



# AIRCRAFT INCIDENT REPORT

(Ref. Law on Aircraft Accident Investigation, No. 59/1996)

**Aircraft :**

- Type and Registration:
- Year of Manufacture:
- Manuf. Serial No:
- No & Type of Engines:

**Registered owner:**

**Operator/User:**

**Date & Time:**

**Location:**

**Type of Occurrence:**

**Type of Flight:**

**Meteorol. Conditions:**

**Flight Conditions:**

**Type of Flight plan:**

**Persons on Board:**

**Injuries:**

**Nature of Damage:**

**The Pilot-in Command:**

**- Licence:**

**- Flying Experience:**

**Information Source:**

Fairchild Hiller, FH-227B.

Corporation, N564LE.

1967.

564.

Two, Rolls Royce Dart 532-7.

Legion Express Inc.

Legion Express Inc.

26 July, 1998, at 23:55 UTC

Keflavik Airport, Iceland (N63°59'06"W022°36'20").

Incident.

Ferry under 14 CFR Part 91.

No wind, Visibility more than 10 km, Few clouds at 1800 ft, Temperature +10°C, Dew Point 9°C, QNH 1012 hPa.

VFR.

IFR with Special Flight Permit for Maintenance.

Crew - Two      Passengers - None

Crew - None      Passengers -

Rear fuselage bottom skin and frames extensively damaged. Right wing tip, propeller blades, lock strut and drag strut destroyed.

47 years old.

USA: ATP, Airplane Multiengine Land, F-27.

Approx. 8,000 hours total time, approx. 3,000 on F-27

AAIB- Iceland.

The aim of aircraft accident investigation is solely to identify mistakes and/or deficiencies capable of undermining flight safety, whether contributing factors or not to the accident in question, and to prevent further occurrences of similar cause(s). It is not up to the investigation authority to determine or divide blame or responsibility. This report shall not be used for purposes other than preventive ones.  
(Law on Aircraft Accident Investigation, No 59/1996, para 1 and para 14.)

## 1. FACTUAL INFORMATION:

### 1.1 The flight:

The aircraft was on 24. July, 1998, at Billund Airport, Denmark, issued with a Special Airworthiness Certificate for Maintenance (Special Flight Permit) including Special Operating Limitations for ferry flight from Billund Denmark, to Glasgow Scotland, to Keflavik, Iceland, to Sondre Stromfjord Greenland, Goose Bay, to KPTL and to Opa Locka, Florida, USA. The aircraft, however, was routed through Aberdeen, where it apparently had made an uneventful fuelling stop.

On final approach for runway 02 at Keflavik airport, Iceland, at 23:38 hrs, when the landing gears were extended, the crew heard an abnormal loud noise from behind and the landing gear position indicators showed that right hand main gear was not locked down. The landing was aborted and the aircraft passed the tower for visual observation. The Co-pilot went back to the cabin for visual check of the landing gears, where he observed that the right landing gear lock strut rear member, had broken loose from the side member assembly and was out of sight. The Captain also verified this. The landing was on runway 02 but the gear was unstable and when it took weight, it collapsed and the aircraft right propeller, wing tip and the bottom of the aft fuselage hit the ground. The aircraft then ran off the runway in a gentle right turn. It came to rest about twenty meters from the runway's right edge, heading east.

Prior to the landing, the airport fire brigade considered foaming the runway, but decided not to do so, as the available type of foaming, light water AFFF, collapses too fast to be effective. Instead the fire brigade was ready when the aircraft landed at 23:55 and applied the foam immediately as the aircraft came to rest.

The fuselage bottom skin and frame structure were extensively damaged and the right wing tip, the right propeller blades, the right main landing gear lock strut and the drag strut, were destroyed.

The aircraft was lifted by airbags and moved with a heavy lift paymover to a parking stand without any further apparent damage and it was then put on a wing jack instead of the right gear, until a suitable brace was fitted to replace the drag and the lock struts.

### 1.2 The investigation:

Prior to the landing, the pilots observed after the extension of the landing gears, that the lock strut rear member of the failed R/H landing gear was out of sight, but later it was found still attached to the shock strut. This indicated that the lock strut must have failed while the landing gear was in or transiting in or out of the up-lock position.

