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

April 22, 2009

Maintenance Records Factual Report

A. ACCIDENT: DCA09MA027

LOCATION: Buffalo, New York

DATE/TIME: February 12, 2009, 10:17 p.m. EST

AIRCRAFT: Colgan Air, Inc. Bombardier DHC-8-402, N200WQ, S/N 4200

B. GROUP MEMBERS:

Group Chairman: Pocholo Cruz
National Transportation Safety Board
Washington, DC

Member: Eric West
Federal Aviation Administration
Washington, DC

Member: Edelmiro Rivera
Air Line Pilots Association, International
Herndon, Virginia

Member: Gerry Shutrump
Colgan Air, Inc.
Manassas, Virginia

C: SUMMARY

On February 12, 2009, about 2217 eastern standard time (EST), a Colgan Air Inc., Bombardier DHC-8-402, N200WQ, d.b.a. Continental Connection flight 3407, crashed during an instrument approach to runway 23 at the Buffalo-Niagara International Airport (BUF), Buffalo, New York. The crash site was approximately 5 nautical miles northeast of the airport in Clarence Center, New York, and mostly confined to one residential house. The four flight crew and 45 passengers were fatally injured and the aircraft was destroyed by impact forces and post crash fire. There was one ground fatality. Night visual meteorological conditions prevailed at the time of the accident. The flight was a Code of Federal Regulations (CFR) Part 121 scheduled passenger flight from Liberty International Airport (EWR), Newark, New Jersey to BUF.

D: DETAILS OF THE INVESTIGATION

1.0 Air Carrier Certificate

On July 16, 1993, the Federal Aviation Administration (FAA) Dulles Flight Standards District Office (FSDO) Eastern Region issued Air Carrier Certificate Number NSVA519S to Colgan Air, Inc. of 10677 Aviation Lane, Manassas, Virginia, 22111. According to the Air Carrier Certificate, it was also reissued on January 23, 1995.

See Attachment 1 for further information.

2.0 Operations Specifications (OpSpecs)[1]

Colgan Air, Inc. 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 was authorized to conduct operations under 14 CFR Part 121 of the Federal Aviation Regulations.

(b) According to Section D072 (Continuous Airworthiness Maintenance Program (CAMP)) of the OpSpecs, Colgan Air, Inc. was authorized to use the Colgan Air, Inc. Q400 Maintenance Program, Volume XXVI, to maintain the accident airplane. This program covers the required maintenance for the aircraft, engine, propellers and components and was developed from the Maintenance Review Board (MRB) document.

[1] 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.

(c) According to Section D076 of the OpSpecs, Colgan Air, Inc. was authorized to use short-term escalations of maintenance intervals on their fleet.

(d) According to Section D085 of the OpSpecs, Colgan Air, Inc. had 5 BE-1900-D, 15 DHC–8-402, and 34 SAAB-340-B aircraft in its fleet.

(e) According to Section D089 of the OpSpecs, Colgan Air, Inc. was authorized to use the Maintenance Time Limitations included in the Q400 Maintenance Program, Volume XXVI, Chapter 3, REV 3 dated December 1, 2008 for the accident airplane and its fleet of DHC-8-402 aircraft.

(f) According to Section D091 of the OpSpecs, Colgan Air, Inc. was authorized to make arrangements with other organizations to perform substantial maintenance.

(g) According to Section D095 of the OpSpecs, Colgan Air, Inc. was authorized to use an approved Minimum Equipment List (MEL) for the accident airplane.

(h) According to Section D485 of the OpSpecs, Colgan Air, Inc. had an Aging Aircraft Inspection and Records Review. N200WQ was below the threshold for the record reporting.

(i) According to Section E096 of the OpSpecs, Colgan Air, Inc. was authorized for a Weight and Balance Program. The program is listed in Colgan Air, Inc. General Maintenance Program (GMM) Chapter 9.

