Bundesstelle für
Flugunfalluntersuchung

German Federal Bureau of
Aircraft Accident Investigation

Investigation Report

Identification

Type of Occurrence:	Accident
Date:	4 August 2017
Location:	Jahnsdorf
Aircraft:	Airplane
Manufacturer / Model:	Focke-Wulf-Flugzeugbau/ Fw 44J “Stieglitz”
Injuries to Persons:	2 persons suffered minor injuries
Damage:	Aircraft substantially damaged
Other Damage:	Damage to aerodrome lighting
State File Number:	BFU17-1025-3X

Factual Information

History of the Flight

The airplane departed Chemnitz/Jahnsdorf Airfield at 12:19 hrs[1] for a familiarisation flight. According to their own statements, both pilots noticed immediately after take-off that the elevator control was ineffective. They reduced engine power. The airplane nose-dived, impacted the ground within the airport boundaries, and stopped after about 30 m.

[1] All times local, unless otherwise stated.

Personnel Information

Pilot in Command

Age:	56
Sex:	Male
Licence:	CPL (A)
Last issuance:	6 September 2016
Ratings:	MEP, PIC, IR
	FI(A) (valid until 31 July 2018)
	Aerobatic, ST(A), BT(A)
Medical certificate:	Class 1 (valid until 26 June 2018)
Limitations or restrictions:	VML[2]
Total flying experience:	Approx. 16,000 hours

Co-pilot

Age:	59
Sex:	Male
Licence:	PPL (A)
Last issuance:	2 April 2015
Ratings:	SEP, PIC (valid until 30 April 2018)
Medical certificate:	Class 2 (valid until 11 February 2018)
Limitations or restrictions:	VML
Total flying experience:	Approx. 650 hours

[2] Correction for defective distant, intermediate and near vision

Aircraft Information

Type Description

The aircraft type Fw44J “Stieglitz” was certified in accordance with the Bauvorschriften für Flugzeuge, Ausgabe 1936 (BVF 1936; certification specifications for aeroplanes, Edition 1936). The European Aviation Safety Agency (EASA) did not take over this type certification. The type was subject to Regulation (EC) No 216/2008, Article 4 (Annex II Aircraft)[3]. The aircraft was subject to national aviation regulation.

The Fw 44J “Stieglitz” is a single-engine biplane with two pilot’s seats in tandem arrangement. The airplane is equipped with mechanical controls of the elevator. The front and aft control sticks are connected with a control rod. The aft control stick transmits the control inputs via another control rod (aft control rod) to a bell crank. Two pairs of cables connect the bell crank with the elevator.

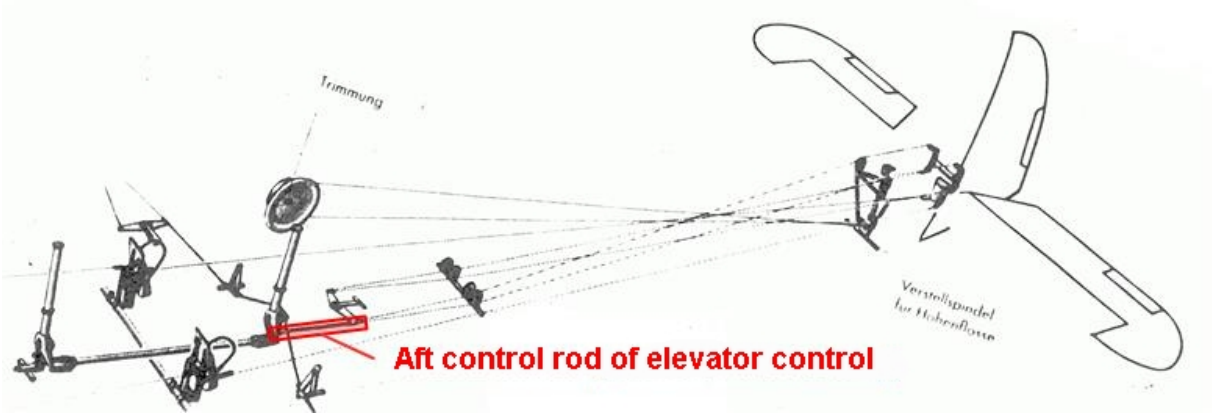


Fig. 1: Illustration of the elevator control Source: LBA/BFU

A ball coupling connects the aft control rod with the control stick. A clevis connects the bell crank with the cable controls.

Type and Maintenance Documentation

The Data Sheet No 726 listed the following documents in regard to the operation, maintenance and inspection of the aircraft type:

[3] According to Regulation (EU) No 1321/2014 of 4 July 2018 this type is listen in Annex I.

Supplementary operating instructions Fw 44J[4], DVL-PfL reviewed in combination with:

- Summary Fw44J, 1. Edition October 1937 (or later)
- Handbook Fw44J (LDv 371 and LDv 372)
- Specifications No 1019 by Focke-Wulff GmbH, Bremen of 28 April 1937
- Operations manual aircraft engine Sh 14 a by Brandenburgische Motorenwerke, Berlin-Spandau

The BFU had a spare parts list Fw 44J (May 1938) available. A maintenance organisation provided the BFU with the drawing „8-4442-02 Höhensteuerstosstange“ (Appendix 3). The BFU did not have any other documentation regarding the elevator control available.

The spare parts list Fw44J Abb 83 shows the aft control rod (Part 4205). Page 88 lists the corresponding parts list (Appendix 2).

None of these documents described actions of the pilots in case of elevator control failure.

Maintenance

The owner stated that in 2014 the airplane was transported to the company Termikas, Lithuania, for maintenance actions. The aim was to overhaul the entire airplane and repair one of the wings. In addition, checks, replacements, and paint work should be carried out. The covering of the fuselage should be rebuilt.

