



The Islamic Republic of Iran
Civil Aviation Organization
Aircraft Accident Investigation Board

Final Report

Basic Information:

File Number: S980102 ATG

Type of Aircraft: Fokker 100

Registration Mark: EP-ATG

Date of Incident: 22 Mar, 2019

Time of the incident: Approximately 07:00 local time

Location: Enroute Mehrabad Airport to Ilam Airport

Issue date: 03 March, 2020

Civil Aviation Organization

Aircraft Accident Investigation Board (AAIB)

Mehrabad International Airport

Tehran/I.R of Iran

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"In the Name of God"

Foreword:

The Civil Aviation Organization, in accordance with international requirements and local regulation of the Islamic Republic of Iran is responsible for monitoring the proper implementation of the regulations and standards of flights in the "Civil Aviation Industries" of the country. In order to identify the sources of threats on flight safety based on the Regulations on the Investigation of an Accident in Civil Aviation Accidents, adopted in 2011 by the government and the International Regulations of the International Civil Aviation Organization (ICAO) Annex 13, the Aircraft Accident Investigation Board (AAIB) institutes the Investigation of the civil aircraft Accidents/Incidents. After determination of the Causes and the Contributing Factors, it will issue Safety Recommendations in order to prevent the same accidents or similar events in future.

According to Aircraft Accident Investigation regulation of the Islamic Republic of Iran, accident investigation shall be used for prevention of similar occurrences and should be conducted without prejudice to any judicial or administrative action that may be taken to determine blame or liability.

Based on Annex 13 to the Convention on International Civil Aviation, Chapter 3, Paragraph 3.1, and Chapter 5, Paragraph 5.4.1; the following is stipulated and recommended:

“The sole objective of the investigation of an incident or accident shall be the prevention of incidents and accidents. It is not the purpose of this activity to apportion blame or liability.”

Consequently, the use of this report for any purpose other than the prevention of future accidents could lead to erroneous interpretation.

In the case of the accident on Mar 22, 2019, involving Fokker 100 aircraft with registration EP-ATG, the IRI CAO Aircraft Accident Investigation Board (AAIB) gathered whole information with coordination of related entities and approached the investigation as representative of State of occurrence.

According to International Law and Appendix 13 to the Chicago Convention, the Notification was sent to the ICAO and Dutch Safety Board (DSB), as state of aircraft manufacturer and designer and UK,AAIB as manufacturer of aircraft landing gear. Both states introduced their accredited representatives accordingly.

The Iran AAIB sent draft of final report to the involved states. The comments from DSB, EASA and Fokker service were received and non-agreed comments were inserted to the report appendices.

1. FACTUAL INFORMATION:

1.1 History of the Flight:

At about time 07:00 local time on Mar. 22, 2019, the Aircraft Fokker 70/100 with registration EP-ATG, flight No.IRC840 from Mehrabad International Airport (OIII) to Ilam Airport (OICI) while approaching Ilam Airport with nine flight crew members and 81 passengers on board, the pilot of the aircraft was unable to extend landing gear due to technical problems.

The pilot attempted to retract the landing gear mechanism in order to recycle the landing gear, but only the nose and left main landing gears were extended. Due to airline limitation on the operating category of Ilam airport (CAT C) and considering total fuel on board, initially, the aircraft was diverted to the first alternate airport (Kermanshah Airport-OICC) but finally, with the decision of the pilot, the flight was continued to the second alternate airport (Mehrabad airport). The pilot reported the problem to the tower section of Mehrabad Airport and requested organizations to be ready for emergency situation. The pilot recycled landing gears and fortunately, all landing gears were normally extended while approaching the airport and normal landing was executed. The aircraft landed safely at 07:50 local time in Mehrabad Airport and aircraft occupants disembarked safely.

The aircraft was jacked up in the hangar to test the Landing Gear operation but the right main landing gear was not extended as expected.

The occurrence was categorized as a “*Serious Incident*” based on the adverse situation that had occurred during the flight.



1.2 Injuries to Persons:

There were nine crew members and 81 passengers on board. No Injuries have been reported in this incident.

