



# National Transportation Safety Board

Washington, D.C. 20594  
 Safety Recommendation

Date: June 22, 1990

In reply refer to: A-90-92

Honorable James B. Busey  
 Administrator  
 Federal Aviation Administration  
 Washington, D.C. 20591

Within the last 18 months the Safety Board has investigated five accidents in which the main landing gear (MLG) on Piper PA-34-200T airplanes has separated during landing roll resulting in damage to the airplanes.<sup>1/</sup> In each accident the left MLG, assembly part number P/N 67926-12, collapsed because of a transverse fracture in the trunnion at the aft web lower end fillet. Metallurgical examination of the separations on the first four trunnions disclosed that the fractures stemmed from very shallow (less than 0.09-inch-deep) fatigue cracks initiating from multiple origins along the aft surface at the lower end of the fillet web. The length of these fatigue cracks ranged from 0.20 to 0.40 inch. Origination of the fatigue was at the forging parting plane in an area of circumferentially oriented grinding marks. The fifth trunnion was not analyzed by the Safety Board metallurgical laboratory; however, the field inspector reported that the trunnion separated similarly and in the same area as the other four trunnions.

On August 15, 1985, the Piper Aircraft Corporation issued Service Bulletin (SB) No. 787A that advised owners and operators of Piper PA-34-200 Seneca, PA-34-200T Seneca II, PA-34-220T Seneca III, PA-44-180 Seminole, and PA-44-180T Seminole airplanes to inspect the MLG trunnions for cracks at the first 1,000 hours time in service and thereafter at intervals of 100 hours until replaced with modified trunnions. However, no mention is made in this SB of the need to inspect for grinding marks or scratches in this area. Trunnions affected by SB No. 787A are P/N 67926 for PA-34-200, PA-34-200T, PA-44-180, and PA-44-180T airplanes and P/N 38486 for PA-34-220T airplanes. The affected trunnion P/Ns are followed by a single or double digit dash number (for example, 67926-2 or 67926-12) indicating whether they are of a different configuration and/or are for the left or right landing gear.

<sup>1/</sup> NTSB Brief of Accident File Nos. 418, 1622, 1883, 5019, and 5072.

The affected trunnions can also be identified by the forging part number. Forging numbers extend above the barrel surface and are an integral part of the forging. Several forging varieties were made; therefore, several forging numbers exist. The affected trunnions will have one of the following forging numbers: 67924, 67924-0, or 67924-1.

The modified trunnions have an increased web cross section in the area of the aft fillet that extends the length of the barrel. The modified trunnions have the same basic part numbers as the affected trunnions except that the part numbers of the modified trunnions are followed by triple digit dash numbers (for example, 67926-802).

The increased cross sectional area and the consequent lower stress on the aft side of the modified trunnion housing provides a greater safety margin during landing and takeoff. Piper Aircraft Corporation reports that PA-34 and PA-44 airplanes using the new trunnion design have not experienced problems.

A review of Accident/Incident Service Difficulty Reports from the National Safety Data Branch of the Federal Aviation Administration (FAA) from January 1, 1983, through July 28, 1989, revealed 25 occurrences in which the trunnion separated on landing and 65 occurrences in which the trunnion was found cracked during ground inspection. In two reported cases, the cracks were found in the web by using a dye penetrant inspection method after visual inspection failed to detect a crack. Four incidents in which trunnions separated on landing occurred within 17 flight hours after the inspection specified in SB 787A. Of these four incidents, one occurred at 4 flight hours since inspection and one occurred on the next flight after inspection. It is believed that some of the fatigue cracks may not be detectable by a detailed visual inspection because of their relatively small size and because they may not be readily differentiated from the grinding marks or scratches on the metal surface.

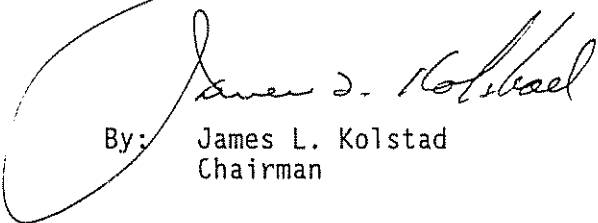
The SB 787A inspection procedure is to be accomplished by "properly cleaning the trunnion housing of dirt and paint" and by visually inspecting the aft side of the lower end of the fillet web with a 10-power magnifying glass. However, the service bulletin does not specify how the paint should be removed from the trunnion web area prior to visual inspection. The paint removal method is a critical step if crack detection is to be successful. A mechanical cleaning method, such as sanding or grinding, will disturb and mask preexisting surface cracks. A commercial paint stripper (a chemical method) will successfully remove paint without disturbing the underlying metal surface.