This company stated that they had only worked as “Subcontractor”[5] and therefore could not provide any maintenance documentation. They also stated that specialists from Germany had obtained all documents and organised the checks. The BFU was provided with a work report. It shows that different tasks (Appendix 4) had been conducted between 5 March 2015 and 26 January 2016. The BFU was provided with 3 versions of this work report. In these the table “List of aircraft overhaul report” was filled in differently. In the tables different people had signed for the same work and they either were or were not stamped (Appendix 4). One version of these work reports contained a stamped and an unstamped table.

[4] Spelling of the aircraft type Fw44J and the designation of listed documents varies with different sources. In terms of readability a uniform spelling was chosen.

[5] The term “Subcontractor” does not match the term “subcontracted organisation” listed in Regulation (EU) No 1321/2014 M.A.615b.

The owner stated that Termikas had been provided with the following maintenance documents.

- Technical description Fw44, Bremen 1933
- Specifications No 1019 of 28 July 1937
- Spare parts list Fw 44, Edition 05/1938
- Service regulation Fw44
- Operations manual and operations regulation aircraft engine Sh 14 A 1936 and 1937

In 2015 the owner had asked 2 Airworthiness Engineers (AE)[6] to monitor the maintenance work at Termikas. These AEs did not take over the tasks. Among other things, one of the AEs stated that the work had already progressed too far, the necessary documentation not been at hand, and therefore he could not accept the task.

On 16 April 2016 the owner filed an application at the Luftfahrt-Bundesamt (German civil aviation authority, LBA) for the issuance of an airworthiness certificate for Annex II aeroplanes and entry in the aircraft register. Due to incomplete application the airworthiness certificate was denied. On 13 June 2016 the owner filed an application at the LBA for a permit to fly[7] in accordance with LuftVZO (Regulation on Certification and Licensing in Aviation) para 12.

A third AE had signed the safety declaration required for a permit to fly. This AE stated that he had issued the safety declaration because

- The airplane had been maintained at an organisation certified in accordance with JAR 145
- The organisation and the quality standards had been known for 20 years
- Documentation and spare parts list had been provided
- The owner had documented the airworthiness and a maintenance program was established

[6] The term “Airworthiness Engineer (AE)” is used instead of “certifying staff” as used in Regulation (EU) 1321/2014.

[7] The LuftVZO uses the term temporary certificate of registration, the LBA documentation permit to fly. In this report the term permit to fly will be used. In order to distinct between the permit to fly issued in accordance with Regulation (EU) No 748/2012 Appendix I (Part-21) and the permit to fly issued in accordance with LuftVZO, the term **(national)** will be added to the latter.

- The certification of the aircraft station and the insurance certificate were provided
- The Data Sheet 726/1 New Annex II 726/SA could be applied.

He had not conducted a visual inspection of the airplane. As far as he knew construction inspection was conducted by the owner and his acquaintance.

On 2 August 2016 the LBA had issued a permit to fly (national) for the ferry flight to Germany (valid until 1 November 2016). On 19 August 2016 the airplane was flown to Germany.

On 9 June 2017 the LBA had issued another permit to fly (national) for flights to maintenance organisations, for airworthiness reviews, familiarisation and/or training flights. It was valid until 8 September 2017. On 24 May 2017 yet another AE issued the safety declaration. In a findings report dated 15 May 2017 he had stated that it was a “follow-up safety declaration” and based on the permit to fly (national) of 2 August 2016. He also had the aircraft certificate of release to service for the propeller and the documentation for the avionic check available.

	Art der Beanstandung, Bericht oder Befund	Art der Behebung
1	Unbedenklichkeitserklärung für Fluggenehmigung erstellen	Folgeunbedenklichkeit auf Grundlage der Fluggenehmigung vom 02.08.2016
		Flugzeug kontrolliert gemäß Checkliste für Unbedenklichkeitserklärung vom
		19.05.2017, es wurden keine Mängel gefunden die gegen eine Ausstellung einer
		Fluggenehmigung sprechen
2	Funkurkunde nicht vorhanden	vom Halter bereits beantragt
3	Überführungsflüge aus Litauen nach Deutschland noch nicht im neuen	
	Bordbuch vorhanden (neues Kennzeichen vergeben)	werden umgehend durch Halter nachgetragen
4	Avionikabnahme notwendig (Einbau neugerät)	am 15.05.2017 durch ASE DE.145.0324 durchgeführt
5	Stau-Statik und Höhenmesser Test notwendig	am 15.05.2017 durch ASE DE.145.0324 durchgeführt
6	Standlauf	durchgeführt, Protokoll erstellt
7	Fremdkörperkontrolle	durchgeführt

Fig. 2: Findings report of 15 May 2017 Source: AE

Neither of the two provided aircraft log books listed any aircraft certificates to release to service in accordance with Regulation (EU) 1321/2014 M.A.801[8] (Appendix 5). Prior to the flight of 4 August 2017 no other maintenance actions were documented.

In a self-declaration regarding the deviance of the approved maintenance program in accordance with LuftGerPV (Regulation on Certification of Aircraft) para 12 subsec-

[8] In this report term Regulation (EU) 1321/2014 will be omitted in this context.

tion 3, the owner stated that the aircraft is maintained in accord with the maintenance documentation issued by the type certificate holder. The maintenance program did not include any indications as to the existing maintenance documentation. The BFU was provided with aircraft continuing airworthiness records which included different documents in no particular order (handbook Fw 44J/LDv 371, test reports, insurance certificates and brochures). Records regarding the aircraft continuing airworthiness, as they are required by Regulation (EU) No 1321/2014 M.A.305, did not exist. Aircraft certificate to release to service (EASA Form 1 or equivalent), e.g. for the new propeller and radio, were not found.

Meteorological Information

According to the Flugleiter (A person required by German regulation at uncontrolled aerodromes to provide aerodrome information service to pilots) at Chemnitz/Jahnsdorf Airfield at the time of the accident the following weather conditions prevailed:

Wind:	260°, 15 kt
Visibility:	10 km
Clouds:	6 Oktas
Temperature:	25°C

Aerodrome Information

Chemnitz/Jahnsdorf Airfield (EDCJ) It has one asphalt runway of 900 m length and one grass strip of 880 m. Both runways have the orientation 068°/248°.