1.3 Damage to Aircraft:

There was not any damage to the aircraft fuselage generally, but due to contamination on the aircraft hydraulic system, only the "Restrictor Check Valve" landing gear on the right side of the aircraft was damaged.

1.4 Other Damage:

Not applicable A

1.5 Personnel Information:

The flight crew certification and training records revealed that both the pilot and the co-pilot had passed their recurrent flight training on type Fokker 100.

No evidence indicated any medical or abnormal behavioral conditions that could have adversely affected their performance during the incident.

Pilot:

The Pilot in command was male, 44 years old, holding Certified ATPL (P1) No. 1935 with type rating of Fokker 100, valid until June 09, 2019. His Medical Certificate was issued on May 12, 2018 for one year.

Co-pilot:

The Co-pilot was male, 30 years old, holding Certified CPL (P1) No. 2960 with type rating of Fokker 100, valid until November 21, 2018 and his Medical Certificate was issued on October 13, 2018 for one year.

1.6 Aircraft Information:

1.6.1 General information:

Fokker 100, EP-ATG with serial number 11329, was a medium-sized, twin-turboprop jet airliner that was built at Fokker Company/ the Netherlands in November 1991.

The Fokker 100 was originally certificated by the Dutch Airworthiness authorities in 1988, and subsequently by EASA, FAA. The aircraft Certificate of Airworthiness has been issued by the Iranian Civil Aviation Organization and was valid. The aircraft gained 34329 cycles and 40110 flight hours since new at the incident time. Aircraft base maintenance was performed in an approved PART-145 maintenance organization in Tehran. The last periodic check on the aircraft was accurately performed based on AMP, AMM.

The aircraft was certificated, equipped, and maintained in accordance with CAO.IRI operation and airworthiness requirements.

The last "C" check on the aircraft was finished in October 2018. While checking the related hydraulic lines, connections and parts were removed /inspected based on AMP task cards.

1.6.2 Engines:

The aircraft was equipped with two TAY 650-15 engines with S/N; 17341, 17342 manufactured by Rolls-Royce company.

1.7 Meteorological Information:

The meteorological condition did not affect the occurrence of this accident.

1.8 Aids to Navigation:

At the time of accident, all navigation aids (on-board & ground) were serviceable.

1.9 Communications:

There was no reported discrepancy between the aircraft and airport and ground stations. In addition, radio conversations recorded in flight control units and pilot performance during the flight indicated that radio communication had been operating normally at the time of the incident.

1.10 Airport Information:

Mehrabad International Airport (OIII) is located in the west of Tehran and designated for scheduled domestic and unscheduled international flights. The airport is operated by the Iranian Airports & ANS Company.

1.11 Flight Recorders:

Aircraft FDR / CVR were removed from the aircraft without sustaining any damage and downloaded at avionics shops of the airlines. Both Flight Data Recorder (FDR) & Cockpit Voice Recorder (CVR) were successfully analyzed.

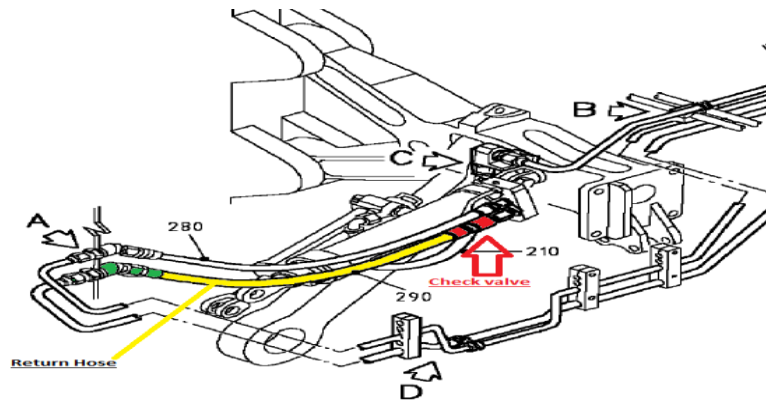
- According to the CVR conversations, there was no specific and effective deficiency on crew performance, which could have affected the incident.
- FDR information on previous flights showed that there were recorded time differences between right and left main landing gear extension during approach to the airports. The recorded delay for the right main landing gear extension only indicates that the flow of hydraulic fluid was obstructed other than normal operation as consequence of entering debris to Restrictor Check Valve orifice on the right landing gear system.