3.0 Aircraft Information

The airplane was manufactured by Bombardier Aerospace on April 12, 2008 and given Canadian Registration of C-FOUQ. The airplane was removed from the Canadian Registry on April 15, 2008 and registered with the FAA on April 16, 2008 given the registration number N200WQ. Colgan Air, Inc. was the original owner of the airplane. The airplane had accumulated 1,819.3 total hours with 1,809 total cycles at the time of the accident.

The airplane was equipped with two Pratt and Whitney Canada (PWC) PW150A turboprop engines, two Dowty Propellers and a Hamilton Sundstrand Auxiliary Power Unit (APU). Table 1 below lists the engines, propellers and APU operating times at the time of the accident.

Table 1 – Engine/Propeller/APU Information

		No.1 Engine	No.2 Engine	No. 1 Propeller	No.2 Propeller	APU
Manufacturer		PWC	PWC	Dowty Propeller	Dowty Propeller	Hamilton Sundstrand
Part Number		3121627-01	3121627-01	697070003	697070003	4503067B
Manufacture Date		1/23/2008	1/27/2008	1/29/2008	1/20/2008	10/18/2007
Date Installed		3/28/2008	3/28/2008	2/16/2008	2/16/2008	1/9/2008
Serial Number		PCE-FA0452	PCE-FA0453	DAP 0451	DAP 0452	SP-E074722
Location of Engine/Propeller/APU Installation		Toronto, CA	Toronto, CA	Toronto, CA	Toronto, CA	Toronto, CA
Total Time (Engine/Propeller /APU hours) at installation		0.0	0.0	0.0	0.0	5.3
Total Cycles (Engine/Propeller/APU cycles) at installation		0.0	0.0	0.0	0.0	14
Total Time of Airframe during engine/propeller/APU installation (hours)		0.0	0.0	0.0	0.0	0.0
Total Cycles of Airframe during engine/propeller/APU installation		0.0	0.0	0.0	0.0	0.0
Time Since Overhaul (hours)		N/A	N/A	N/A	N/A	N/A
Hours since last installation (cycles)		N/A	N/A	N/A	N/A	N/A
Total Time in hours and (Cycles) as of 2/12/2009		1,819.3 (1,809)	1,819.3 (1,809)	1,819.3 (1,809)	1,819.3 (1,809)	661.7 (N/A)

4.0 Maintenance and Inspection Programs

Summary of Maintenance Program

Colgan Air, Inc. developed the Q400 Continuous Airworthiness Program using guidance from the Q400 Maintenance Review Board (MRB) and Maintenance Planning Document (MPD). Requirements of the Q400 Maintenance Program were developed under the process guidelines of the ATA Airline/Manufacturer Maintenance Program Planning Document (MSG-3). Initial check intervals for the Systems and Powerplant program were expressed in flight hours, flight cycles, APU hours or calendar time. Any check interval change was to be substantiated by service experience, or in accordance with DHC-8-400 MRB Report. The tasks were to be accomplished at the specific intervals. The objective was to prevent deterioration of the inherent safety and reliability levels of the equipment.

Airworthiness Directives and Manufacturer Service Bulletin compliance were written into the program as applicable. Additionally, all Zonal and Structural tasks were written into Colgan Air, Inc.'s maintenance program.

Line Checks (L-1 and L-2) – Line checks are servicing and visual walk around checks for general condition from the ground. L1 Checks were accomplished every 3 days or 36 flight hours whichever comes first. L2 Checks were accomplished every 6 days or 50 flight hours whichever comes first. General condition includes damage; security; signs of fluid leakage; doors, panels, fairings, and cowlings in normal condition. Complete instruction for completing both the L-1 and L-2 were contained in their particular work card.

A Checks (A, 2A, 3A, 5A and 6A) – "A" Checks were accomplished every 400 flight hour intervals.

Engine Maintenance Program – The Colgan Air, Inc. Pratt & Whitney Engine Continuous Airworthiness Maintenance Program was developed from the requirements found in the DHC-8-400 Maintenance Review Board (MRB) and Maintenance Planning Document (MPD). The tasks contained the maintenance requirements and consisted of installed engine repetitive visual and borescope inspection of the engine's external and internal parts, specific maintenance checks and a performance trend monitoring program.