Wreckage and Impact Information

One person involved in the recovery operation determined that the clevis had separated completely from the aft control rod of the elevator control.

Further investigation by the BFU determined that at the end of the aft control rod 2 opposite bore holes were located at a distance of 7 mm and 2 bore holes at a distance of 13 mm and 17 mm, respectively. The clevis showed one through bore hole (16 mm from the thread beginning) (Appendix 1, Photo 3). It was clogged with dark

material (dirt). The screw nut on the clevis was located 23 mm from the thread beginning and could not be rotated smoothly. The thread had a length of 43 mm.

Fire

There was no fire.

Organisational and Management Information

Luftfahrt-Bundesamt

The Luftverkehrs-Zulassungs-Ordnung (Regulation on Certification and Licensing in Aviation, LuftVZO) para 12 Temporary Certificate of Registration lists the following:

(1) Aircraft in accordance with para 6 can, as an exception, especially for technical reasons, training, presentation and ferry flights receive a temporary certificate of registration if liability cover is proven and on request a safety declaration for the proposed use exists.

Regarding the implementation, the LBA stated the following:

It is correct that the regulatory body does not even mandate the submission of a safety declaration in para 12 LuftVZO. In general, the submission of the insurance policy is sufficient. In principle, the LBA does not conduct a technical examination (checking the aircraft). The basis for the examination of the aircraft, which is the basis for the AE/certifying staff to determine the safety declaration for the use of the intended purpose is left to their own discretion.

In general, this corresponds with the procedure of issuance of EASA Form 18b (see field 9) for EU aircraft.

The BFU asked other AEs which requirements have to be met for the attestation of safety at the application for a permit to fly (national). The consistent statements were that depending on the specific case the scope of testing has to be determined and would include physical examination of the aircraft. Different statements were given whether or not an aircraft certificate to release to service in accordance with M.A.801 has to be issued.

Company in Lithuania

The company Termikas was a certified maintenance organisation in accordance with Regulation (EU) 1321/2014 Annex II (Part 145). The aircraft type Fw 44J “Stieglitz” was not part of the certificate.

Regulation (EU) No 1321/2014

In accordance with the Regulation on Certification of Aircraft (LuftGerPV), Regulation (EG) No 2042/2003 and Regulation (EG) No 1321/2014, respectively, were also valid for aircraft types, which are subject to Regulation (EG) No 216/2008 Article 4.

It regulated the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and the approval of organisations and personnel involved in these tasks.

AEs, the BFU interviewed, stated that maintenance work, on historic aeroplanes, is often conducted by organisations without certification as Part-145 maintenance organisation or at certified maintenance organisations without the rating for the type involved. Therefore, these organisations cannot assume responsibility for the work conducted. In accordance with M.A.801 c) complex work on ELA1[9] aircraft can be released by AEs.

In Article 3 para 3, the above-mentioned regulation also stipulated that the certificate of airworthiness of aircraft, which have a permit to fly, has to be ensured through specific provisions. These were to be stipulated in the permit to fly, according to Regulation (EU) No 748/2012 Appendix I (Part-21).

Regulation (EU) No 748/2012 stipulated the requirements which were necessary for the issuance of a permit to fly and the corresponding flight conditions (Appendix 7).

[9] ELA1 aircraft in this context are aircraft with a maximum take-off mass of 1,200 kg or less which is categorised as technically non-complicated powered aircraft.

Additional information

The BFU contacted the other 18 owners of Fw44J “Stieglitz” listed in the aircraft register of the LBA in writing asking for information as to how the clevis is secured in their airplanes. In 8 airplanes an additional positive connection (cotter-pin or lock wire) was installed. In 5 airplanes no additional safety device was fitted.[10]

The BFV 1936 Item 3423 stipulates:

Counter nuts are not permitted as safety device; their use is recommended if thread clearance during alternating stress shall be avoided.

The BFU did not find any indications in the maintenance documentation provided that a positive safety device of the clevis by means of cotter-pin or lock wire was intended. A positive connection is drawn in the technical drawing 8-4442-02 (Appendix 3, Part 13) depicting the aft control rod.

[10] Five owners did not respond.

Analysis

Conduct of Flight

Both pilots held the required licences and ratings to conduct this flight. Both had extensive flying experiences. The weather was suited to conduct the flight.

The malfunction of the elevator was noticed at an altitude which did not allow for an extended decision making process. Because the existing operating documentation does not include any information on how to proceed in case of elevator malfunction, it cannot be analysed if the continuation of the flight and the control of the airplane using elevator trim could have prevented the accident.

Technical Examination

The elevator control malfunctioned due to the clevis separating from the aft control rod. By design the mounting of the aft control rod (ball coupling) on the control stick allows an axial turning of the control rod. This design allows the transmission of the elevator control input and the movement of the control stick during aileron control input. The ball coupling at the front end of the control rod is no safety device to prevent axial turning as it exists in other types of control rods (e.g. welded-on clevis). If the counter nut is loosened the clevis can separate from the control rod. The aileron control input via the control stick further assists this process.

Due to a safety device missing at the front end of the control rod by design, a safety device at the clevis is required. A counter nut cannot fulfil this function, even though some airplanes were equipped with a counter nut only. According to the certification specification BFV 1936 Item 3423 valid for this airplane, counter nuts as safety device were not permitted. Nonetheless, use at the control rod made sense because the existing thread clearance could be eliminated.

The BFU could not clarify if the counter nut was tightened during the maintenance work. It is probable that it was not tightened enough, because separation occurred after only a few flight hours.

The BFU is of the opinion that the installation of a positive safety device is required and was intended, because only then the certification specification could be met. During the investigation it could not be clarified which kind of safety device was intended for the elevator control (e.g. cotter-pin, safety pin, lock wire) of this aircraft type.