1.12 Wreckage and Impact Information:

Post-Incident Inspections:

In the hangar, the following inspections were done on aircraft-related landing gear system and components for investigation purpose as required by AAIB.

- The aircraft was jacked up, and the operational tests of landing gear both on normal and alternate condition were made, but the right main landing gear was not extended.
- The restrictor check valve near RH main landing gear actuator was opened and some parts of Cut O-ring were found on the orifices of the restrictor valve and related screen filter was cut.
- The main LG selector valve and its filter were checked with normal condition.



Failed Check Valve

1.13 Medical and Pathological Information:

None relevant

1.14 Fire:

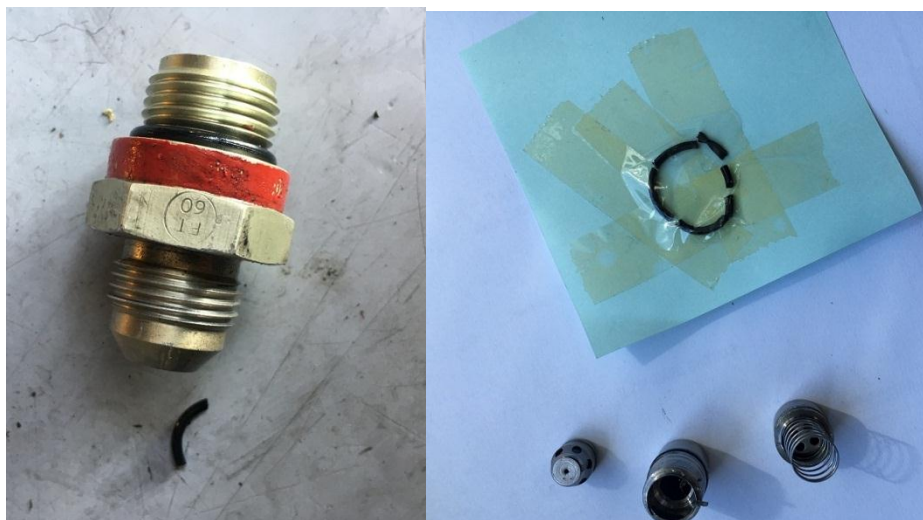
There were no indications of a post-impact fire on the aircraft.

1.15 Survival Aspects:

The survival aspect was not considered critical, and all passengers disembarked the aircraft safely through the exit door.

1.16 Tests and Research:

All parts of O-ring were collected from the system and sent to Fokker Service in the Netherlands for analysis.



The investigation at Fokker Service has been finalized with the following conclusions:

- The origin and part number of the O-ring cannot be positively defined.
- Most probably, the O-ring entered the hydraulic system during a maintenance activity.

1.17 Organizational and Management Information:

The airline is a registered air carrier in the IR of Iran with a valid Air Operator Certificate (AOC) at the time of the incident. The airline has an approved CAMO for Continued Airworthiness Management of aircraft under approved CAME.

1.18 Additional Information:

Many occurrences were reported concerning F100 aircraft, where during approach, after selecting landing gear down, one of the main landing gears (MLG) could not be extended and was locked down. In all cases, subsequent investigation revealed that the filter screen of the corresponding restrictor check valve (integrated in a hydraulic hose assembly) was broken, and debris inside the restrictor check valve was blocking the return flow from the affected MLG actuator. Additional inspections of the fleet of the operators involved revealed more damaged or failed filter screens. Some attempts were made by the manufacturer to improve design characteristics of the landing gear system. A brief history of the events is described as:

