



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

July 16, 2014

### **Group Chairman's Factual Report**

# **MAINTENANCE**

**DCA12IA113**

## **A. INCIDENT**

Operator: Southwest Airlines  
Location: El Paso, Texas  
Date: July 27, 2012  
Time: 2:14 PM Mountain Standard Time<sup>1</sup>  
Airplane: Boeing 737-3H4, Registration Number: N379SW, Serial #: 26586,  
Line #: 2580

## **B. MAINTENANCE GROUP**

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

Member: Edith Stein  
Southwest Airlines  
Dallas, Texas

## **C. SUMMARY**

On July 27, 2012, about 1400 mountain daylight time, Southwest Airlines flight 1871, a Boeing 737-3H4, registration N379SW, experienced a structural failure of the nose gear actuator retract beam when the landing gear was selected down during approach to El Paso International Airport (ELP), El Paso, Texas. There were no injuries to the 71 passengers and 5 crewmembers on board and the airplane sustained substantial damage. The flight was operating under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 121 on a regularly scheduled passenger flight from Las Vegas McCarran International Airport (LAS), Las Vegas, Nevada to ELP. Visual meteorological conditions prevailed at the time.

## **D. DETAILS OF THE INVESTIGATION**

### **1.0 Air Carrier Certificates**

On January 30, 1989, Federal Aviation Administration (FAA) Flight Standards District Office (FSDO), Southwest Region issued Southwest Airlines Co., P.O. Box 37611, Love Field, Dallas, Texas 75235, Certificate Number SWAA304A.

For more information see Attachment 1 – Air Carrier Certificate

---

<sup>1</sup> All times are Mountain Standard Time (MST) based on a 24-hour clock, unless otherwise noted. Actual time of incident is approximate.

## 2.0 Operations Specifications (OpSpecs)<sup>2</sup>

Southwest Airlines has a Part 121 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 14CFR Part 121 operation.
- (b) Per section D072 of the OpSpecs, the Continuous Airworthiness Maintenance Program (CAMP), authorized Southwest Airlines to use the Southwest Airlines Maintenance Procedures Manual (MPM), MSG-3 Maintenance Specification (S3100) and B737CL Time Limit Index to maintain the airplanes.
- (c) Per section D074 of the OpSpecs, Southwest Airlines was authorized to use a maintenance reliability program for its fleet of aircraft per the Southwest Airlines Maintenance Procedures Manual Chapter 15.
- (d) Per section D085 of the OpSpecs, Southwest Airlines have 149 737-300, 23 737-500 and 424 737-700, 17 737-800 and 88 717-200 aircraft in its fleet. Fleet total of 701 aircraft.
- (e) Per section D090 of the OpSpecs, Southwest Airlines was authorized to utilize CASE<sup>3</sup> 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, Southwest Airlines 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, Southwest Airlines was authorized to use an approved Minimum Equipment List (MEL).
- (h) According to Section D097 of the OpSpecs, the FAA has approved sections of Southwest Airlines 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).
- (i) Per section D485 of the OpSpecs, Southwest Airlines had an Aging Aircraft Inspection and Records Review. N379SW was below the threshold for the record reporting.

---

<sup>2</sup> 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.

<sup>3</sup> 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.

- (j) Per section E096 of the OpSpecs, Southwest Airlines was authorized for a Weight and Balance Program.

### 3.0 Aircraft Information

The Boeing Airplane Company manufactured the airplane which was delivered to Southwest Airlines on February 22, 1994. Southwest Airlines was the original owner of the airplane. The airplane had 59,939.06 total hours with 49,780 total cycles at the time of the incident.

The airplane was equipped with two CFM56 engines and a Honeywell Auxiliary Power Unit (APU). The engines and APU had accumulated the following operating times at the time of the incident:

**Table 1 - Engine and APU Information**

	<b>No.1 Engine</b>	<b>No.2 Engine</b>	<b>APU</b>
<b>Manufacturer</b>	General Electric	General Electric	Honeywell
<b>Part Number</b>	CFM56-3B1	CFM56-3B1	GTCP85-129H
<b>Manufacture Date</b>	3/28/88	4/3/87	5/27/90
<b>Date Installed</b>	3/30/2005	3/31/2009	2/19/2012
<b>Serial Number</b>	723136	721642	P100250
<b>Location of Engine/APU Installation</b>	DAL	DAL	PHX
<b>Total Time (Engine /APU hours) at installation</b>	48,163:48	65,753:13	40,707:00
<b>Total Cycles (Engine/APU cycles) at installation</b>	35,578	60,198	N/A to Southwest Program
<b>Total Time of Airframe during engine/APU installation (hours)</b>	37,768:54	51,019:41	58,519:18
<b>Total Cycles of Airframe during engine/APU installation</b>	32,967	43,097	48,736
<b>Time Since Overhaul (hours)</b>	70,596	74,935	6,623:40
<b>Hours since last installation (cycles)</b>	22,433 (17,015)	9,182 (6,885)	928:06* (N/A to SWA)
<b>Total Time in hours and (Cycles) as of 7/27/2012</b>	70,334:00 (52,391)	74,672:38 (66,881)	41635:06 (N/A to SWA)