The drawing “8-4442-02 Höhensteuerstosstange” shows in position 13 a part which is radially guided through the control rod and the clevis. The BFU was not provided with the appropriate parts list. It could not be clarified if component 13 is a cotter-pin or another positive safety device. The fact that the spare parts list Ex44J (Appendix 2, Fig. 83 and Page 88) does not list a cotter-pin or similar component does not prove that installation was not intended.

The discovery that in most of the Fw44J operated in Germany a cotter-pin was used is proof that a safety device in form of a cotter-pin was part of the type definition. Even in airplanes with no positive safety device the aft control rod had bore holes. The BFU is of the opinion that it can be ruled out that the aft bore hole[11] was meant to be a check hole. At the accident airplane it was only 7 mm from the end of the control rod. It is unlikely that such a short length of thread engagement was intended for the clevis. It is also illogical that two check holes 10 mm away from each other were intended.

The BFU is of the opinion that the following causes resulted in the fact that no cotter-pin was installed during the maintenance work:

- Missing unambiguous maintenance documentation which stipulates a positive safety device and its execution.
- Missing final examination of the airplane after the maintenance work in Lithuania by the AE.
- Missing aircraft certificate to release to service in accordance with M.A.801

An erroneous interpretation of the aft bore hole as check hole might have contributed to the cotter-pin not being installed in the other 5 airplanes.

With the publication of the LBA Airworthiness Directive (AD) D-2017-264 the use of a positive safety device was included in the maintenance documentation. This unambiguously defines the function of the bore hole in the aft control rod.

Type and Maintenance Documentation

During the maintenance of this aircraft type the problem was that the available maintenance documentation did not define the aircraft type as specifically as it would have been necessary for the repair work. The documents listed in the data sheet are operating instructions and regulations for simple maintenance work (e.g. lubrication plans, rigging work). Design drawings are not completely available because there is

[11] The bore hole which is closer to the aft end of the control rod.

no longer a type certificate holder. These would have been necessary in order to perform complex maintenance work (repairs).

This situation cannot be ruled out where historic aeroplanes are concerned. Therefore, the owner should ensure and an AE check that necessary documents are available or compiled later.

Maintenance of the Airplane in Lithuania

The extent of the maintenance work performed in Lithuania could not be unambiguously clarified. The instructions of the owner were general and did not include any references to the maintenance documentation. The work reports (Appendix 4) of Termikas included references to the maintenance documentation but individual work steps could not be deduced from it. Therefore, it was not possible to understand if and which work orders for the work on the elevator existed and how these tasks were performed and checked.

The BFU could not determine how Termikas organised the checking of the tasks performed. On the one hand Termikas stated that they could not assume any responsibility because they were only working as “subcontractor” for the German owner of the airplane. On the other hand performance of the tasks was documented (Appendix 4). With it responsibility was documented which they later did not want to assume.

The BFU is of the opinion that Termikas should improve the organisation of their work so that prior to the beginning of the work it is clear who assumes responsibility. It should further be ensured that the documentation of the work is unambiguous so that only one version of a work report exists.

Maintenance Work Organisation

After maintenance in Lithuania the aircraft was to receive a Certificate of Airworthiness. A valid Airworthiness Review Certificate (ARC) was needed. Figure 3 depicts the regular process to receive an ARC (green border). Because the company in Lithuania did not have a certificate for the maintenance of the aircraft type Fw 44J “Stieglitz” an AE would have had to supervise the complex work in order to then issue an aircraft certificate to release to service in accordance with M.A.801 (Fig. 3 red border).

Since the owner could not find an AE for these tasks, and maintenance was completed he filed an application for a permit to fly (national) in accordance with LuftVZO para 12. The aircraft airworthiness review in accordance with M.A.901 was not con-

ducted. Therefore, a process was started (Figure 3, right line of action) which did not inevitably result in the verification that an aircraft certificate to release to service in accordance with M.A.801 existed.

