during flight, (g) a propeller feathering, (h) aircraft structure requiring major repairs, (i) cracks, corrosion, (j) other safety critical issues as stated in the FAR part. These occurrences must be reported within 72 hours of the event.

[9] Each scheduled operator is required under 14 CFR Part 121.705 to submit a summary of any (a) interruption to flight, (b) unscheduled change of aircraft en route, or unscheduled stop or diversion from a route caused by known or suspected mechanical difficulties or malfunctions that are not required to be reported as service difficulty reports.

for the Delta Air Lines MD-88 Fleet. The MPD recommended task is a restoration with a 10 year time limit or 20,000 Flight Cycles whichever occurs first. The Delta Air Lines maintenance program listed the restoration task (ID 72462) but the task was not scheduled. Delta Air Lines conducted an internal investigation in order to determine when and how this maintenance program error occurred. Delta determined the restoration task was erroneously added to the MD88 maintenance program in 2010. Subsequently, Delta conducted an analysis utilizing reliability data and revised the maintenance program for the anti-skid control valves.

The Airworthiness Group removed the four anti-skid control valves from the airplane for testing (Refer to the factual report prepared by the Airworthiness Group Chairman for findings). One of the four anti-skid control valves installed on the accident airplane did not match the records reviewed by the Maintenance Group. Maintenance records indicated that the right outboard valve serial number 4402 was installed; however according to the Airworthiness Group, the right outboard anti-skid control valve serial number was 4384. Delta Airlines conducted an internal review but could not determine how this record keeping error occurred. Further, both serial number valves were beyond the restoration limit per the approved Delta maintenance program at the time of the accident.

15.0 Vendors

The Maintenance Group reviewed the Approved Vendor List provided by Delta Air Lines. Delta Air Lines accomplished audits of their essential maintenance providers on a bi-annual basis. Additionally, per Delta's OpSpec, Delta was also authorized to utilize CASE as a means for qualifying vendors. All essential maintenance and component vendors were listed in the operator's Approved Maintenance Provider List. There were no discrepancies in the listing.

16.0 Method of Record Keeping

Delta Air Lines uses several different maintenance electronic systems (i.e. System Computerized for Economic Performance, Tracking, Recording and Evaluation or SCEPTRE) to manage the various aspects of the maintenance program and configuration of their aircraft. Data for components installed, MEL/carry over/deferred item records, Engineering Authorizations, logbooks, engine records, etc. were entered into the aircraft computer records on a daily basis. A computer file history was maintained so that all inspections and checks were monitored for time limitations. The computer files were backed up daily to prevent total loss of history files. All hard copy documents are verified, scanned, audited and imaged and the hard copies are then shredded by Delta Air Lines. At this time, Delta Air Lines retains all maintenance historical files in the TechOps approved Imaging System as outlined in Delta Air Lines TOPP 50-40-05.

17.0 Manuals

Delta Air Lines used the following manuals to maintain the airworthiness of its fleet and management of the airline.

Technical Operations Policy and Procedures (TOPP) – Manual outlines Technical Operation's Policies and Procedures Manual system used to comply with 14 CFR Part 121 regulatory

requirements and to provide information, policies, and procedures for the overall safety, administration, and operation of Delta's Technical Operations.

Minimum Equipment List (MEL) – List of equipment and instruments that may be inoperative on a specific aircraft.

Weight and Balance Manual – Weight and balance procedures to be followed by maintenance and flight operations personnel on all aircraft operated by Delta Air Lines.

Manufacturer Supplied and Delta Air Lines customized Manuals - Aircraft/Engine Maintenance Manuals, Structural Repair Manuals, Overhaul Manuals, Wiring Manuals, Fault Isolation Manuals, Illustrated Parts Catalog, Corrosion Program Manual, NDT Manual, and Service Bulletins.

18.0 Braking, Auto Spoiler and Thrust Reverser System

The Maintenance Group reviewed the records associated with the landing gear, brakes, auto spoiler, and thrust reverser systems. Table 4 provides the most recent task description and record of completion. In addition, the records for the C-Check that was completed September 22, 2014, were reviewed. This review focused on ATA chapters for Auto Flight, Flight Controls, Hydraulics, Indicating, Landing Gear (Brakes, Antiskid, & Auto Brakes), Navigation, Engine Power and Thrust Reversers both routine and non-routine items were reviewed.