\*Southwest Airlines tracking program does not calculate actual hours and cycles on model APU while installed. Hours shown for Hours Since Last Installation are APU Hours.

For more information see Attachment 2 – Aircraft Spec Sheet

#### 4.0 Maintenance and Inspection Programs

The maintenance program was developed using the Maintenance Steering Group (MSG-3)<sup>4</sup> analysis logic. All Maintenance Planning Documents (MPD) were incorporated into the Southwest Airlines Maintenance Program.

The Southwest Airlines Maintenance Program Intervals are as follows:

- (a) Time Controlled Maintenance Task (MT): Maintenance requirements that are not packaged within a routine maintenance check are tracked individually.
- (b) Maintenance Visit 1 (MV1): Performed on aircraft that overnight with a minimum of four hours ground time at maintenance bases or stations where scheduled overnight maintenance is performed.
- (c) Maintenance Visit 2 (MV2): Walk-Around Check for safety and security - assuring integrity for flight. It may be performed at any station by or under the supervision of a qualified Airframe and Powerplant (A&P) Mechanic. MV2 visits were accomplished every 7 days.
- (d) Maintenance Visit 3 (MV3): Inspection accomplished primarily on a walk-around basis to ensure condition, safety, security and servicing prior to flight. It is accomplished at SWA Maintenance Bases or Stations where SWA mechanics are on duty. MV3 visits were accomplished every 500 hours / 50 days whichever came first.
- (e) Cabin Visit (CV) Checks: Contained a set group of interior tasks such as passenger accommodations, cabin safety items, doors, etc., but also contained exterior items such as lubrications and servicing. This visit was to be conducted in a hanger and was separate from the "HC" Check package. However, the "CV" may be scheduled in conjunction with any phase of "HC" Check or Heavy Maintenance Visits. CV visits were accomplished every 1,000 hours / 1,000 cycles / 150 days whichever came first.
- (f) Half C (HC) Checks: HC Check was divided into two phases; HC1 and HC2. A sequenced "HC" Check identified as "2HC" indicates a task that was scheduled every second "HC" Check. The "HC" Check may contain Systems/Powerplant, Zonal, STC, and Southwest originated Tasks. The check will be conducted in a hangar and may be scheduled in conjunction with other Checks or Special Visits. The "HC1", "HC2" or combination thereof does not zero out any lesser check. All cards issued will be completed with the exception of the Deviations as outlined later in the section. The "HC" Check limit is subject to the Cease Time Program.

---

<sup>4</sup> 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.

HC Checks were accomplished every 2,000 hours / 2,000 cycles whichever came first. Both 1HC1 and 1HC2 Checks were accomplished every 4,000 hours / 4,000 cycles / 547 days whichever came first. Both 2HC1 and 2HC2 Checks were accomplished every 8,000 hours.

- (g) Heavy Maintenance Checks: The checks consisted of 2, 4, 6, 8, 10, 12 and 14 year repetitive tasks and were packaged into “Y” Checks (8Y, 10Y etc.). The “Y” Checks included various tasks from the MSG-3 Structural, System/Powerplant, and Zonal Program, STC and Southwest Airlines Tasks. Heavy Maintenance Checks may also include modifications, repairs, rework and Special Item cards.