The Piper Aircraft Corporation has indicated that the longitudinal forging parting plane that passes through the web surface of the trunnions was subjected to mechanical grinding during manufacture to remove residual forging metal flash and that grinding marks remained on the final parts. In each of the four trunnions examined by Safety Board metallurgists, the fatigue cracks propagated along circumferential grinding marks on the aft surface in the web area. Grinding marks oriented circumferentially to the trunnion barrel will act as greater stress raisers than marks oriented longitudinally. Consequently, the circumferential grinding marks should be removed by polishing to reduce the stress concentration in this area.

The Safety Board notes that although no fatalities have occurred to date as a result of PA-34 and PA-44 trunnion separations, the possibility of extensive property damage and injury or death resulting from such an incident exists. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive for Piper Aircraft Corporation PA-34 and PA-44 airplanes having main landing gear trunnions identified by part number (P/N) 67926 or P/N 38486 followed by a single- or double-digit dash number to require periodic inspection and inspections of the lower fillet of the web on the aft surface of the trunnion for evidence of cracks (by periodic inspection with an appropriate nondestructive testing method such as dye penetrant or eddy current) and grinding marks or scratches (by a one-time detailed visual inspection that does not disturb the trunnion metal surface). Trunnions found to contain cracks should be removed from service and trunnions found to contain grinding marks or scratches should be reworked by polishing to remove these discontinuities. (Class II, Priority Action)(A-90-92)

KOLSTAD, Chairman, COUGHLIN, Acting Vice-Chairman, LAUBER and BURNETT, Members, concurred in this recommendation.

  
By: James L. Kolstad  
Chairman

Brief of Incident

File No. - 5019 5/05/89 MIAMI,FL A/C Reg. No. N859SC Time (Lcl) - 2307 EDT

-----Basic Information-----  
 Type Operating Certificate-ON-DEMAND AIR TAXI  
 Name of Carrier -GULF FLIGHT CENTER  
 Type of Operation -NON SCHED,DOMESTIC,PASSENGER  
 Flight Conducted Under -14 CFR 135  
 Incident Occurred During -LANDING  
 Aircraft Information-----  
 Make/Model - PIPER PA-34-200T  
 Landing Gear - TRICYCLE-RETRACTABLE  
 Max Gross Wt - 4570  
 No. of Seats - 6  
 Aircraft Damage  
 MINOR  
 Fire  
 NONE  
 Crew Fatal Serious Minor  
 Pass 0 0 0  
 Injuries  
 None 1 2

End Make/Model - CONTINENTAL L/TS10-360 ELT Installed/Activated - YES/NO  
 Number Engines - 2 Stall Warning System - YES  
 Engine Type - RECIP-FUEL INJECTED  
 Rated Power - 200 HP

-----Environment/Operations Information-----

Weather Data  
 Wx Briefing - NO RECORD OF BRIEFING  
 Method - N/A  
 Completeness - N/A  
 Basic Weather - VMC  
 Wind Dir/Speed- 160/005 KTS  
 Visibility - 7.0 SH  
 Lowest Sky/Clouds - 7000 FT SCATTERED  
 Obstructions to Vision- NONE  
 Precipitation - NONE  
 Condition of Light - NIGHT(BRIGHT)  
 Itinerary  
 Last Departure Point  
 SARASOTA,FL  
 Destination  
 SAME AS ACC/INC  
 ATC/Airspace  
 Type of Flight Plan - NONE  
 Type of Clearance - VFR  
 Type Appch/Lnds - STRAIGHT-IN  
 FULL STOP

-----Personnel Information-----

Pilot-In-Command  
 Certificate(s)/Rating(s)  
 COMMERCIAL  
 SE LAND,ME LAND  
 Age - 56  
 Biennial Flight Review - YES  
 Current Months Since - 6  
 Aircraft Type - PA-34  
 Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT  
 Flight Time (Hours)  
 Total 3136  
 Make/Model- 564  
 Instrument- 458  
 Multi-Eng - 1162  
 Last 24 Hrs - 4  
 Last 30 Days- 84  
 Last 90 Days- 217