Table 4 - Chapter 32 Maintenance Program

ATA	Type of Task	Task Description	Frequency	Last C/W	Work Card
32 - 00	OPC	BRAKE FLUID QUANTITY LIMITERS	C	9/22/2014	3200-7564
32 - 00	OPC	AUTO BRAKE SYSTEM	C	9/22/2014	3243-7161
32 - 00	OPC	COMPUTER - AUTO BRAKE	C	9/22/2014	3243-7161
32 - 00	OPC	PANEL - AUTO BRAKE CONTROL	C	9/22/2014	3243-7161
32 - 00	FNC	MAIN LANDING GEAR BRAKE PINS FOR BRAKE WEAR	A1 /SC	3/2/2014	0520-9326
32 - 00	FNC	DUAL BRAKE CONTROL VALVE	C	9/22/2014	3200-7564
32 - 15	GVI	BRAKE SYSTEM LEAK CHECK	A1	11/2/2014	0591-0401
32 - 40	DET	BRAKE PRESSURE BLEED DOWN INSP	90 DA	12/15/2014	3240-2564
32 - 42	SVC	CHECK BRAKE ACCUMULATOR PRECHARGE PRESSURE	A1	11/2/2014	0520-9326
32-00	SVC	BLEED BRAKES	C	9/22/2014	3200-7564

ATA	Type of Task	Task Description	Frequency	Last C/W	Work Card
32 - 46	GVI	ANTISKID SYSTEM CANNON PLUGS	C	9/22/2014	3200-7564
32 - 00	OPC	DUAL ANTI-SKID CONTROL VALVES	C	9/22/2014	3243-7161
32 - 00	OPC	TRANSDUCER - ANTI-SKID SPEED	C	9/22/2014	3200-7564
32 - 46	RST	DUAL ANTI-SKID CONTROL VALVE ASSEMBLY	3652 DA		Scheduled Parts Change
27 - 00	OPC	SPOILER, AUTO FAIL, AUTO DO NOT USE INDICATION	C	9/22/2014	2760-7293
27 - 00	LUB	GROUND SPOILER CYLINDERS AND SPOILER ACTUATORS	B	9/22/2014	2751-6327 / 2751-6577
27 - 00	OPC	SPOILER CONTROL SYSTEM	C	9/22/2014	2760-7293
27 - 00	OPC	GROUND SPOILER CONTROL SYSTEM	C2	3/20/2013	2700-7464
27-00	OPC	AUTOSPOILER SYSTEM	C	9/22/2014	2760-7293
12-00	LUB	LUBE TAIL CONE, THRUST REVERSER AND TAIL BUMP	C	9/22/2014	5262-6121
29-00	SVC	RUDDER ELEVATOR AND THE THRUST REVERSER HYDRAULIC ACCUMULATOR	A1	11/2/2014	2900-6473 / 0591-0301
78-00	FNC	THRUST REVERSER SYSTEM	C	9/22/2014	7830-7399 / 2900-6473
78-00	FNC	THRUST REVERSER SYSTEM LOW PRESSURE WARNING SWITCH	H	12/31/2010	7830-7265
32-00	FNC	CHECK GROUND SENSING SWITCHES	C	9/22/2014	3200-2850
32-41	SVC	TIRE PRESSURE	3 DA	3/5/2015	1270-2999

19.0 Flight Recorder Parameter Verification

The flight recorder parameter verification is a yearly task on the MD-88 fleet. The review process verifies that each parameter is being recorded correctly and if not, corrective action is taken. The parameter verification reviews the FAA mandatory parameters and select parameters that Delta Air Lines tracks. In addition, while accomplishing the parameter verification if an issue is observed with a non-required parameter the technician corrective action is required. The

maintenance group reviewed the flight recorder parameter verification checklist for N909DL. The last check was completed 9/18/2014, at the last C-check maintenance visit. The flight recorder is removed and sent to Delta for the parameter verification. All parameters passed the verification check.

Submitted by: Gregory Borsari
Aviation Accident Investigator
Maintenance

Attachment 1

Delta Air Lines, Inc.
Air Carrier Certificate

US Department
of Transportation
Federal Aviation
Administration

Air Carrier Certificate

This certifies that

DELTA AIR LINES, INC.
HARTSFIELD-JACKSON ATLANTA INTERNATIONAL AIRPORT
ATLANTA, GA 30354

has met the requirements of the Federal Aviation Act of 1958, as amended, and the rules, regulations, and standards prescribed thereunder for the issuance of this certificate and is hereby authorized to operate as an air carrier and conduct common carriage operations in accordance with said Act and the rules, regulations, and standards prescribed thereunder and the terms, conditions, and limitations contained in the approved operations specifications.

This certificate is not transferable and, unless sooner surrendered, suspended, or revoked, shall continue in effect indefinitely.

By Direction of the Administrator

[redacted]

THOMAS S. STACHIW
(Signature)

Certificate number: DALA 026A

Effective Date: 9/30/1988

Issued at: SO-27

MANAGER, DELTA CMU
(Title)

SOUTHERN REGION
(Region/Office)