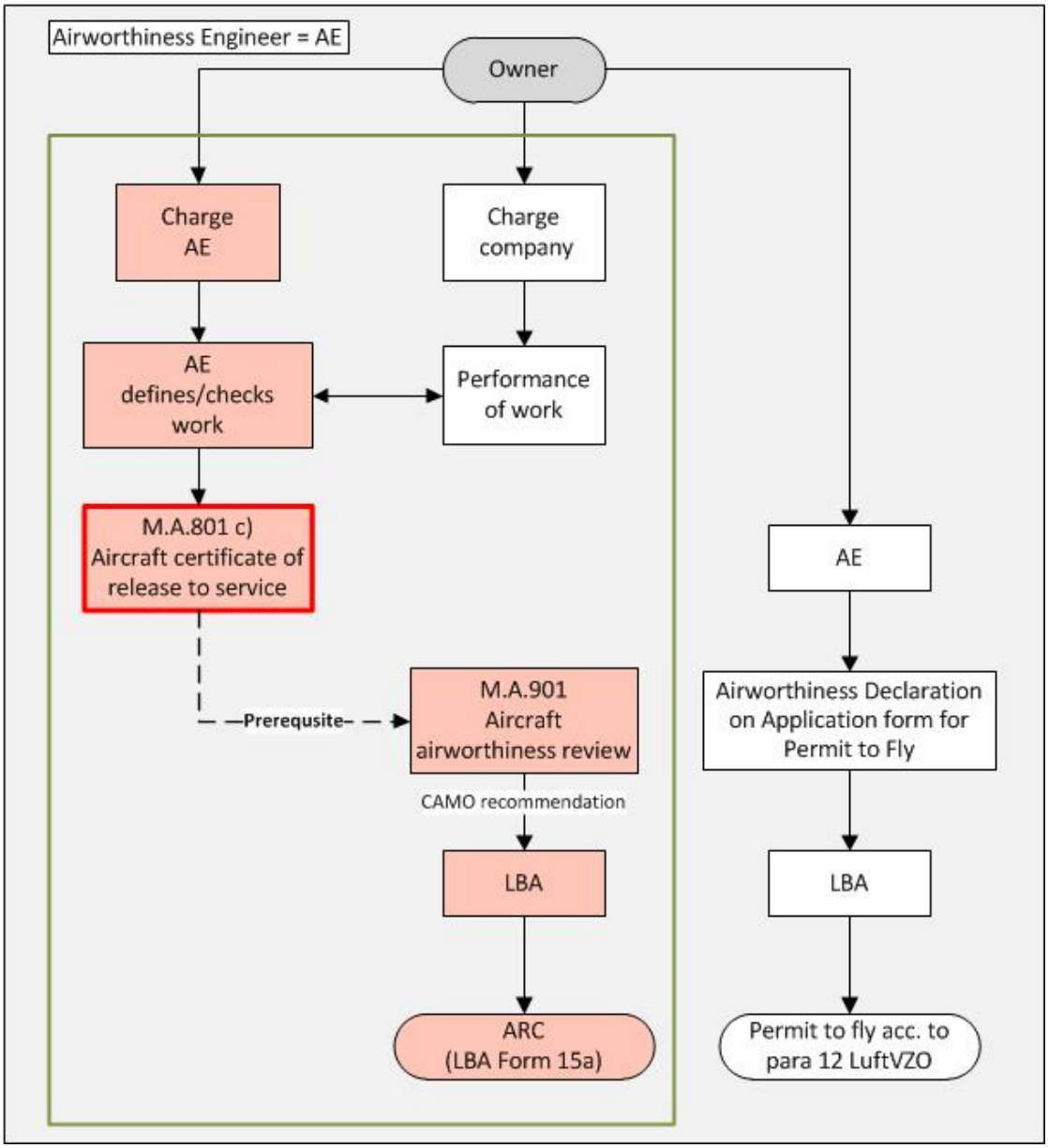


Fig. 3: Flow chart maintenance

Red boxes: this work was not performed.

Green areas: normal process to obtain an ARC Source: BFU

The BFU is of the opinion that the owner should have ensured that prior to the beginning of the maintenance work an AE organises and supervises the work. It is obvious

that this complex fact as required by Regulation (EU) 1321/2014 was not clear to him.

However, the problems of the missing work supervision and aircraft certificate to release to service in accordance with M.A.801 could also not be solved after the aircraft had been transferred to Germany. Therefore, another permit to fly (national) was requested. These actions of the owner show that he had no plan for a solution of the problem and was overwhelmed by the organisation of the maintenance for the aircraft. This is supported by the deficit in the compilation of the aircraft documentation (M.A.305 Aircraft continuing airworthiness record system).

In 2016 a safety declaration was issued without sufficiently considering the maintenance work performed, because it was not verified whether or not an aircraft certificate to release to service existed. A physical examination of the airplane was not performed. The LBA was of the opinion that a technical examination was not required for a safety declaration. Therefore, the AE could choose his own criteria which would then allow operating the airplane without final check of the work performed.

The AE, who signed the safety declaration in 2017, conducted a physical examination of the aircraft using his own criteria. The special detail of the missing cotter-pin was not determined. He had called his examination “Folgeunbedenklichkeit (follow-up safety declaration)” and therefore declared that it was based on the already issued safety declaration.

The BFU is of the opinion that based on the deficits in the reports regarding the continuing airworthiness (M.A.305) assessment of the pre-condition for the issuance of the safety declaration was not possible.

Issuance of the Permit to Fly (national)

It is not clear why the safety declaration has to be part of the LBA application if the requirements are not defined. These missing regulations resulted in the AE utilising this grey area by not performing a physical examination of the airplane. Had the aircraft been examined in accordance with M.A.901, an aircraft certificate of release to service in accordance with M.A.801 would have been required. Even though comprehensive maintenance procedures, which had been classified as “critical maintenance tasks”, had been performed on the airplane, there were no mandatory requirements which would have obliged the AE to satisfy himself that all maintenance procedures had been performed properly, as it was stipulated for example in M.A.801.

Contrary to the issuance of the permit to fly (national) in accordance with para 12 LuftVZO, clearly defined requirements have to be met for the issuance of a permit to fly in accordance with Regulation (EU) No 748/2012. These also include the configuration of the airplane and the resulting stipulations of the flight conditions. At the end the LBA has to be convinced that the aircraft can fly safely under the conditions or limitations given.

The BFU is of the opinion that the requirements which the LBA stipulates for the safety determination for a permit to fly (national) (para 12 LuftVZO) are similar to those for a permit to fly (Regulation (EU) No 748/2012.

Conclusions

Findings

Due to the special design the clevis at the aft control rod of the elevator control can separate if no safety devise is used.

The maintenance documentation did not list any cotter-pins or lock wires to safeguard the clevis at the aft control rod of the elevator control.

The installation of such a safety device was intended although it is not listed in the maintenance documentation.

In more than half of the registered Fw 44J “Stieglitz” cotter-pins or lock wires were used.

Even in airplanes with no positive safety device the aft control rod had bore holes.

The data sheet applicable in accordance with the certification specifications for aeroplanes BVF 1936 requires that mounting nuts have to be safeguarded and counter nuts were not permissible.

The requirements of BVF 1936 can be met by using a positive connection device.

The owner did not sufficiently manage the maintenance work in Lithuania.

During the maintenance work aircraft certificates to release to service (M.A.801) were not issued.

After the maintenance procedures in Lithuania, there were no checks by AE who ensured that all maintenance procedures had been performed properly.

There were no LBA requirements regarding the issuance of safety declarations for a permit to fly (national) in accordance with LuftVZO para 12.

The safety declaration for a permit to fly in accordance with LuftVZO para 12 was issued without sufficiently considering the maintenance work.