-----Instrument Rating(s) - AIRPLANE

-----Narrative-----

THE FLT REPRD THAT AFTER THE ACFT HAD TOUCHED DOWN & ROLLED APRX 400 TO 600 FT, THE LEFT MAIN GEAR COLLAPSED & THE ACFT VEERED OFF THE LEFT SIDE OF THE RWY. AN INVESTIGATION REVEALED THE LEFT MAIN LANDING GEAR TRUNNION HAD FAILED FROM FATIGUE. THE FAILURE OCCURRED THRU THE BARREL NEXT TO THE LOWER END OF THE FILLET. A METALLURGICAL EXAM SHOWED THE FATIGUE HAD ORIGINATED AT THE BASE OF A GRINDING MARK. SEVERAL SECONDARY CRACKS WERE ALSO FOUND WHICH ORIGINATED FROM GRINDING MARKS NEXT TO THE FATIGUE FRACTURE. THE AIRPLANE LOGBOOK SHOWED THE TRUNNION HAD BEEN INSPECTED AT THE LAST 100 HR INSPECTION IAW PIPER SERVICE BULLETIN (S/B) #787A. THE ACFT HAD FLOWN ABOUT 80 HRS SINCE THAT INSPECTION. THE S/B REQUIREMENT WAS TO \*PROPERLY CLEAN THE TRUNNION HOUSING OF DIRT AND PAINT AND CAREFULLY INSPECT THE HOUSING FOR CRACKS WITH A 10 POWER GLASS AT THE LOWER END OF THE FILLET.\*

Brief of Incident (Continued)

File No. - 5019      5/05/89      MIAMI, FL      A/C Reg. No. N8599C      Time (Lcl) - 2307 EDT

Occurrence #1      MAIN GEAR COLLAPSED  
Phase of Operation      LANDING - ROLL

Findings(s)

1. LANDING GEAR, MAIN GEAR STRUT - FATIGUE
2. MAINTENANCE, SERVICE BULLETTINS - PERFORMED -
3. PROCEDURE INADEQUATE - MANUFACTURER

Occurrence #2      LOSS OF CONTROL - ON GROUND  
Phase of Operation      LANDING - ROLL

Findings(s)

4. DIRECTIONAL CONTROL - NOT POSSIBLE -
5. GROUND LOOP/SWERVE - UNCONTROLLED -

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this incident was:  
FATIGUE FAILURE OF THE LEFT MAIN LANDING GEAR TRUNNION. A CONTRIBUTING FACTOR WAS: INADEQUATE INSPECTION PROCEDURE  
IN PIFER SERVICE BULLETIN #787A.

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Brief of Accident

File No. - 418      6/16/89      LAS CRUCES, NM      A/C Reg. No. N36345      Time (Lcl) - 1115 MDT

-----Basic Information-----  
Type Operating Certificate-NONE (GENERAL AVIATION)

Type of Operation - INSTRUCTIONAL  
Flight Conducted Under -14 CFR 91  
Accident Occurred During -LANDING

Aircraft Damage  
SUBSTANTIAL  
Fire  
NONE

Fatal      Serious      Minor      Injuries  
0          0          0          None  
0          0          0          2  
0          0          0          1

-----Aircraft Information-----  
Make/Model - PIPER FA-34-2001      End Make/Model - CONTINENTAL LTS10-360      ELT Installed/Activated - YES/NO  
Landing Gear - TRICYCLE-RETRACTABLE      Number Engines - 2      Stall Warning System - YES  
Max Gross Wt - 4570      Engine Type - RECIP-FUEL INJECTED  
No. of Seats - 6      Rated Power - 220 HP

-----Environment/Operations Information-----

Weather Data  
WX: Briefing - COMPANY  
Method - IN PERSON  
Completeness - WEATHER NOT PERTINENT  
Basic Weather - VMC  
Wind Dir/Speed- 130/007 KTS  
Visibility - 60.0 SM  
Lowest Sky/Clouds - UNK/NR SCATTERED      ATC/Airspace  
Lowest Ceilings - NONE      Type of Flight Plan - NONE  
Obstructions to Vision- NONE      Type of Clearance - NONE  
Precipitation - NONE      Type APCN/Lnda - TRAFFIC PATTERN  
Condition of Light - DAYLIGHT

Airport Proximity  
ON AIRPORT

Airport Data  
LAS CRUCES  
Runway Ident - 12  
Runway Lth/Wid - 7494/ 150  
Runway Surface - ASPHALT  
Runway Status - DRY