Propeller Maintenance Program – The Program was performed in accordance with the approved Colgan Air, Inc. Continuous Airworthiness Maintenance Program. This program consisted of guidance for aircraft maintenance items as well as requirements for propeller inspections, servicing, and replacement of life limited components.

Table 2 below lists the previous inspections accomplished on airplane N200WQ. This information was retrieved from the airplane maintenance records:

Table 2 – Maintenance and Inspection Program

Check	Date	Location	Total Time	Total Cycles
Line Check L1	2/12/2009	Albany, NY	1,816.8	1,806
Line Check L2	2/12/2009	Albany, NY	1,816.8	1,806
A Check	12/24/2008	Albany, NY	1,571.9	1,567
2A Check	12/24/2008	Albany, NY	1,571.9	1,567
3A Check	10/23/2008	Albany, NY	1,174.3	1,182

NOTE: The Colgan Air, Inc. Maintenance Program contains additional maintenance intervals. Since the accident airplane was relatively new, the threshold intervals for the later maintenance intervals had not been met.

A review of both the recent Line Checks (L-1 and L-2) completed on the aircraft the night before the accident revealed one non-routine that was written up by maintenance crew for the APU DC Starter/Generator came off line. The

maintenance crew evaluated and deferred the APU Generator system per MEL 24-30-4. Prior to the accident, maintenance cleared the MEL in EWR on February 12, 2009 by replacing the K-26 Contactor per AMM 24-24-31.

5.0 Continuing Analysis And Surveillance Program (CASP)[2]

Colgan Air, Inc. conducts daily meetings to review the previous days maintenance discrepancies on the fleet. Furthermore, Colgan Air, Inc. analyzes its maintenance operations with the use of CASP. The manual (Rev 15 dated March 31, 2008), which outlines Colgan Air, Inc. policies and procedures regarding CASP, is an accepted program by the FAA. The program was also in place to provide surveillance and analysis of the air carrier's Continuous Airworthiness Maintenance Program (CAMP) for performance and effectiveness and to implement corrective action for any deficiencies.

In addition, Colgan Air, Inc. conducted monthly CASP meetings. The CASP report covered the preceding month's activity. The report was a statistical analysis of maintenance data collected from the following sources: (1) Departure delays; (2) Flight cancellations; (3) Pilot reports; (4) Component removals and (5) Engine data. According to Director of Quality Control, the FAA Principal Maintenance Inspector or representative's attended most of the meetings scheduled on the last Thursday of every month.

Four CASP reports (October 2008, November 2008, December 2008 and January 2009) were reviewed. There were no systemic issues with N200WQ in the reports. For the Q400 Colgan Air, Inc. fleet the following are of note:

- The October report noted 3 ice detector fail light discrepancies for the Q400 fleet. All 3 were troubleshot per Q400 FIM 30-80-00-810 and Operational Check accomplished with no discrepancies.

- The November report noted 5 ice detector probe discrepancies for the Q400 fleet. All 5 were removed and replaced. Operational check after the replacements were conducted with no discrepancies.

- The December report noted 9 ice detector probe faults resulting in two ice detector probe replacements. The other 7 faults were Operational Check OK with no repeat discrepancies.

- The January report did not have any reports of ice detector fail light or ice detector probe discrepancies in the Q400 fleet.

[2] 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.

6.0 Minimum Equipment List (MEL)[3]

The MEL is intended to permit operation with inoperative items of equipment for a period of time until repairs can be accomplished. It is important that repairs be accomplished at the earliest opportunity. In order to maintain an acceptable level of safety and reliability the MEL establishes limitations on the duration of and conditions for operation with inoperative equipment. The MEL provides for release of the aircraft for flight with inoperative equipment. When an item of equipment is discovered to be inoperative, it is reported by making an entry in the Aircraft Maintenance Record/Logbook as prescribed by FAR. The item is then either repaired or may be deferred per the MEL or other approved means acceptable to the Administrator prior to further operation. MEL conditions and limitations do not relieve the operator from determining that the aircraft is in condition for safe operation with items of equipment inoperative.