On September 14, 2009, a F28 Mark 0100 (Fokker 100), conducted an emergency landing with a not completely extended main landing gear (MLG) at Stuttgart Airport. On approach to Stuttgart, the main landing gear failed to extend. After several unsuccessful attempts to lower the gear, an emergency landing was carried out. The aircraft was substantially damaged. Investigation revealed two pieces of hard plastic in the Restrictor Check Valve, which was installed in the hydraulic return pressure line between the Pilot-and-Main Slide of the Main Landing Gear Selector Valve and the return system. Based on the facts of the accident and other operators' reports, the Fokker service issued SBF100-32-095 as design change of L/G Hydraulic System (Installation of T union filter P/N: QA07597) to effectively prevent entering of pollution and debris to the MLG Check Valve as a preventative action. The scenario of Stuttgart accident is not related to restrictor-check valve in hose but modified T-union filter could not prevent damage to restrictor valve.

On May 10, 2014, a Fokker 100, registration EP-ASZ performing flight EP-853 from Mashhad to Zahedan (Iran), was on approach to Zahedan when the left main gear did not extend prompting the crew to abort the approach and enter a hold. Attempts to lower the left main gear via alternate means failed, forcing the crew to perform a partial gear up landing on Zahedan's runway 35 about one hour after aborting the first approach; the aircraft veered left off the runway and came to a stop about 1500 meters down the runway left off the runway. The revealed investigation showed that a new hazard appeared and integral screen filter of modified T-union based on SBF100-32-095 and also SBF28-32-154, became detached from T-union and caused damage to other filters in hose Assy. (P/N: 97867-1). Then EASA issued AD No. 2015-0077 in accordance with Fokker

Services SBF28-32-166, and mandated one-time inspection of a hydraulic hose in accordance with the instructions of Fokker Services CSB-32-026 to detect damaged screen filter on the Check Valve.

On Feb 16, 2018, a Fokker 100, registration EP-FQF performing flight QB-1202 from Tehran Mehrabad to Mashhad (Iran) was on final approach to Mashhad's runway 31R in night conditions when the crew did not receive a down and locked indication for the left main gear and went around. The aircraft entered a hold while the crew was performing the related checklists and attempted to resolve the problem in vain. The aircraft finally needed to perform a partial gear up landing on runway 31R without the left main gear in position. The aircraft touched down on right main gear and nose gear and kept the left wing up as long as practicable. The aircraft subsequently settled on the left wing coming to a stop off the runway and became involved in an accident. The evidence of the accident showed that all preventative actions issued by related authorities were done on the aircraft, but again, the screen filter near hydraulic restrictor check valve was damaged by reflected force of contamination and sediment available in the hydraulic system, which caused the blockage of the nozzle downstream to down lock L/H landing gear mechanism. Iran AAIB recommended periodical inspections based on SBF28-32-164 and SBF100-32-166 providing instructions for removal of the affected hydraulic hoses (including the restrictor check valve) to be inspected in-shop, and for installation of serviceable parts in relation to Fokker Services CSB-32-026 to provide those in-shop inspection instructions to detect any damaged filter screen repetitively. However, EASA believed that repetitive inspections on the hydraulic hose would increase the risk of entering pollution to the system. EASA specialists noted that they are already aware of the events over the recent years, so a number of improvements to the F70/F100 hydraulic system have been certified and made mandatory by them.

The whole preventative actions could not prevent the problem before this incident due to design of the system and may join with other failures to cause similar occurrences.

The respective follow-up caused EASA to publish AD 2018-0076 as a result of the findings during the investigation of the EP-ASZ accident regarding modified T-union and restrictor check valve with filter screen. Finally, the latest EASA AD 2019-0104 about hose assemblies was issued with a restrictor check valve with non-wire mesh screen filters which was issued on 19 March 2019 as a result of the investigation of all (3) similar accidents and the feedback from one-time inspection SB's SBF100-32-164 and CSB-32-026. The introduction of the improved hose assembly's PN A25509-01 i.a.w. SBF100-32-162R1 would have prevented the extension failure due to the more robust internal filters.

1.19 Useful or Effective Investigation Techniques:

The standard and normal techniques based on ICAO Accident Investigation Manual (DOC.9756) were applied.