-----Personnel Information-----

Pilot-In-Command  
Certificate(s)/Rating(s)  
COMMERCIAL,CFI  
SE LAND,ME LAND

Age - 36      Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT  
Biennial Flight Review  
Current - YES      Flight Time (Hours)  
Months Since - 1      Total - 1540      Last 24 Hrs - 3  
Aircraft Type - FA-34      Make/Model- 30      Last 30 Days- 148  
Instrument- 77      Last 90 Days- 419  
Multi-Eng - 42

Instrument Rating(s) - AIRPLANE

-----Narrative-----

THE LEFT MAIN LANDING GEAR COLLAPSED SHORTLY AFTER TOUCHDOWN. THE ACFT THEN VEERED OFF THE LEFT SIDE OF THE RWY & WAS FURTHER DAMAGED. AN INVESTIGATION REVEALED THE LEFT GEAR COLLAPSED AFTER THE LEFT MAIN LANDING GEAR TRU NNION HAD FAILED. THE TRU NNION FAILED IN AN AREA THAT WAS ADDRESSED BY PIPER SERVICE BULLETIN #787A. SERVICE BULLETIN #787A REQUIRED AN INSPECTION OF THE TRU NNION AT THE 1ST 1000 HRS TIME IN SERVICE AND THEREAFTER AT INTERVALS NOT TO EXCEED 100 HRS UNTIL IT WAS REPLACED BY A MODIFIED TRU NNION. THE ACFT HAD FLOWN 67 HRS SINCE THE LAST INSPECTION.

Brief of Accident (Continued)

File No. - 418      6/16/89      LAS CRUCES, NM      A/C Reg. No. N36345      Time (Lcl) - 1115 MDT

Occurrence #1      MAIN GEAR COLLAPSED  
Phase of Operation      LANDING - FLARE/TOUCHDOWN

Findings(s)

1. LANDING GEAR, MAIN GEAR STRUT - FAILURE, TOTAL
2. MAINTENANCE, SERVICE BULLETINS - PERFORMED -
3. PROCEDURE INADEQUATE - MANUFACTURER

Occurrence #2      LOSS OF CONTROL - ON GROUND  
Phase of Operation      LANDING - ROLL

Findings(s)

4. DIRECTIONAL CONTROL - NOT POSSIBLE -
5. GROUND LOOP/SWERVE - UNCONTROLLED -

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this accident was:  
FAILURE OF THE LEFT MAIN LANDING GEAR TRUNNION, A CONTRIBUTING FACTOR WAS: INADEQUATE INSPECTION PROCEDURE IN  
PIPER SERVICE BULLETIN #787A.





Brief of Accident (Continued)

File No. - 1622      8/01/88      LAURENS, SC      A/C Reg. No. N8191J      Time (Lcl) - 1800 EDT

Occurrence #1      MAIN GEAR COLLAPSED  
Phase of Operation      LANDING - ROLL

Findings(s)  
1. LANDING GEAR, MAIN GEAR STRUT - FATIGUE

Occurrence #2      LOSS OF CONTROL - ON GROUND  
Phase of Operation      LANDING - ROLL

Findings(s)  
2. DIRECTIONAL CONTROL - NOT POSSIBLE -  
3. GROUND LOOP/SWERVE - UNCONTROLLED -

Occurrence #3      ON GROUND COLLISION WITH OBJECT  
Phase of Operation      LANDING

Findings(s)  
4. OBJECT - RUNWAY LIGHT

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are finding(s) 1

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Brief of Accident

File No. - 1883      3/10/88      LOWER LAKE, CA      A/C Reg. No. N155X      Time (Lcl) - 1730 PST

-----Basic Information-----  
Type Operating Certificate-NONE (GENERAL AVIATION)      Aircraft Damage SUBSTANTIAL

Type of Operation --PERSONAL      Injuries Fatal Serious Minor None  
Flight Conducted Under -14 CFR 91      0      0      0      1  
Accident Occurred During -LANDING      0      0      0      0

-----Aircraft Information-----  
Make/Model - PIPER PA-34-200T      End Make/Model - CONTINENTAL TS10-360-E      ELT Installed/Activated - YES/NO  
Landing Gear - TRICYCLE-RETRACTABLE      Number Engines - 2      Stall Warning System - YES  
Max Gross Wt - 4570      Engine Type - RECIP-FUEL INJECTED  
No. of Seats - 6      Rated Power - 200 HP