The safety declaration for a permit to fly in accordance with LuftVZO para 12 was issued without checking whether all aircraft certificates of release to service (M.A.801) had been provided.

The aircraft continuing airworthiness record system (M.A.305) was incomplete.

Causes

The accident occurred because during maintenance a positive safety device was not installed at the clevis at the aft control rod. Therefore the elevator control separated.

Contributing factors:

- Missing unambiguous maintenance documentation stipulating a positive safety device and its execution.
- Insufficient organisation of the maintenance procedures
- Missing requirements for the issuance of a safety declaration for the permit to fly (national) in accordance with LuftVZO para 12.

Safety Recommendations

On 25 September 2017 the BFU issued the following Safety Recommendation:

BFU SR No 05/2017

The Luftfahrt-Bundesamt should stipulate a positive safety device for the clevis in the maintenance documentation of the Focke-Wulf Fw 44J “Stieglitz”. The Luftfahrt-Bundesamt should require the immediate implementation of this amendment for the aircraft with a certificate of registration.

On 29 November 2017 the LBA issued the Airworthiness Directive (AD) D-2017-264 which requires the inspection of the clevis safety device at the aft control rod of the elevator control and the installation of an accurately fitting splint.

On 15 April 2020 the BFU issued the following Safety Recommendation:

BFU SR No 03/2020

The Luftfahrt-Bundesamt should define which requirements have to be met for the safety declaration on the application for the issuance of a permit to fly (national).

These requirements should be comparable to the stipulations for the issuance of a permit to fly (Regulation (EU) No 748/2012).

Investigator in charge:	Thomas Karge
Assistance:	Uwe Berndt

Braunschweig: 30 April 2020

Appendices

1. Photographs

2. Excerpt spare parts list Fw44J

3. Design drawing

4. Excerpt work reports (Termikas)

5. Page 2 of the application for the issuance of a permit to fly in accordance with LuftVZO para 12 including safety declaration

6. Excerpt Regulation (EU) No 1321/2014

7: Excerpt Regulation (EU) No 748/2012

Appendix 1: Photographs

Photo 1: Accident site Source: Person involved in the salvage operation

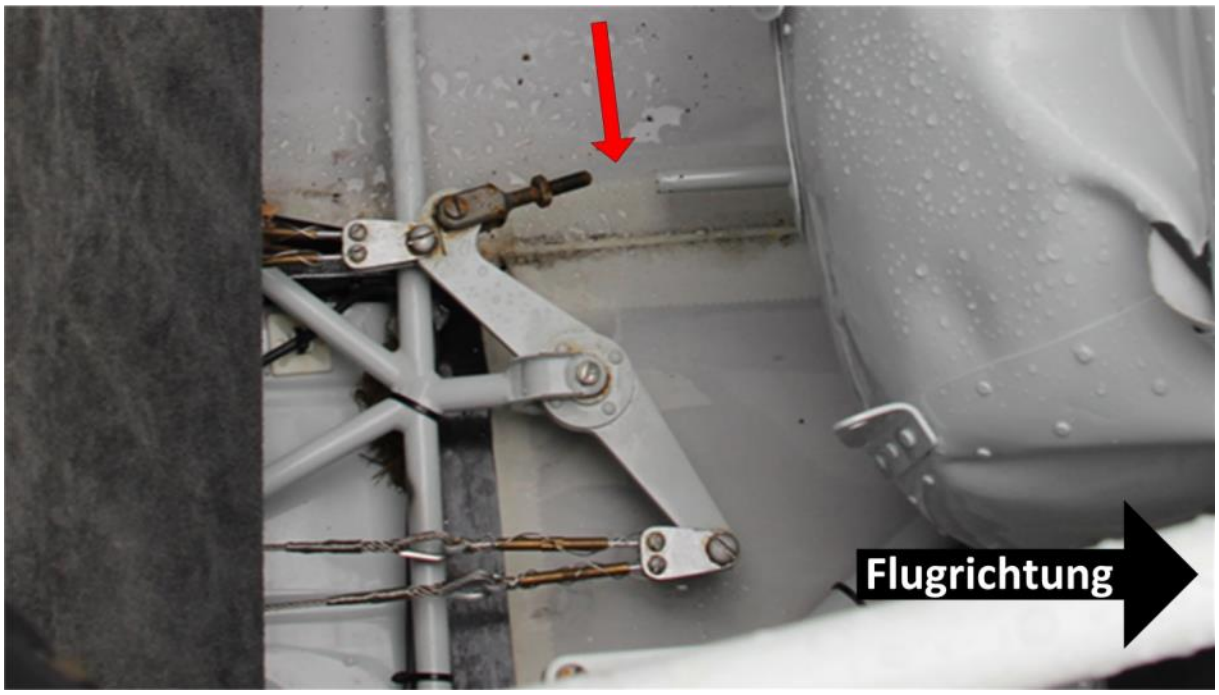


Photo 2: Aft control rod and bell crank; red arrow marks the separated aft control rod; black arrow: flight direction
Source: BFU