2. ANALYSIS:

Evaluation of the incident technical information, including FDR/CVR readout and aircraft technical status was analyzed as:

Fokker 100, EP-ATG was planned to be checked by airline facilities on a hangar at Tehran Mehrabad Airport. The last "C" check on the aircraft was finished in October, 2018. During the check, related hydraulic lines, connections and parts were removed /inspected based on AMP task cards without any findings. All airworthiness directives and mandatory bulletins were done on the aircraft based on the airline documentation at the time of incident .During daily work on the aircraft landing gear system, a lost O-ring entered the hydraulic system by human error of a technician while performing the related technical tasks.

During landing gear operation, the O-ring parts had been displaced between LG selector valve and RH main landing actuator in the hydraulic system. The displacement of the parts as contamination of hydraulic fluid incorporating high-pressure operation caused damage/rupture to screen filter of check valve and contaminated parts entered the orifice of restrictor and blocked return line of actuator to extend right main LG.

During aircraft operation from October 2019 up to March 2019, the flight crew could not sense any abnormality about time difference on LG extension between right and left hand MLG because they were busy on approach and landing checklist and did not focus on time delay.

The airline utilizes flight data monitoring system, but the time difference of MLG extension was not a defined event on the system to detect the failure.

The revealed inspections did not define the location of missed O-ring on the components of landing gear system. Although the O-ring was sent to the Netherlands for further investigation, the origin of O-ring could not be identified. However, due to normal inlet filter of the main landing gear selector valve, it seems that the O-ring entered the LG system during maintenance at position between LG selector valve and right MLG actuator.

3. CONCLUSIONS:

3.1 Findings:

- 1- The crew was certified to operate the aircraft and there was no operational issue causing the incident.
- 2- The weather was good; the meteorological conditions had no influence on the incident.
- 3- The aircraft had the required certification and was maintained in accordance with existing regulations, but precautionary action to prevent entering of pollution to the hydraulic system was not observed by technicians.
- 4- Flight and landing seemed to proceed under normal conditions up to time of LG extension while approaching the Ilam airport.
- 5- The captain was pilot flying and decided to recycle the LG, but it was unsuccessful and returned to Tehran.
- 6- During approach to Tehran Mehrabad Airport, the pilot again recycled the landing gears, and fortunately all landing gears were opened normally and aircraft had a safe landing.
- 7- The on-board passengers and crew members disembarked normally.

3.2 Causes:

The aircraft was involved in a serious incident due to the main right landing gear component failure resulting from hydraulic contamination by a foreign object with the following contributing causes:

- Poor-quality maintenance action on landing gear system
- Design limitation characteristics of LG system of the aircraft type

4. SAFETY RECOMMENDATIONS:

On Mar. 24, 2019, following the initial findings of this incident and also recent accident on another F100 in IR of Iran territory, the Civil Aviation Organization of Iran issued an emergency Airworthiness Directive (AD 2019-01-E) including urgent inspection on LG check valve to detect damaged filter on the system.

In consideration of the final results of this investigation, and in order to prevent similar incidents in the future, as well as to improve the safety of flights, the following safety recommendations have been issued:

Ref No: 980102ATG;

To EASA:

1. To mandate Fokker Service to notify all F100 operators/pilots about findings of the incident via safety letter and guide preventative actions accordingly with reference of time delay for LG operation.

To the Iranian F100 operators:

2. To perform safety surveys on L/G shops and to evaluate their capabilities as well as obtain related maintenance approvals.
3. To improve flight data monitoring of the company and define the time difference events on the flights to detect LG failures.
4. To comply with CAO.IRI Emergency Airworthiness Directive (2019-01-E) dated Mar. 24, 2019.
5. To reinforce the internal quality control and the quality inspections through their safety & quality departments and/or audits, in order to ensure the suitability of the maintenance methodology and procedures of the tasks carried out in the workshop, with a view to guaranteeing the correct performance of technicians.