-----Environment/Operations Information-----  
Weather Data      Itinerary      Airport Proximity  
WX Briefing - NO RECORD OF BRIEFING      Last Departure Point      ON AIRPORT  
Method - N/A      REDDING, CA  
Completeness - N/A      Destination      PEARCE FLD  
Basic Weather - VHC      SAME AS ACC/INC      Runway Ident - 12  
Wind Dir/Speed- 120/005 KTS      ATC/Airspace      Runway Lth/Wid - 2485/ 50  
Visibility - 50.0 SH      Type of Flight Plan - NONE      Runway Surface - ASPHALT  
Lowest Sky/Clouds - 25000 FT SCATTERED      Type of Clearance - NONE      Runway Status - DRY  
Lowest Ceiling - NONE      Type Apch/Lnds - STRAIGHT-IN  
Obstructions to Vision- NONE  
Precipitation - NONE  
Condition of Light - DAYLIGHT

-----Personnel Information-----  
Pilot-In-Command      Age - 51      Medical Certificate - VALID MEDICAL-WAIVERS/LIMIT  
Certificate(s)/Rating(s)      Biennial Flight Review      Current      Flight Time (Hours)      Last 24 Hrs - 3  
PRIVATE      Months Since - 1      - Aircraft Type - PA-34      Make/Model - 982      Last 30 Days- 10  
SE LAND, ME LAND      - Aircraft Type - PA-34      Instrument- 131      Last 90 Days- 20  
Multi-Eng - 982

-----Instrument Rating(s) - NONE

-----Narrative-----  
DRG THE LNDG ROLL, THE LEFT MAIN LNDG GEAR COLLAPSED & THE ACFT VEERED OFF THE RWY, FURTHER DAMAGING THE AIRCRAFT. AN INVESTIGATION REVEALED THE LEFT MAIN LANDING GEAR TRUNNION HAD FAILED. IT HAD FAILED DIAGONALLY APRX 5 INCHES FROM THE BOTTOM OF THE TRUNNION & 2 INCHES BELOW THE ROTATING AXIS. A METALLURGICAL EXAM REVEALED PREEXISTING FATIGUE WHERE THE FRACTURE OCCURRED. THE TRUNNION HAD BEEN IN SVC FOR APRX 4081 HRS OF OPERATION. FIPER SVC BULLETIN #787A, DATED 8/15/85, ADDRESSED THE POSSIBILITY OF CRACKS DEVELOPING IN THE AREA OF THE FAILURE. IT RECOMMENDED THAT AFTER THE 1ST 1000 HRS IN SVC, TRUNNIONS BE INSPECTED AT INTERVALS NOT TO EXCEED 100 HRS UNTIL REPLACED. THE LAST ANNUAL INSPECTION WAS DATED 3/8/88, BUT THERE WAS NO LOGBOOK ENTRY TO INDICATE THE INSPECTIONS HAD BEEN COMPLETED. THE ACFT HAD FLOWN ONLY 4 HRS SINCE THE LAST INSPECTION.

Brief of Accident (Continued)

File No. - 1883      3/10/88      LOWER LAKE, CA      A/C Reg. No. N1555X      Time (Lcl) - 1730 PST

Occurrence #1      MAIN GEAR COLLAPSED  
Phase of Operation      LANDING - ROLL

Findings(s)

1. LANDING GEAR, MAIN GEAR - FATIGUE
2. MAINTENANCE, SERVICE BULLETINS - NOT FOLLOWED - OTHER MAINTENANCE PSNL

Occurrence #2      LOSS OF CONTROL - ON GROUND  
Phase of Operation      LANDING - ROLL

Findings(s)

3. DIRECTIONAL CONTROL - NOT POSSIBLE -
4. GROUND LOOP/SWERVE - UNCONTROLLED -

-----Probable Cause-----

The National Transportation Safety Board determines that the Probable Cause(s) of this accident is/are findings(s) 1

Factor(s) relating to this accident is/are findings(s) 2

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Brief of Incident

File No. - 5072      7/21/88      TAMPA,FL      A/C Res. No. N47506      Time (Lcl) - 0800 EDT

Basic Information-----

Type Operating Certificate-ON-DEMAND AIR TAXI      Aircraft Damage  
Type of Operation -BUSINESS      HINOR  
Flight Conducted Under -1A CFR 91      Fire  
Incident Occurred During -LANDING      NONE      Fatal      Serious      Minor      None  
Crew      0      0      0      1  
Pass      0      0      0      0