Colgan Air, Inc. was authorized to use an approved MEL on its Bombardier DHC-8-402 airplanes per its OpSpecs. At the time of the accident, there were no open MEL items in the airplane logbook and electronic records. The current MEL Control log in the airplane was not recovered. However, there were the following Open Deferred and Non-essential Equipment Furnishing items:

Open Deferred Maintenance Items (DMI)

DMI #11011 – November 2, 2008 - Temporary repair of fwd baggage door (Repair Drawing 8/4-52-432)

DMI #11254 – January 7, 2009 - LH stab boot requires edge sealant no later than 10 days, extended to February 16, 2009.

History of DMI #11254

On January 5, 2009 a tear was identified on the de-ice boot of the left inboard leading edge horizontal stabilizer. According to Colgan Aircraft Flight Log (No. 173622), the mechanic applied "speed" tape to the damaged area and deferred the maintenance action per the Director of Maintenance and Chapter 30-10-7 of the MEL. The MEL was listed as a category "C" (10 day deferral) and given an ID number of 34077. According to the Director of Maintenance, a piece of aluminum tape was placed over the tear in the de-ice boot to prevent it from tearing away any portion of the boot. The deferral was needed to allow the aircraft to get to Colgan's Newark Maintenance Base (EWR) at the end of days flying.

Once the aircraft was at the EWR maintenance base the night of January 5, 2009, Maintenance removed the left inboard horizontal stabilizer leading

[3] 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.

edge segment along with the de-ice boot. The de-ice boot was then replaced in accordance with the DHC-8-402 Aircraft Maintenance Manual (AMM) Chapter 30-11-81. This action cleared MEL 30-10-7. After a curing time, the leading edge assembly was then installed back on the left horizontal stabilizer with the new de-ice boot attached. An RII inspection was accomplished for the installation on January 7, 2009 (Aircraft Flight Log 173623). The airplane had not flown since it arrived EWR the night of January 5, 2009.

According to the Director of Maintenance, part of the installation process was to install one seal on either side of the horizontal stabilizer leading edge segment. Once the seals were in place, a sealant was introduced to prevent moisture from accumulating in between the segments. Due to the wet weather at EWR, the decision was made not to apply the sealant. Hence on January 7, 2009, Deferred Maintenance Item (DMI) 11254 was created and entered in the Aircraft Flight Log (173624) for the need to install sealant to the left hand inboard horizontal stabilizer leading edge within 10 days. DMI 11254 was extended 3 times by Colgan Air, Inc. due to maintenance requirements on other Colgan aircraft. The DMI was to be cleared prior to February 16, 2009.

Because there was no sealant installed, Colgan Air, Inc. was authorized to use aluminum adhesive to cover the area (Maintenance Task 51-23-00-390-806) until sealant was applied. The Director of Maintenance stated that aluminum adhesive tape found on the accident aircraft was used to cover the gaps between the inboard and outboard edges of the leading edge segment only. The aluminum adhesive was not placed on any part of the inflatable de-ice boot.

DMI #11291 – February 12, 2009 - permanent repair for fwd baggage door (DMI #11011) to be complied with no later than C check on the aircraft (Permanent Repair Drawing 8/4-52-435)

DMI #11400 – February 12, 2009 - #1 engine missing fastener from top of outboard horseshoe panel

Open Non-essential Equipment and Furnishings (NEF)

NEF #765 – October 28, 2008 – F/O left armrest adjustment mechanism inoperative

See Attachment 2 for further information.

7.0 Supplemental Type Certificates (STC)[4]

Supplemental Type Certificates (STC), supplied by air carrier, was reviewed. One STC was documented and installed by the operator.