The examination of the broken and the bent hinge pin that connects the fore and rear members of the lock strut and the failed lugs on the fore member indicates, that the failures took place in overload as the gear was pulled up into the up-lock.

The failed hinge pin that should normally be packed with grease, had very little of it. The lock strut rear member pivot bracket did not rotate freely and the uplock roller on the shock strut could not be moved at all. This appeared to be due to a lack of lubrication and most of the other lubricating points on this gear did not have evidence of a recent lubrication.

The aircraft maintenance manual requires that these items should have been lubricated at least within the last six months prior to the flight.

The condition of the left main landing gear was considerably better regarding lubrication, as the uplock roller there moved freely.

Examination of the maintenance records that were carried onboard the aircraft indicated that the aircraft had not flown much during the last four years. The airframe total time was 35,300 hrs, on 18. March 1994, but when the aircraft was released from maintenance in Billund, on 24. July 1998, the airframe total time was 35,405:36 hrs. Thus the flight hours during the previous four years to the accident was only 105:36 hours.

The failed lock strut, Mfg. Serial Number DRG36/65, was fitted, on 26. June 1986, in an overhauled condition with the time limit of 16,000 hrs to be removed at 48,885 hrs, airframe time. Thus the lock strut time in service since installation was over 12 years and 2,520 flight hours.

Information provided by the current owner of the aircraft indicated that the aircraft had been in storage for more than two years prior to this flight, but that he had the aircraft lubricated prior to the flight from Billund. He indicated that an interruption during the lubrication process of the aircraft might have caused confusion and omission of the lubrication of the landing gear in question.

The current owner of the aircraft has also stated that the previous owner, New Air A/S in Billund, Denmark, had during the maintenance done on this particular aircraft prior to the departure from Billund, performed eight landing gear swings, mainly due to sticking switches on the nose landing gear, that needed cleaning before they operated properly for the cockpit indicators.

## 2. SYNOPSIS:

The aircraft suffered a failure of the right hand main landing gear lock strut assembly during flight. As structural integrity is required of the lock strut assembly to maintain the rigidity of the main landing gear in the down position to carry the aircraft on ground, the landing gear collapsed towards retracted position when it took weight when the aircraft landed.

The in-flight observations provided by the pilots of the aircraft and the subsequent investigation of the failed landing gear lock strut assembly and the condition of the landing gear indicate, that the cause of the failure was overloading of the hinge pin that connects the fore and the rear members of the lock strut.

The nature of the failure indicates that the pin may have started to yield during the retraction checks of the landing gear in Billund, due to overload caused by the lack of lubrication of the pin and the up-lock roller. The resistance in the lock strut joint may have been increasing with each retraction of the gear, causing the pin to fail completely when the gear was pulled into the up-lock position after the last retraction prior to the accident after the take-off from Aberdeen.

When the gear was extended during the final approach to Keflavik airport, the rear member of the lock strut was pushed back and left in a backward position, while the drag strut and the fore member of the lock strut were moved into the down position by the actuating ram. The fore member slamming and breaking away from the rear member of the lock strut probably generated the abnormal loud noise, mentioned by the pilots. Thus the pilots could not see the rear member of the lock strut at all, when they checked the position of the landing gear prior to landing as it was at that time behind the centre door leaning against the upper member of the landing gear.

During the landing roll, when the landing gear collapsed toward the retracted position, with the drag strut and the fore member of the lock strut remaining in the down position, held by the actuating ram, the drag strut failed due to excessive bending load at the pin where the fore member of the lock strut was attached to it.

The aft lugs of the lock strut member, at this moment possibly cracked open but still holding the two ends of the failed hinge pin embedded in the lug holes by the pulling force that broke the pin, were now hit by the upper part of the shock strut and knocked off. The broken off bits of the lugs and the pin ends were found on the runway where the landing gear collapsed.

## 3. SAFETY RECOMMENDATIONS:

None.

## 4. APPENDICES:

- 4.1 Figures from the F-227 Maintenance Manual.
- 4.2 Special Airworthiness Certificate, issued for N564LE, 24 July 1998.