Aircraft Information-----

Make/Model - PIPER PA-34-200T      End Make/Model - CONTINENTAL TS10-360-E      ELT Installed/Activated - YES/NO  
Landing Gear - TRICYCLE-RETRACTABLE      Number Engines - 2      Stall Warning System - YES  
Max Gross Wt - 3400      Engine Type - RECIP-FUEL INJECTED  
No. of Seats - 6      Rated Power - 200 HP

Environment/Operations Information-----

Weather Data  
Wx Briefing - FSS  
Method - TELEPHONE  
Completeness - FULL  
Basic Weather - VMC  
Wind Dir/Speed- 160/005 KTS  
Visibility - 9.0 SM  
Lowest Sky/Clouds - 900 FT SCATTERED      Type of Flight Plan - NONE  
Lowest Ceiling - 9000 FT OVERCAST      Type of Clearance - NONE  
Obstructions to Vision- NONE      Type Apch/Lnds - TRAFFIC PATTERN  
Precipitation - RAIN SHOWERS      FULL STOP  
Condition of Light - DAYLIGHT

Personnel Information-----

Pilot-In-Command      Age - 29      Medical Certificate - VALID MEDICAL-NO WAIVERS/LIMIT  
Certificate(s)/Rating(s)      Biennial Flight Review      Current - YES      Flight Time (Hours)      Total      926      Last 24 Hrs - 0  
COMMERCIAL      Months Since - 11      Make/Model-      336      Last 30 Days- 14  
SE LAND,ME LAND      - Aircraft Type - PA-34      Instrument-      216      Last 90 Days- 88  
Multi-Eng - 421

Instrument Rating(s) - AIRPLANE

Narrative-----

SHORTLY AFTER DEPO, THE FLT ELECTED TO RTAN TO THE ARPT FOR PAPERWORK HE HAD FORGOTTEN. HE RPTD THE APCH & TOUCHDOWN WERE NORMAL, BUT DRG THE LNDG ROLL, THE LEFT MAIN GEAR COLLAPSED. SUBSEQUENTLY, THE ACFT VEERED OFF THE RWY & HIT A RWY LGT BEFORE STOPPING. AN EXAM OF THE LEFT GEAR REVEALED THE LEFT MAIN LNDG GEAR TRUNNION HAD FAILED NR THE FILLET WEB DUE TO FATIGUE. THE TRUNNION HAD BEEN IN SVC FOR 1255 HRS OF OPN. PIPER SVC BULLETIN #787A, DATED 8/15/85, RECOMMENDED THAT AFTER 1000 HRS OF SVC, THE TRUNNIONS BE INSPECTED AT INTERVALS NOT TO EXCEED 100 HRS OF OPN UNTIL REPLACED. INSPECTIONS WERE TO BE MADE WITH A 10 POWER MAGNIFYING GLASS AFTER PAINT & DIRT WERE REMOVED. THE TRUNNION HAD BEEN INSPECTED AT 55 FLT HRS BEFORE THE ACNT, BUT KFRIDLY, THE OPERATOR FAILED TO PROPERLY REMOVE THE PAINT & DIRT BEFORE THE INSPECTION.

Brief of Incident (Continued)

File No. - 5072      7/21/88      TAMPA,FL      A/C Reg. No. N47506      Time (Lcl) - 0800 EDT

Occurrence #1      MAIN GEAR COLLAPSED  
Phase of Operation      LANDING - ROLL

Findings(s)

1. LANDING GEAR, MAIN GEAR STRUT - FATIGUE
2. MAINTENANCE SERVICE BULLETINS - NOT FOLLOWED - COMPANY MAINTENANCE PSNL

Occurrence #2      LOSS OF CONTROL - ON GROUND  
Phase of Operation      LANDING - ROLL

Findings(s)

3. DIRECTIONAL CONTROL - NOT POSSIBLE -
4. GROUND LOOP/SERVE - UNCONTROLLED -

Occurrence #3      ON GROUND COLLISION WITH OBJECT  
Phase of Operation      LANDING

Findings(s)

5. OBJECT - RUNWAY LIGHT

---Probable Cause---

The National Transportation Safety Board determines that the Probable Cause(s) of this incident is/are finding(s) 1

Factor(s) relating to this incident is/are finding(s) 2