5. Appendices:

- Non-agreed comments
- CAO.IRI Emergency Airworthiness Directive (2019-01-E)
- EASA Airworthiness Directive No. 2019-0104
- Fokker Service Bulletin No. SBF100-32-162

Non-agreed comments:

<i>Index</i>	<i>Source</i>	<i>Comments</i>	<i>Condition</i>
1-	<i>EASA</i>	The report, at § 1.18 lists a number of occurrences relating to the F100 Landing Gear System and the actions put in place by the Manufacturer and EASA (respectively with SB and AD mandating modifications to the LG system). The report though, while providing evidence as to why “poor quality maintenance action on the landing gear system” appears being a cause for the event, fails to provide any evidence supporting the statement that “design limitation characteristics of LG system on aircraft type” is also to be considered a cause. Design aspects in fact are not further assessed nor mentioned in the “Analysis”	<i>Non-agreed</i>
2-	<i>Fokker</i>	The referenced SBF100-32-095 (and T-union filter PN QA07597) is not related to the referenced Stuttgart Airport accident nor to the restrictor-check valve in hose assembly and therefore not to this EP-ATG incident.	<i>Partially agreed</i>
3-	<i>Fokker</i>	Fokker Services is of the opinion that there is no additional need for EASA to inform operators/pilots about the findings of this specific investigation on EP-ATG because operators have already been sufficiently informed on the subject in general through the information in: <ul style="list-style-type: none"> - The "Reason" paragraph of EASA AD 2019-0104. - The "Reason" paragraph of Fokker Services SBF100-32-162 Revision 1. - Fokker Services All Operators Message AOF100.213 (currently at revision #04). -Fokker Services Fokker 70/100 Airworthiness Recommendation Catalogue items 32-32-1 and 32-32-2. 	<i>Partially agreed</i>

CAO.IRI Emergency Airworthiness Directive (2019-01-E)

تاریخ: ۱۳۹۸/۰۱/۰۲
شماره: ۱۰۱۶

بسمه تعالی



Emergency Airworthiness Directive

AD No.: 2019-01-E
Issued: 24, March 2019

این دستورالعمل صلاحیت پروازی اضطراری Emergency Airworthiness Directive توسط سازمان هواپیمایی کشوری ایران (CAOIRI) و بر اساس مقررات CAOIRI Part-21، 21.A.38 صادر شده است. بر اساس مقررات CAOIRI Part-M, M.A.301 ندانم صلاحیت پرواز یک وسیله پرواز باید با انجام Applicable AD اطمینان یابد. لذا هیچ شخصی مجاز به عملیات وسیله پرواز این که بر روی آن باید یک AD اجراء شود نیست تا اینکه الزامات آن AD اجراء شود، مگر بر اساس CAOIRI Part M.A.303 غیر آن تعیین کرده یا یک معاینی بر اساس CAOIRI Part M.B.302 صادر گردد.

FOKKER SERVICES B.V	نام دارنده تأییدیه طراحی
F28 aeroplanes	نوع / مدل
08 August 2018	تاریخ اجراء
EASA.A.037, A20EU	گواهینامه بر سه اطلاعات گواهینامه نوع
ندارد	AD خارجی
ندارد	جایگزین کننده
32 – Landing Gear	ATA
Fokker Aircraft B.V.	سازنده
F28 Mark 0070 and Mark 0100 aeroplanes, Aeroplanes of Iran Air, Aseman Airlines, Qeshm Air, Karoun Air, kish air	کاربر

علت: وقوع برخی حوادث برای سیستم های ارایه فرود هواپیماهای فوکر ۱۰۰ ناوگان کشور، مبنی بر عدم عملکرد صحیح آنها در زمان pressure و همچنین گرفتگی لوله ها و فیلتر های سیستم هیدرولیک که منجر به نشستن یا وضعیت اضطراری و آسیب دیدن هواپیما شده است.

اقدامات لازم الاجراء

	Required Action	Reference	Interval
1	Detail inspection of the all Restrictors of MLG Retraction actuator and selector valves and related lines due to MLG Extension problem.	AMM TASKS: 32-32-04 32-32-07 IPC 32-32-20	Every A Check
2	L/G HYDRAULIC CONTROL Inspection of the restrictor check valve	AD 2015-0077 Paragraph SB:F100-32-166	Every A Check
3	The inspection of Restrictor check valve screen	Component SB CSB-32-0	Every A Check
4	Alternate Manual Extension L/G in the ON & OFF hydraulic pressure	F100 AMM Task	Every A Check

زمان انطباق با این AD این AD بصورت اضطراری صادر شده و زمان انطباق آن ۵ روز بعد از زمان صدور می باشد. یعنی حداکثر تا پایان هشتم فروردین ۹۸ (برابر با ۲۸ مارس ۲۰۱۹) یکبار لازم است چهار مورد فوق انجام شود و بعد هر چک A تکرار شود.