Reykjavík, 12 November, 1998

Aircraft Accident Investigation Board – Iceland

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# FOKKER F-27

## MAINTENANCE MANUAL

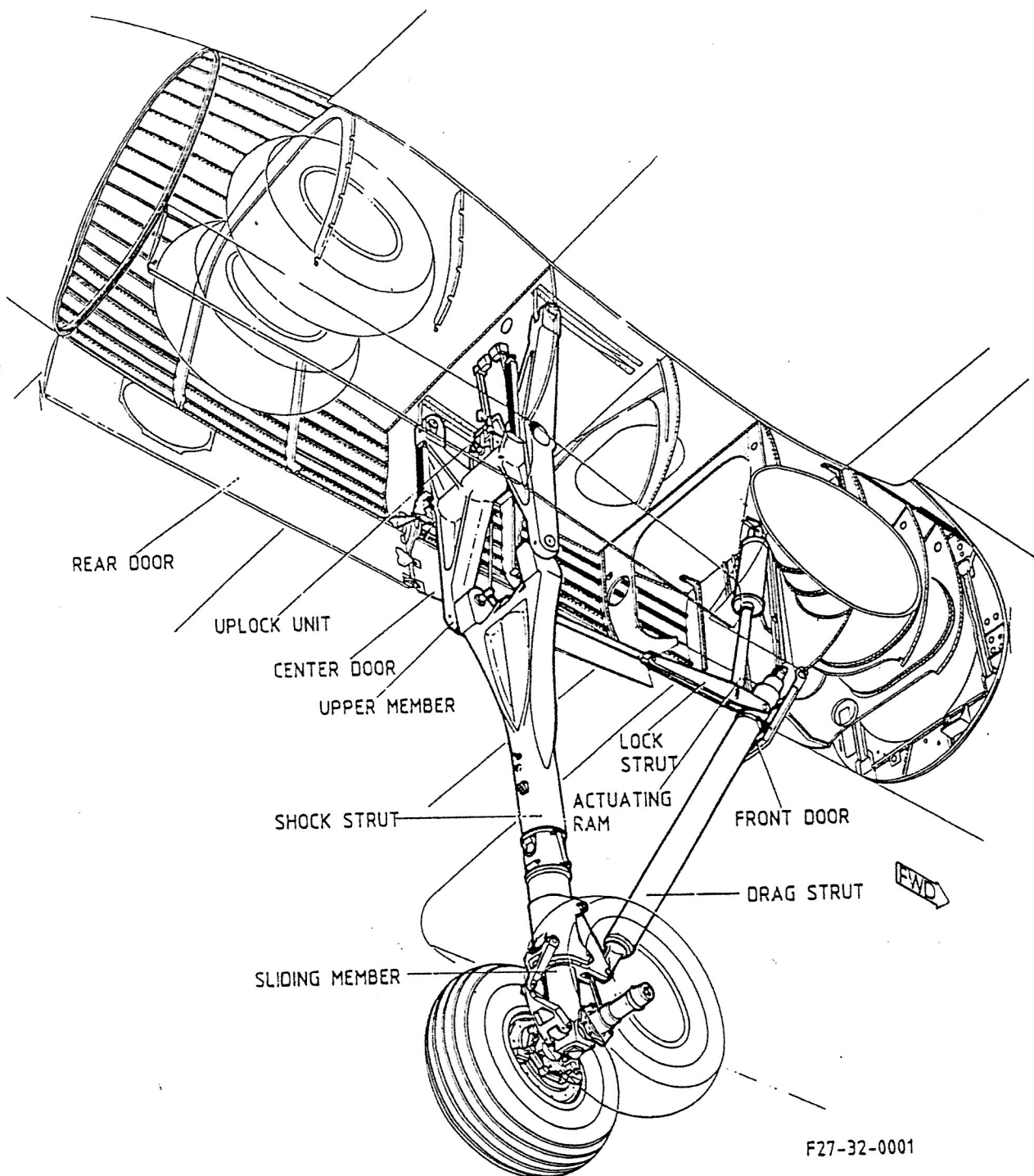


FIG. 1 MAIN LANDING GEAR - GENERAL ARRANGEMENT (MK 200, 400, 600)

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# FOKKER F-27 MAINTENANCE MANUAL