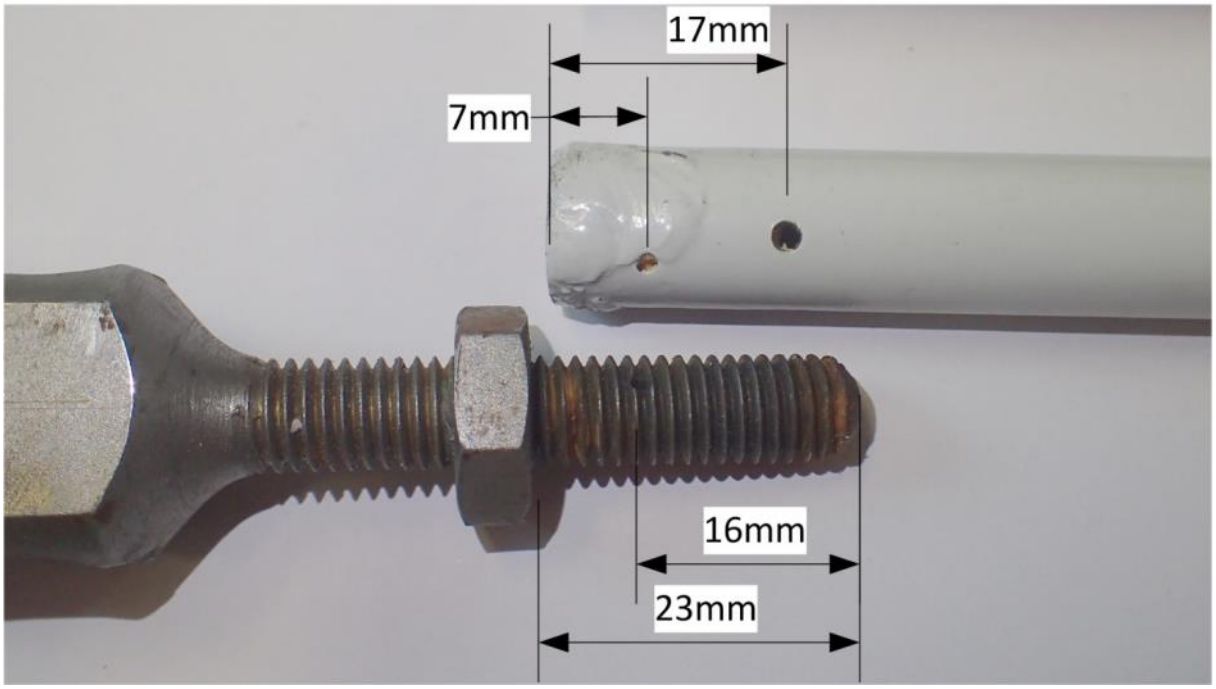
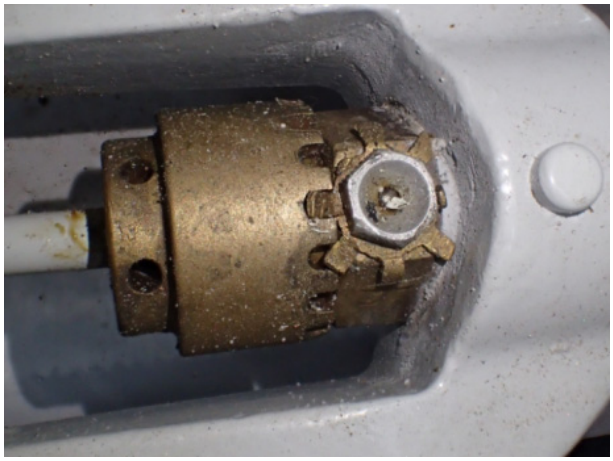
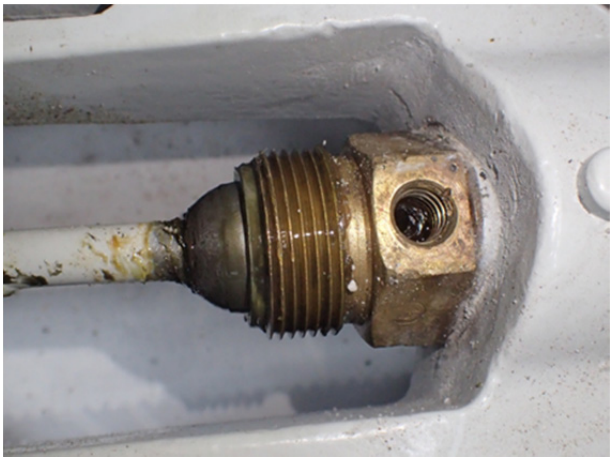


Photo 3: Bore hole distances at the clevis and the aft control rod Source: BFU

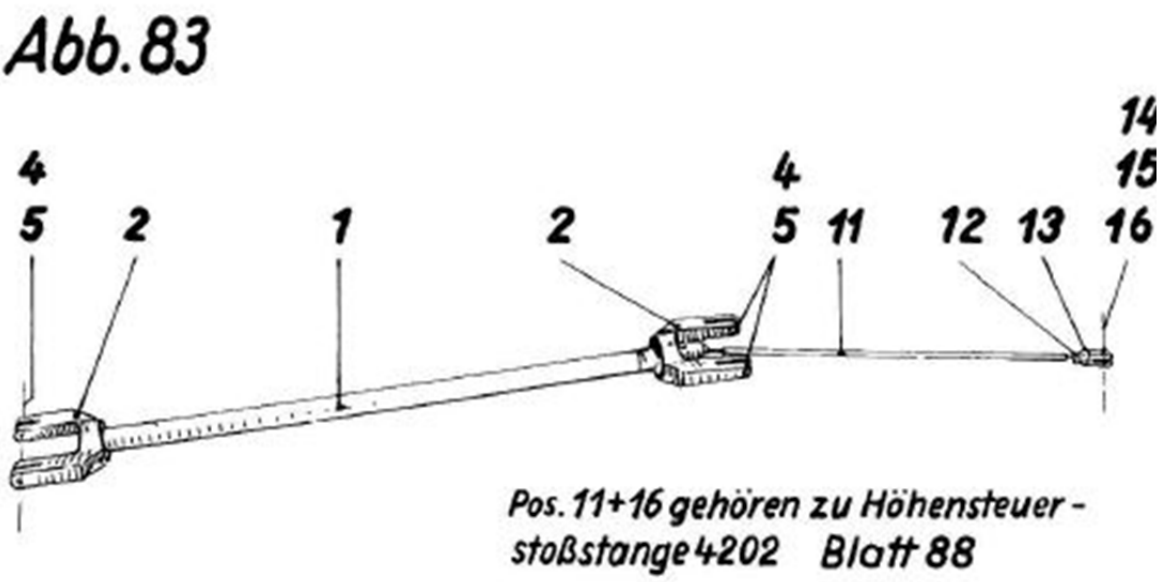




Photos 4 and 5: Front connection of the aft control rod with the control stick; with and without coupling nut
Source: BFU