صفحه ۱ از ۱

معتمد حسینی
 معاون استاندار پرواز



Airworthiness Directive

AD No.: 2019-0104

Issued: 10 May 2019

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 of that Regulation.

This AD is issued in accordance with Regulation (EU) 748/2012, Part 21.A.3B. In accordance with Regulation (EU) 1321/2014 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [Regulation (EU) 1321/2014 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [Regulation (EU) 2018/1139, Article 71 exemption].

Design Approval Holder's Name:

FOKKER SERVICES B.V.

Type/Model designation(s):

F28 aeroplanes

Effective Date: 24 May 2019

TCDS Number(s): EASA.A.037

Foreign AD: Not applicable

Supersedure: This AD supersedes Directorate-General of Civil Aviation of The Netherlands (RLD) AD (BLA) [94-095](#) dated 15 July 1994, including its Correction; and EASA AD [2015-0077](#) dated 06 May 2015.

ATA 32 – Landing Gear – Main Landing Gear Hydraulic Hose Assemblies – Replacement

Manufacturer(s):

Fokker Aircraft B.V.

Applicability:

F28 Mark 0070 and Mark 0100 aeroplanes, all serial numbers (s/n); and F28 Mark 1000, Mark 2000, Mark 3000 and Mark 4000 aeroplanes, all models, all s/n.

Definitions:

For the purpose of this AD, the following definitions apply:

The applicable SB: Fokker Services Service Bulletin (SB) SBF28-32-165 and SBF100-32-162 Revision 1, as applicable.

Affected part: Hose assemblies, having Part Number (P/N) 97867-1 or P/N 97867-3.

Serviceable part: Hose assemblies, having P/N A25509-01 or P/N A25629-01.



Reason:

In 1994, an occurrence was reported of a single main landing gear (MLG) collapse on a Fokker F28 aeroplane. Investigation results showed that sudden movement of the MLG retraction actuator could lead to the pressurization of the MLG downlock actuator and lifting of the MLG toggle links. Sudden movement of the retraction actuator, although a few millimeters only, might occur when the aeroplane touches down at a relatively large “crab-angle”. When subjected to resulting side-loads, the MLG may then retract.

This condition, if not corrected, could lead to a runway excursion, possibly resulting in damage to the aeroplane and injury to occupants.

Prompted by this event, Fokker Aircraft revised SBF28-32-123, introducing hydraulic hose assembly P/N 97867-1 to the MLG retraction actuators of F28 Mark 1000 through Mark 4000 aeroplanes. This hose assembly has a built-in restrictor check valve including wire-mesh filter screens. Consequently, the RLD issued AD (BLA) 94-095 to require replacement of hose assemblies P/N A71462-401 (without a built-in restrictor check valve) with hose assemblies P/N 97867-1. On all F28 Mark 0070 and Mark 0100 aeroplanes, either hose assemblies P/N 97867-1 or P/N 97867-3 (both having a built-in restrictor check valve, and a wire-mesh filter screen) were installed on the Fokker production line.

After that AD was issued, three reports were received on Fokker F28 Mark 0100 aeroplanes of failure to extend a single MLG. Investigation revealed that these events were caused by debris in the hydraulic circuit, combined with failure of a wire-mesh filter screen. This eventually resulted in debris entering the restrictor check valve, blockage of the restrictor orifice just prior to or during landing gear down selection, consequent hydraulic lock and failure of the affected MLG to extend.