**Table 2 - Heavy Maintenance Check Intervals**

<b>CHECK TYPE</b>	<b>INTERVAL</b>
2Y	730 days/8,200 hours/9,000 cycles
4Y	1,460 days/16,000 hours/12,000 cycles
4YA	Initial - 3,650 days Repeat - 1,460 days /15,000 cycles
6Y	2,190 days / 24,000 cycles
6YA	Initial – 2,950 days Repeat – 2,190 days/25,000 hours/ 18,000 cycles
6YB	Initial – 3,650 days Repeat – 2,190 days/24,000 hours/ 18,000 cycles
8Y	2,920 days/30,000 hours/24,000 cycles
8YA	Initial – 3,650 days; Repeat – 2,920 days
8YB	Initial - 4,380 days Repeat – 2,920 days /24,000 cycles
10Y	3,650 days/36,000 cycles
12Y	4,380 days/36,000 cycles
14Y	5,110 days

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

The following is a listing of the previous inspections accomplished on airplane N379SW. This information was retrieved from the airplane maintenance records:

**Table 3 - Maintenance Checks**

<b>Check</b>	<b>Last Check Dat</b>	<b>Location</b>	<b>Total Time</b>	<b>Total Cycles</b>
MV1	7/22/2012	PHX	59,898:03	49,751

MV2	7/23/2012	HOU	59,908:43	49,758
MV3	6/19/2012	DAL	59,590:29	49,515
CV	6/18/2012	DAL	59,590:29	49,515
HC	6/18/2012	DAL	59,590:29	49,515
1HC1	9/15/2011	DAL	57,882:44	48,248
1HC2	6/18/2012	DAL	59,590:29	49,515
2HC1	7/1/2010	HOU	54,513:35	45,690
2HC2	1/20/2011	PHX	56,168:52	46,959
2Y	11/5/2011	PAE	58,117:47	48,437
4Y	11/2/2009	PEMCO	52,649:42	44,301
4YA	11/5/2011	PAE	58,117:47	48,437
6Y	11/5/2011	PAE	58,117:47	48,437
6YA	11/25/2008	IND	49,898:39	42,314
6YB	11/2/2009	PEMCO	52,649:42	44,301
8Y	11/2/2009	PEMCO	52,649:42	44,301
8YA	11/5/2011	PAE	58,117:47	48,437
8YB*	11/25/2006	N/A	N/A	N/A
10Y*	11/24/2004	N/A	N/A	N/A
12Y*	11/26/2006	N/A	N/A	N/A
14Y	11/25/2008	IND	49,898:39	42,314
16Y	11/02/2009	PEMCO	52,649:42	44,301
18Y	11/05/2011	PAE	58,117:47	48,437
20Y	11/29/94	N/A	N/A	N/A
22Y	11/29/94	N/A	N/A	N/A
24Y	11/29/94	N/A	N/A	N/A
26Y	11/29/94	N/A	N/A	N/A
28Y	11/29/94	N/A	N/A	N/A
30Y	11/29/94	N/A	N/A	N/A

\* MSG-2 to MSG-3 Maintenance Program Bridge Start Dates

The Aging Aircraft Maintenance Program Inspection for N379SW showed the following:

- The airplane was not part of the Supplemental Structural Inspection Document (SSID) program due to the airplane not having reached the 66,000 cycle threshold.
- The airplane was not part of the Repair Assessment Program (RAP) due to the airplane not having reached the 24Y/ 60,000 cycle threshold.
- As previously stated, the airplane had not yet met the threshold requirements of the Aging Aircraft Program.

For more information see Attachment 2 – Aircraft Spec Sheet

## **5.0 Continuing Analysis and Surveillance System (CASS)<sup>5</sup> and Reliability Program.**

The CASS program was in place to provide surveillance and analysis of the Southwest Airlines Continuous Airworthiness Maintenance Program (CAMP) for performance and effectiveness of the Inspection and Maintenance Programs, to include maintenance, preventative maintenance and alterations. Southwest Airlines conducted monthly CASS meetings, which according to Southwest representative, the FAA Principal Maintenance Inspectors or representatives attend. The CASS meetings covered the preceding month's activity. The CASS report showed statistical analysis of maintenance data collected from several sources i.e. Quality Assurance audits, Minimum Equipment List, Maintenance Station Performance, Hazmat Audits, etc.

Additionally, Southwest Airlines has an approved Reliability Program. The Program (Mechanical Reliability Report and Reliability Control Board Report) monitors the reliability of the aircraft, its systems, components, structures and powerplants. The Reliability Program defines the time limitations or standards for determining intervals between restoration, inspections, and checks of airframes, powerplants, appliances and emergency equipment and serves to satisfy the requirements of 14 CFR Part 119.49. The reports typically contain information on System and Component Alerts, updates on previous component reliability issues, operation Flight Data, Delays and Cancellations, MEL and Configuration Deviation Lists, Inspection Findings, Logbook Data, Component removals and Engine Data, etc.

CASS and Reliability reports (June 2012 and July 2012) were reviewed. There were no systemic issues with the landing gear system, the structure or hydraulic system in the fleet.