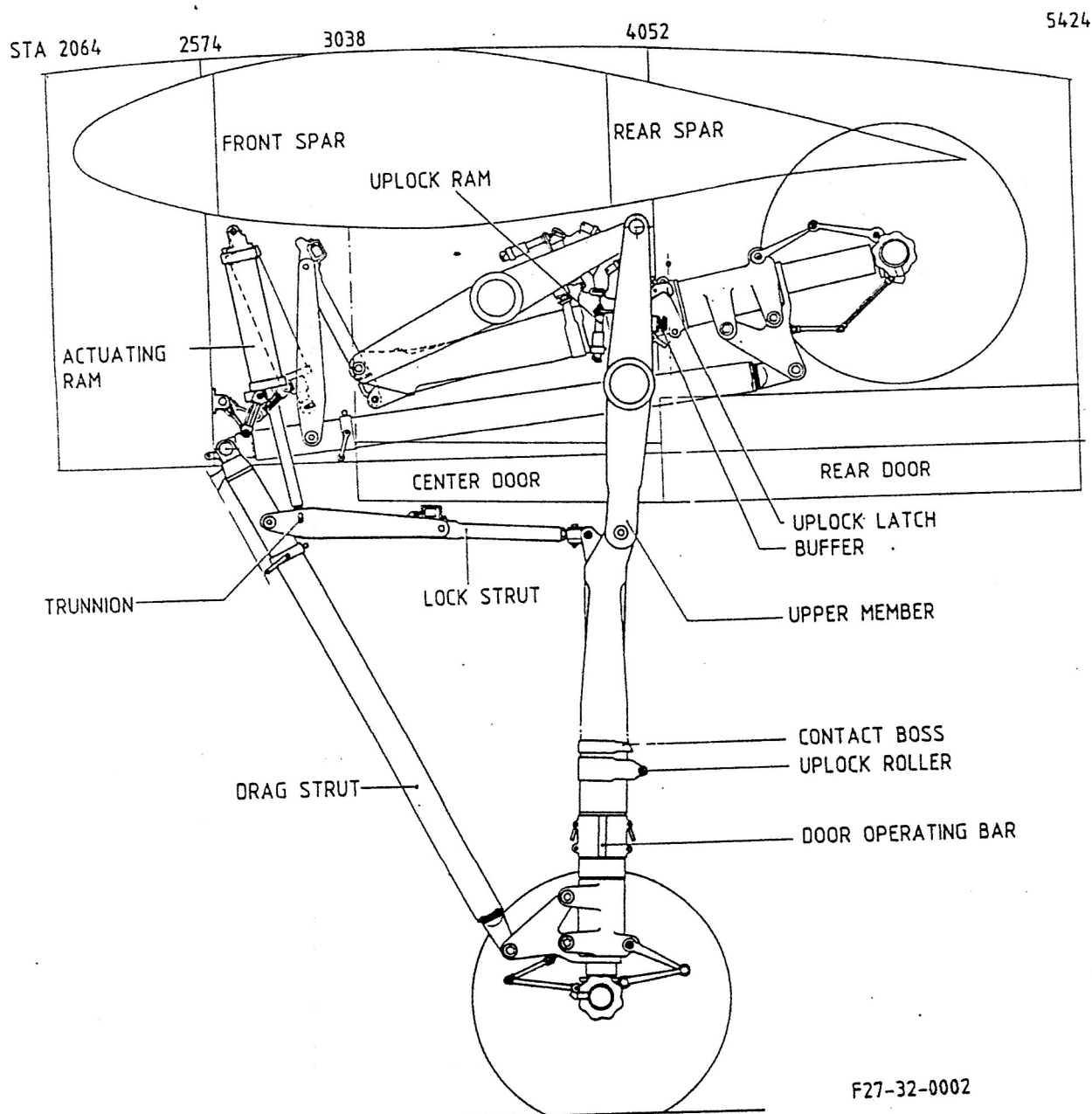


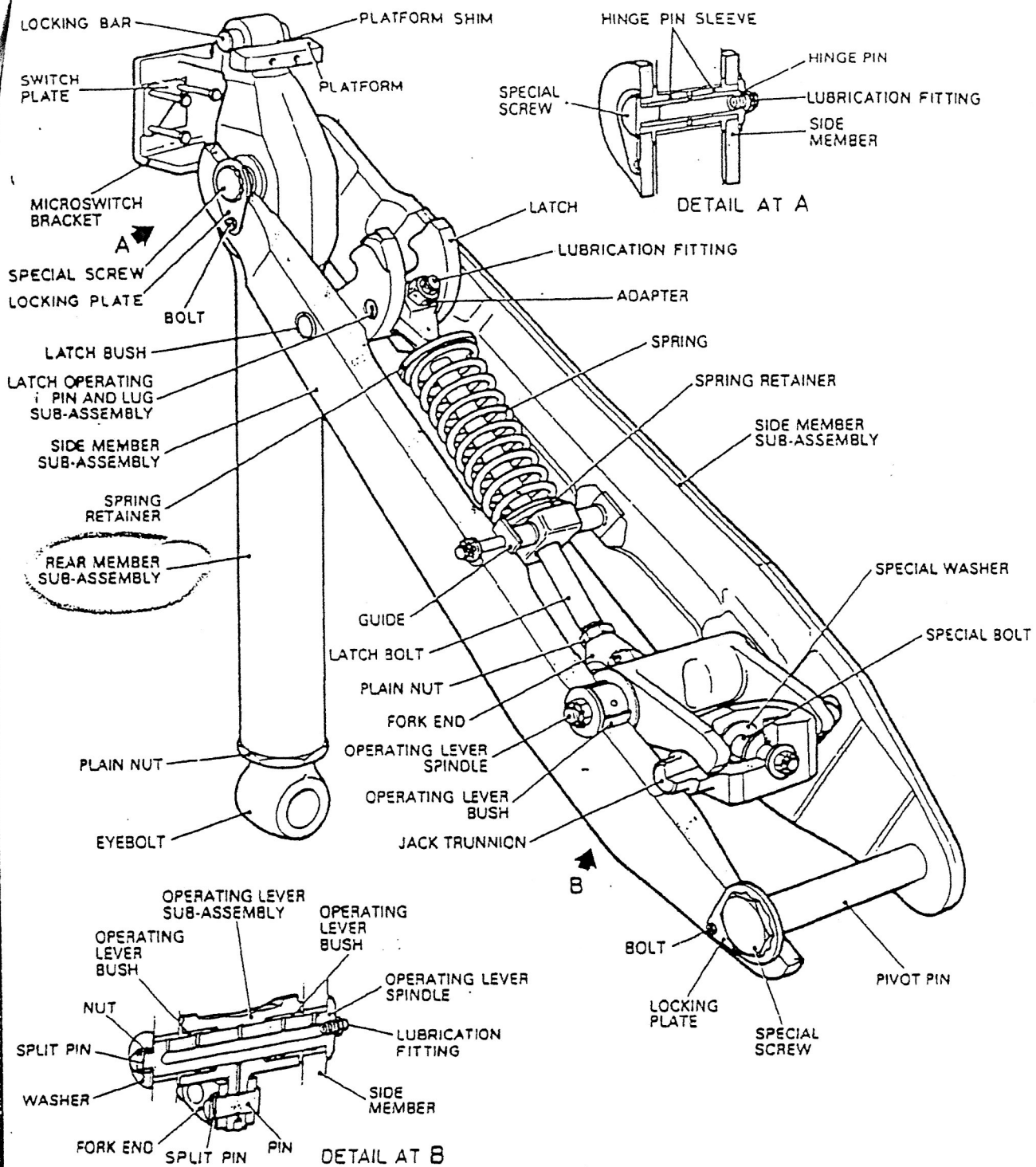
FIG. 3 MAIN LANDING GEAR - KINEMATICS (MK 200, 400, 600)

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Code 1

# Dowty Aerospace Gloucester

09058YA01 COMPONENT MAINTENANCE MANUAL



F2783501K

Lock Strut  
Figure 1

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## Log Book Certificate

Fairchild F H - 227 B Serial No. 564 N 5 6 4 L E  
Airframe Total Time: 35405.6 Hours July 24, 1998

I find that this Fairchild FH-227B Serial No. 564 meets the requirements of the certification requested and have issued a Special Airworthiness Certificate for Maintenance ( Special Flight Permit ) dated July 24, 1998.  
Special Operating Limitations dated July 24, 1998 are part of this certificate.