Following the first 2 reports, Fokker Services issued SBF100-32-166, SBF28-32-164 and Component SB CSB-32-026 to provide instructions for the removal of hoses P/N 97867-1 and P/N 97867-3 from all F28 aeroplanes, in-shop inspection of the filter screens on the restrictor check valves of the removed hoses and installation of serviceable hoses P/N 97867-1 and P/N 97867-3, as applicable. Consequently, EASA issued AD 2015-0077 to require those actions.

More recently, Fokker Services developed hose assemblies P/N A25509-01 and P/N A25629-01, equipped with restrictor check valves with strengthened (non-wire mesh) screen filters and issued the applicable SB accordingly, providing installation instructions.

For the reasons described above, this AD cancels the now-redundant requirements of RLD AD (BLA) 94-095 and EASA AD 2015-0077, which are superseded, and requires replacement of the affected parts with serviceable parts.

Required Action(s) and Compliance Time(s):

Required as indicated, unless accomplished previously:

Replacement:

- (1) Within 18 months after the effective date of this AD, replace each affected part with a serviceable part in accordance with the instructions of the applicable SB.



Part(s) Installation:

- (2) After modification of an aeroplane as required by paragraph (1) of this AD, do not install any affected part on that aeroplane.

Ref. Publications:

Fokker Services SBF28-32-165 original issue dated 19 March 2019.

Fokker Services SBF100-32-162 Revision 1 dated 19 March 2019.

The use of later approved revisions of the above-mentioned documents is acceptable for compliance with the requirements of this AD.

Remarks:

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.
2. This AD was posted on 29 March 2019 as PAD 19-050 for consultation until 26 April 2019. No comments were received during the consultation period.
3. Enquiries regarding this AD should be referred to the EASA Programming and Continued Airworthiness Information Section, Certification Directorate. E-mail: ADs@easa.europa.eu.
4. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this AD, and which may occur, or have occurred on a product, part or appliance not affected by this AD, can be reported to the [EU aviation safety reporting system](#).
5. For any question concerning the technical content of the requirements in this AD, please contact: Fokker Services B.V., Technical Services Dept., P.O. Box 1357, 2130 EL, Hoofddorp, The Netherlands, Telephone +31-88-6280-350, Fax +31-88-6280-111, E-mail: technicalservices@fokker.com.
The referenced publication can be downloaded from www.myfokkerfleet.com.





Airworthiness Recommendations Catalogue Fokker 70/100

Landing Gear Hydraulic Control System

The introduction of measures to minimize the probability of a blocked hydraulic line

Effectivity

All F28Mk0070 and F28Mk0100 aircraft serial numbers.

Background

Following a landing with both main landing gears (partly) retracted and other main landing gear landing gear hydraulic control related incidents, a comprehensive review of feedback from one-time inspection service bulletins and of previous service experience was performed to determine whether additional actions were required to minimize the probability of a blocked hydraulic line in the main landing gear extension system. Refer to the information in AOF100.213#02 for further details.

Based on the conclusions from the review, Fokker Services:

- issued SBF100-32-170 for the replacement of the T-union with integrated filter (introduced with SBF100-32-095) by a standard T-union without filter. SBF100-32-170 cancels SBF100-32-095.
- revised SBF100-32-163 (introduction of a filter screen in the return line of the parking brake shut-off valve) into an approved and generic recommended service bulletin.
- revised SBF100-32-162 (introduction of a modified flexible MLG actuator hose assembly with an improved non-wire mesh filter screen) into an approved and generic recommended service bulletin.

Recommendations

Incorporate SBF100-32-170, revision 1 of SBF100-32-163 and revision 1 of SBF100-32-162 in accordance with the accomplishment instructions and compliances in the service bulletins.

Airworthiness Directive

2018-0076 and 2018-077, PAD 19-050.

Other References

Fokker 70/100 All Operators Messages AOF100.160#04, AOF100.163#02, AOF100.189#03, AOF100.212#02, AOF100.213#02 and AOF100.220.
Fokker 70/100 Airworthiness Recommendations Catalogue items 32-32-2 and 32-44-4.

Apr 01/19
Technical Services
Fokker Services BV

ATA100: 32-32
Subject: 1
Issue: 7

Printed, 25 April 2019 10:34:17 CET