STC ST00886NY, Technical Directive 400-53-08-01; Installation of a flight manual storage box in the cockpit floor aft of the center console on all Colgan Air, Inc. Bombardier DHC-8-402. The storage box was installed on N200WQ on April 16, 2008.

8.0 Airworthiness Directive (AD)[5] and Service Bulletin (SB) Summary

The air carrier provided an AD summary list for review. The AD summary contained the method of compliance, service bulletin and last accomplishment date. The air carrier does not have a Service Bulletin Summary sheet. However, the mandatory Service Bulletins are listed in the Technical Directive Summary list. A review of Airworthiness Directive status lists for the aircraft, powerplant engines, propeller and appliances were conducted. All ADs applicable to this airplane were implemented. No discrepancies were found during the review of the listing.

AD 96-09-25	Minimize the potential hazards associated with operating the airplane in severe icing conditions. Colgan Air, Inc. installed a copy of the AD in the aircraft flight manual on April 10, 2008.
AD 99-19-18	Revise aircraft flight manual limitations section – ice protection system. Colgan Air, Inc. installed a copy of the AD in the aircraft flight manual on April 10, 2008
AD 2008-13-07	Elevator overload bungees installed in reverse orientation and prohibit further installation of P/N FE2890000000 Bungee. Colgan Air, Inc. prohibited the use of above P/N Bungee in its receiving database on July 14, 2008.

See Attachment 3 for further information.

[4] 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.
[5] 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.

9.0 Colgan Aircraft Flight Logs

According to the Colgan Air, Inc. GMM, the Aircraft Flight Log and maintenance form provide the following information:

- Airworthiness release signature block to document its issuance.
- Engine trend monitoring spaces for flight crews to enter data.
- A discrepancy section for appropriately rated airmen or flight crewmember to document unscheduled maintenance discrepancies.
- A corrective action section for appropriately rated airmen (or an authorized individual of a certificated repair station) to document corrective action. Corrective action record entries constitute a return to an airworthy status, once the appropriate logbook entry is signed and dated.

The flight logs were reviewed from April 2008 thru February 2009. The review indicated that the maintenance check records were up to date and complete. No discrepancies were noted.

10.0 Weight and Balance Summary

Per the Colgan Air, Inc. OpSpecs, the airplanes were to be weighed every thirty-six (36) calendar months.

The last actual weight and balance on the airplane was accomplished at Bombardier (April 12, 2008) prior to airplane delivery. A supplemental aircraft weight and balance was accomplished on February 4, 2009 in Newark, New Jersey for the removal of a Fly Away Kit.

Basic Operating Weight:	39,823.7 pounds
Arm:	391.7 inches
Moment:	15598202.3 lb-inches

See Attachment 4 for further information.

11.0 Service Difficulty Reports (SDR)[6] and Mechanical Interruption Summary Report (MISR)[7]

From April 2008 thru February 2009, Colgan Air, Inc. reported three Service Difficulty Reports and 70 Mechanical Interruption Summary Reports to the FAA for N200WQ.

The SDR and MISR highlighted issues with Emergency Door Light Illuminations on the airplane. From April 2008 to July 2008, Colgan Air, Inc, had eleven MISRs and three SDRs for Emergency Door Light Illuminations. According to the Colgan Air, Inc. representatives, they enlisted the help of Bombardier door experts to understand the issues with rigging and maintaining the doors. Since August 2008 to present Colgan Air, Inc. has not reported any Emergency Door Light Illumination issues.

See Attachment 5 for further information.

12.0 Major Repairs and Alterations

According to the records (April 2008 to February 2009) and since taking possession of the airplane, there were no major repairs accomplished on the accident airplane.

One Alteration was accomplished on the airplane that was considered minor by the operator's Classification Airframe Alteration Checklist. The minor alteration entailed the installation of a flight deck manual stowage box per Technical Directive 400-53-08-01 and STC ST00886NY. The modification was accomplished on the accident airplane on April 16, 2008. There were no discrepancies associated with the installation of this alteration in the records.

[6] 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.

[7] 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.