## **6.0 Minimum Equipment List (MEL)<sup>6</sup>**

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

## **7.0 Supplemental Type Certificates (STC)<sup>7</sup>**

Supplemental Type Certificates (STCs), supplied by air carrier, were reviewed. A total of 33 STCs were documented and installed by the operator. STC research did not reveal any STC work in the nose landing gear wheel well area.

For more information see Attachment 3 – STC Report

---

<sup>5</sup> 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.

<sup>6</sup> 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.

<sup>7</sup> 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.



## **8.0 Airworthiness Directives (AD)<sup>8</sup> and Service Bulletins (SB)**

Southwest Airlines 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 of the listing.

For more information see Attachment 4 – AD Compliance Report

## **9.0 Aircraft Flight Logs**

Electronic Aircraft Flight Logs were reviewed from April 27 2012 thru July 27, 2012. The review focused on Structural and System (Hydraulic and Nose Landing Gear) discrepancies on the incident airplane. There were no previous write-ups or systemic issues prior to the incident.

## **10.0 Weight and Balance Summary**

Per the Southwest Airlines OpSpecs, the airplanes were to be weighed every thirty-six (36) calendar months. The last actual weight and balance on the airplane was accomplished on September 11, 2010 by Southwest Airlines at Midway Airport. 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:	73,596 pounds
Arm:	650.39 inches
Moment:	47866130.94 lb-inches

For more information see Attachment 5 – Weight and Balance Summary

## **11.0 Service Difficulty Reports (SDR)<sup>9</sup> and Mechanical Interruption Summary Report (MISR)<sup>10</sup>**

From November, 2011 to July 27, 2011, Southwest Airlines reported 57 Service Difficulty Reports (56 Structural and 1 Hydraulic (current incident)) to the FAA for aircraft N379SW. There were no SDRs associated with nose wheel area of the airplane.

---

<sup>8</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> 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.

From July 2011 to July 2012, Southwest Airlines reported two Mechanical Interruption Summary Reports to the FAA for aircraft N379SW. The Southwest Airlines MISR listings dealt with systems issues (one brake shuttle valve for leaking and one for left hand landing gear strut for being low) for the airplane.

## **12.0 Major Repairs and Alterations**

A review of the Major Repairs listing for the Hydraulics, Landing Gear and Structure did not reveal any major repairs accomplished on the nose wheel area of the airplane.

The major alteration listing revealed 81 major alterations on the incident airplane. Again, there were no major alterations accomplished to the nose wheel area of the incident airplane.

For more information see Attachment 6 – Major Alterations

## **13.0 Time Limit Components**

Time Limit component status for the airplane, the two installed powerplants and the APU were reviewed. According to Southwest Airlines, their tracking program could not back date the Time Limit Components to the date of the incident; therefore, a report dated September 19, 2012 was produced for review.

For more information see Attachment 7 – Time Limit Component Listing

## **14.0 Vendors**

The Maintenance Records Group reviewed the Approved Vendor List provided by Southwest Airlines. On the average, Southwest Airlines accomplished audits of the approved vendors on an annual basis. All essential maintenance vendors were listed in the operator's Approved Maintenance Provider List. There were no discrepancies in the listing.

## **15.0 Method of Record Keeping**

Southwest Airlines used several different maintenance electronic systems 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 several times a day to prevent total loss of history files. All hard copies of the documents are verified, scanned and then shredded by Southwest Airlines. According to Southwest Maintenance Procedures Manual 28-08-07, at this time, Southwest Airlines does not dispose of any aircraft, engine or component historical records.

## 16.0 Manuals

Southwest Airlines used the following manuals to maintain the airworthiness of its fleet and management of the airline.

Maintenance Procedures Manual (MPM) – The manual provided company policies and procedures to be followed by all persons performing maintenance and inspection services on company aircraft.

MSG-3 Maintenance Specification (S3100) – Defined the maintenance program for the B737-300/-500 type aircraft operated by Southwest Airlines and was maintained in accordance with its CAMP, Reliability Program and the Southwest Engine Reliability Program as required by OpSpecs D072.

Time Limit Index – Provides the definition of requirements for components that have specific time limitations and are not tracked by task cards.

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

SWA Weight and Balance Manual – Weight and balance procedures to be followed by maintenance and flight operations personnel on all aircraft operated by Southwest Airlines.