13.0 Time Limit Control Components

Time limited component status for the airplane, the two propellers, two installed powerplant engines and APU were reviewed in the Colgan Air Maintenance V2.44 (CAM) system. The status report also provided the times of the scheduled maintenance checks for the airplane. The compliance status was satisfactory and no discrepancies were noted.

See Attachment 6 for further information.

14.0 Vendors

The Maintenance Records Group reviewed the Approved Vendor List provided by Colgan Air, Inc. On the average, Colgan Air, Inc. accomplished audits of the approved vendors on a two-year basis. All substantial maintenance vendors were listed in the operator's D091 OpSpecs. There were no discrepancies with the listing.

15.0 Method of Record Keeping

According to GMM Chapter 6, Colgan Air, Inc. uses a computerized system to manage the various aspects of the maintenance program and configuration of their aircraft. The system is referred to as CAM (Colgan Air Maintenance V2.44).

The CAM system consists of several integrated modules or grouping of program relating to specific areas of the operation. Data for components installed, Deferred Maintenance Items, Technical Directives/Fleet Campaign Directives, engine records, etc. were entered into the aircraft computer records on a daily basis. A computer file history was maintained so that all scheduled airplane inspections and checks were monitored for time limitations. All items were listed using aircraft time, cycles, and calendar day based on method required to track the task. The report also lists the workcard, if available, utilized to comply with the requirements of the scheduled task.

The computer files were backed up several times a week to prevent total loss of historical files. All hard copies of the paperwork were also kept by Colgan Air, Inc.

16.0 Manuals

Colgan Air, Inc. used the following manuals to maintain the airworthiness of its fleet and management of the airline.

General Maintenance Manual (REV 38 dated April 28, 2008) – The manual contains instructions and information for Maintenance personnel to conduct operations in accordance with Colgan Air policies, procedures, Federal Aviation Regulations and Operations Specification issued to Colgan Air by the FAA. Additionally, the GMM Chapter 9 incorporates Colgan Air, Inc's Weight and Balance procedures.

Q400 Maintenance Program Manual REV 3 dated December 1, 2008 – FAA accepted time limits for the accomplishment of the overhaul, replacement, periodic inspection and routine checks of the aircraft, and its component parts, accessories and appliances. The majority of program was derived from DHC 8-400 Bombardier Maintenance Review Board and Maintenance Planning Document.

Q400 Minimum Equipment List (MEL) REV 5 dated August 1, 2008 – list of equipment and instruments that may be inoperative on a specific aircraft.

Manufacture Supplied Manuals - Aircraft/Engine/Propeller Maintenance Manuals, Structural Repair Manuals, Overhaul Manuals, Wiring Manuals, Fault Isolation Manuals, Illustrated Parts Catalog, Corrosion Program Manual, NDT Manual, Significant Structure Items Manual, Service Bulletins and Engine Manuals.

17.0 Ice and Rain Protection

The following information describes the maintenance program of the Ice and Rain Protection System for the Bombardier DHC-8-402.

Maintenance Program

Item No.	Description	Task	Frequency	Date Accomplished on Airplane
301100-101	Operational Check of the Deicing System Air Supply (CCMR IDENT NO. 30.2a) (MRBR Task Number 301100-201)	OPC	C	Not yet due
301100-201	Operational Check of the Deicing System Air Supply	OPC	C	Not yet due
301100-202	Operational Check of the Deicing Hold Down System (This task incorporated in 301100-205)	OPC	12M CHECK	Not yet due
301100-203	Operational Check of the Deicing System Rear Fuselage Heated Check Valve	OPC	12M CHECK	Not yet due
301100-204	Operational Check of the Deicing System Isolation Shut-Off Valve	OPC	12M CHECK	Not yet due
301100-205	Operational Check of the Deicing System in Manual Mode (This task incorporates 301100-202 and 301100-206)	OPC	12M CHECK	Not yet due
301100-206	Operational Check of the Airframe Deicing	OPC	12M	Not yet due

	Equipment Heating in Manual Mode (This task incorporated in 301100-205)		CHECK	
301100-207	Detailed Visual Inspection of the Deice Boots for Pin Holes	DVI	A	12/24/2008
301100-208	Drain the Tailplane Deice Boot Air Lines NOTE* Post Modsum IS4Q3050002	SVC	A	12/24/2008
302100-101	Operational Check of the Engine AIr Intake Adapter Heater (MAJOR IDENT NO. M30.1)	OPC	3C	Not yet due
306000-201	Detailed Visual Inspection of the Propeller Deice Brush Wear Indicator	DVI	A	12/24/2008

OPC - Operational Check
DVI – Detailed Visual Inspection
SVC – Service

Colgan Air, Inc. L1 and L2 Checks

Colgan Air, Inc. L1 and L2 Checks (February 12, 2009) accomplished on the accident airplane were reviewed. There were no non-routines discrepancies reported for Ice and Rain Protection System.

L1 Check Tasks

- Visual check of Ice Detectors for Condition
- Visual check for condition of all deicer boots on the wings and empennage.

L2 Check Tasks – There were no Ice and Rain Protection System maintenance tasks.

Colgan Air, Inc. A, 2A and 3A Checks

A and 2A Checks (December 24, 2008) accomplished on the accident airplane were reviewed. There were no non-routines reported for the Ice and Rain Protection System in both Checks.

A Check Tasks

- Drain the de-icing air lines
- Detailed visual inspection of the propeller deice brush wear indicators
- Detailed visual inspection of the deicing boots for pin holes
- General visual inspection of propeller blade deicer assemblies for condition and correct installation

2A Check Tasks – There were no Ice and Rain Protection System maintenance tasks.

3A Check (October 23, 2008) accomplished on the accident airplane were reviewed. A Non-routine was generated for the L/H horizontal stabilizer inboard deice boot having a small hole approximately 24 inches form the inboard edge. Colgan Maintenance applied de-ice boot patch on the small hole in the L/H horizontal stabilizer inboard boot 24 inches from the inboard edge in accordance with Aerazur De-Ice boot patch kit #506299.

See Attachment 7 for further information.

Logbook Pages

A review of the logbook pages from April 2008 to February 2009 was accomplished. Additional information can be seen in attachments. The Flight Log page below is of interest.

February 12, 2009 - Flight Log 176083 (Flight 3201 EWR-ALB)

Inbound into ALB, the flight crew reported an "Ice Detect Fail Annunciator illuminated in flight".

ALB Maintenance accomplished the following:

"Removed and Replaced R/H IDP IAW Bombardier Q400 AMM Task 30-80-01-000-801. P/N OFF/ON 4100S019-07; S/N OFF: AC30218; S/N ON: AC78547. OPS check of the ice detection system satisfactory IAW Q400 Task 30-80-00-710-801 at this time."

See Attachment 8 for further information.

Ice Detector Probe (IDP) Reliability

According to Colgan Air, Inc., Ice Detector Probe malfunctions (Ice Detect Fail Annunciator Illuminated in flight) have been a recurring issue on the Colgan Q400 aircraft. From February 2008 to February 2009, the operator (with a fleet of 15 airplanes) had replaced 22 IDPs during this time frame. For the same period above, the operator also documented 44 non-routines associated with the ice detection fail light illuminating in flight. According to the operator, the component has a high failure rate with a corresponding high no fault found rate when sent to the repair vendor.

Bombardier Aerospace was aware of the reliability issues and is working with operators. On April 17, 2008, Bombardier released a service letter (DH8-400-SL-30-011) providing operators with techniques for troubleshooting the ice detection system and to introduce a new, on wing, test box that allowed operators to reduce the IDP no fault found. According to Colgan Air, Inc. representatives this new test box has helped improved the reliability of the IDPs in its fleet of Q400 aircraft.

See Attachment 9 for further information.