Manufacture Supplied Manuals - Aircraft/Engine 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 N379SW Hydraulic/Landing Gear/Structure Maintenance Program

The following information describes the maintenance program for the Hydraulic/Landing Gears System and the Structure in the Nose Wheel Well area of the airplane:

**Table 4 - Southwest Airlines B737-300 Chapter 29 Maintenance Program**

MPD No.	Southwest Document	Description	Task	Frequency	Date Accomplished on Airplane
29-020-01	MT 329-20-01	Functional Check (off-aircraft) the nose landing gear “A” hydraulic system up line fuse	FC	25,000 hours	5/16/2011

**Table 4 - Southwest Airlines B737-300 Chapter 32 Maintenance Program**

MPD No.	Southwest Document	Description	Task	Frequency	Date Accomplished on Airplane
---------	--------------------	-------------	------	-----------	-------------------------------

32-012-01	332-012-01-01	Service the Nose Landing Gear Shock Strut	SVC	3,000 cycles	6/19/2012
32-014-01	MT 312-00-02 MT 312-00-03	Restore the exposed Surfaces of the nose landing gear shock strut piston by cleaning	CLN	7 days	MV2 – 7/23/2012 MV3 – 6/19/2012
32-016-01	MT 332-21-00	Lubricate the nose landing gear assembly including: extension/retraction mechanisms and steering control components	LUB	400 cycles 60 days	7/23/2012
32-018-01	SDIS (AD 90-25-01)	Restore the Nose Landing Gear Assembly	RES	18,000 cycles 10 years	8/18/2006
32-024-02	332-024-01-01	Functional Check the nose landing gear manual extension system	FC	8,200 hours	11/5/2011
32-054-01	332-054-01-01	Inspect (Detailed) the nose wheel steering mechanical control path	INSP	3,000 cycles	6/19/2012
32-300-01	SDIS AD 90-25-01 AMOC 120S-07-579	Int –GV: Inspect the nose landing gear assembly	INSP	10 years	8/18/2006
32-800-01	MT 312-00-02 MT 312-00-03	External Zonal(GV) nose landing gear (from the ground) EZAP (enhanced zone analysis procedure)	GV	300 cycles 40days	MV2 – 7/23/2012 MV3 – 6/19/2012

**Table 6 - Southwest Airlines B737-300 Chapter 53 Maintenance Program**

<b>MPD No.</b>	<b>Southwest Document</b>	<b>Description</b>	<b>Task</b>	<b>Frequency</b>	<b>Date Accomplished on Airplane</b>
53-842-01	MT 312-00-02 MT 312-00-03	External Zonal (GV) Nose wheel well and landing gear doors. Spec. No. 53-ZAP-01 (T/C 353-842-00-01) satisfies EZAP requirement	GV	300 cycles 40 days	9/16/2011
53-300-01	353-300-01-01	Ext-GV: Inspect the exterior surface of the fuselage from BS 178-1217 and landing gear bays including skin panes and skin splices, cutouts, fwd face of the fwd pressure bulkhead at BS 178	GV	3 years	11/5/2011
53-310-01	353-310-01-01	Int-GV: Inspect the fuselage lower lobe fwd of the bilge from BS 178-380 below S-17 and area above the bilge from BS 380-540 from S-17 to S-26 and BS 727-1016 form S-17 to	GV	12,000 cycles 4 years	11/3/2009

		S-25			
--	--	------	--	--	--

## 18.0 N379SW Historical Parts

The Maintenance Group reviewed the history of the damaged parts of the incident airplane. According to Southwest Airline records, the Retract Actuator Support Beam Assembly (Boeing Kit Part Number: 65C38207-1) had not been changed previously nor was there a time in the past that another one was ordered for repair. Purchasing records revealed that the only time Southwest Airlines procured Retract Actuator Support Beam Assembly kit was to repair the incident airplane.

Also a review was accomplished on the damaged NLG Hydraulic Actuator Return Line (Part Number: 171X141DDB0263C). Southwest Airlines does not have nor was it required to have a maintenance program for the hydraulic line. The hydraulic line was replaced on condition. Purchasing records revealed that seven each of the hydraulic lines have been issued to Southwest Airlines fleet during the past 2 years.

Submitted by: Pocholo Cruz  
Aerospace Engineer

### Attachments:

- Attachment 1 – Air Carrier Certificate
- Attachment 2 – Aircraft Spec Sheet
- Attachment 3 – STC Report
- Attachment 4 – AD Compliance Report
- Attachment 5 – Weight and Balance Summary
- Attachment 6 – Major Alterations
- Attachment 7 – Time Limit Component Listing