18.0 Ice Detector Probe Manufacturer

Zodiac Aerospace is the main supplier of the IDPs to Bombardier Aerospace. However, Zodiac Aerospace provides these IDPs to Bombardier through their subsidiary French company, Aerazur. The R/H IDP (S/N AC30218) that was removed from the accident airplane was original from the factory. The replacement IDP was a repaired unit (S/N AC78547), originally removed from N195WQ on November 22, 2008. Aerazur in France accomplished the repair on the IDP.

19.0 Flight Controls/Wings

Maintenance Program

Flight Controls

Item No.	Description	Task	Frequency	Last Accomplished
271000-106	Operational Check of the Roll Disconnect Mechanism (CCMR IDENT NO. 27.1a, MRBR Task Number 271000-206)	OPC	A	12/24/2008
271000-206	Operational Check of the Roll Disconnect Mechanism	OPC	A	12/24/2008
273000-104	Operational Check of the Elevator Control Pitch Disconnect Mechanism (CCMR IDENT NO. 27.8a, MRBR Task Number 273000-204)	OPC	A	12/24/2008
273000-204	Operational Check of the Elevator Control Pitch Disconnect Mechanism	OPC	A	12/24/2008
273000-206	Operational Check of the Elevator Control Stick Pusher System (This task incorporated in 273300-201)	OPC	A	12/24/2008
273300-101	Operational Check of the Elevator Control Stick Pusher System (MAJOR IDENT NO. M27.6, MRBR Task Number 273300-201)	OPC	A	12/24/2008
273300-201	Operational Check of the Elevator Control Stick Pusher System (This task incorporates 273000-206)	OPC	A	12/24/2008
276000-205	Operational Check of the Roll Spoiler SPLR1 and SPLR2 Push Off Switchlights	OPC	A	12/24/2008

Wings

Item No.	Description	Task	Frequency	Last Accomplished
576001 A201	General Visual Inspection of the Aileron Assembly, LH and RH	GVI	2A	12/24/2008

GVI – General Visual Inspection

Colgan Air, Inc. L1 and L2 Checks

Colgan Air, Inc. L1 and L2 Checks (February 12, 2009) accomplished on the accident airplane were reviewed. There were no non-routine discrepancies reported for either Flight Control or Wing system.

L1 Check Tasks

- Visual check of the L/H and R/H inboard/outboard leading edge section of wing for obvious damage
- Visual check of L/H and R/H horizontal and vertical stabilizer leading edges for obvious damage

L2 Check Task – There were no Flight Control or Wing system maintenance tasks.

Colgan Air, Inc. A, 2A and 3A Checks

A and 2A Checks (December 24, 2008) accomplished on the accident airplane were reviewed. There were no non-routines reported for either Flight Control or Wing discrepancies on both Checks.

A Check Tasks

- Operational check of roll disconnect mechanism
- Operational check of elevator control pitch disconnect mechanism
- Operational check of roll spoiler 1 and 2 push off switchlights
- Operational check of the elevator control stick pusher system

2A Check Tasks

- Detailed visual inspection of the yaw damper actuator
- General visual inspection of the aileron assembly

3A Check (October 23, 2008) accomplished on the accident airplane were reviewed. There were no non-routines reported for either Flight Control or Wing discrepancies.

Logbook Pages – Flight Controls/Wings

A review of the logbook pages from April 2008 to February 2009 was conducted. The logbook pages revealed no chronic issues with the accident airplane's flight control system or wing components.

Pocholo Cruz
Aerospace Engineer

Attachments:

Attachment 1 – Certificates
Attachment 2 – Deferred Maintenance Items
Attachment 3 – Airworthiness Directive/Service Bulletin Status
Attachment 4 – Weight and Balance Summary
Attachment 5 – Service Difficulty Reports /Mechanical Interruption Summary Reports
Attachment 6 – Time Limit Control Components
Attachment 7 – Ice and Rain Protection Maintenance Program/Inspections
Attachment 8 – Ice and Rain Protection Flight Log Pages
Attachment 9 – Ice Detection Probe Reliability