Photo 6: Example of the additional safety device (cotter-pin) at another Fw44J “Stieglitz”
Source: Owner of a Fw44J “Stieglitz”

Appendix 2: Excerpt spare parts list Fw44J



Ersatzteilliste Fw 44 J Bl. 88

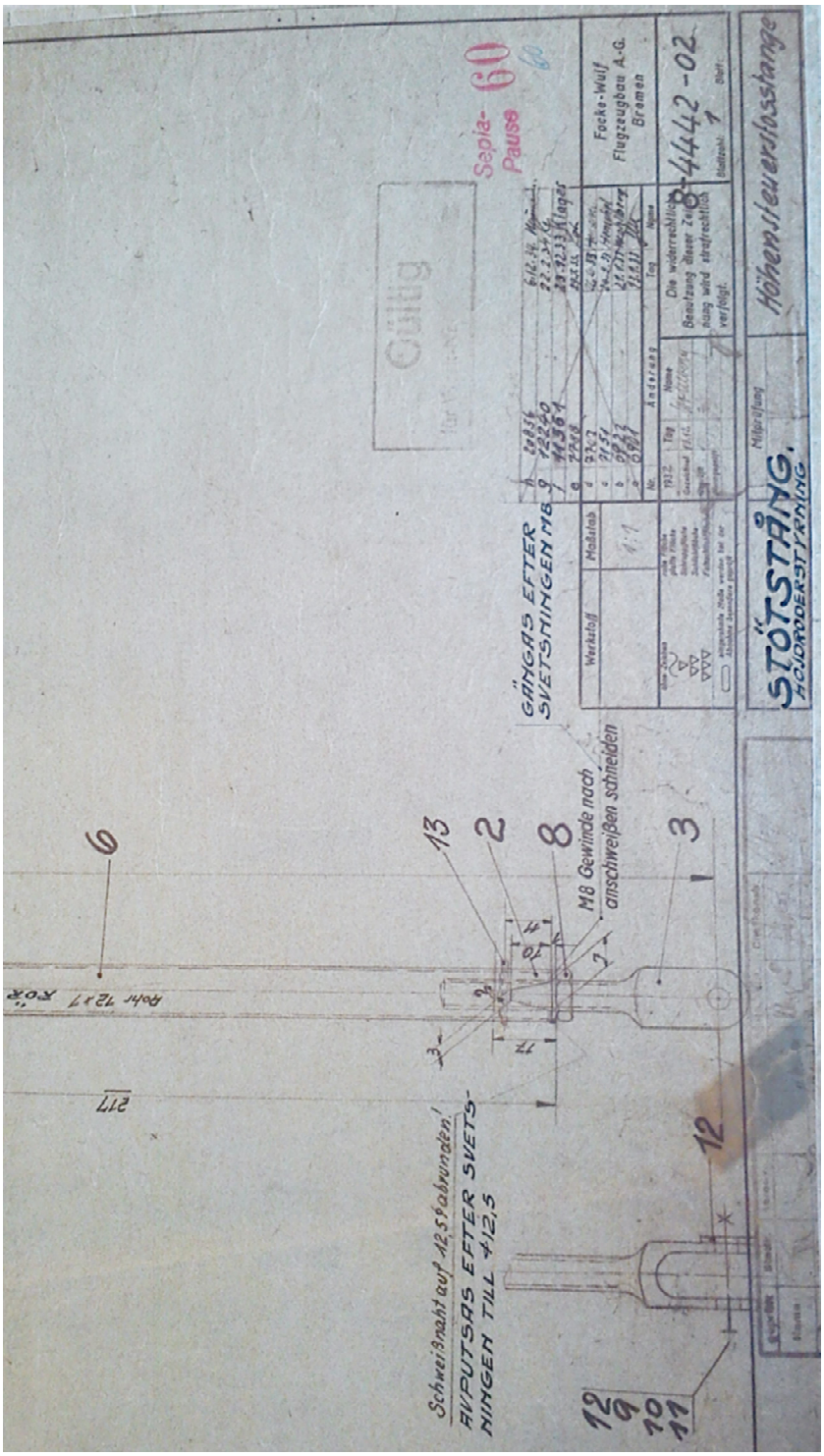
Höhen- und Quersteuer

1	2	3	4	5
Ersatzteil Nr.	Stück-zahl	Benennung	Werkstoff	Abb. Orts-Nr.
4202	1	Höhensteuer-Stoßstange		82/10
420205	1	Strebenrohr m.Teil 1, 2 und 6	-	83/11
M8 DIN L 49	1	Sechskantmutter	1 120.5	83/12
420203	1	Gabel	1 120.5	83/13
M6sLx25 DIN L 53	1	Linsenbolzen	1 120.5	83/14
B6,2 KrK 143	1	Scheibe	3115.4	83/15
M6 DIN L 51	1	Kronenmutter	1 120.5	83/16

Appendix 2: Spare parts list Fw44J Fig 83 and parts list Page 88

Source: Luftfahrt-Archiv Hafner

Appendix 3: Design drawing 8-4442-02 Höhenruderstosstange



Appendix 3: Design drawing Source: Maintenance organisation (not involved)

Appendix 4: Excerpt work reports (Termikas)

FW 44 D-[redacted] performed works

List of aircraft overhaul report	Date	signature	Stamp
Wings manufacturing performed (according to: "FW-44 wings schedule" dated 1933 Bremen)	2015.03.05	[redacted]	
Wings assembly performed (according to: "Beichteibung FW 44 J" dated 1936 Bremen)	2015.04.14	[redacted]	
Fuselage overhaul performed (according to: "Beichteibung FW 44 J" dated 1936 Bremen)	2015.05.12	[redacted]	
A/C covering Cekonite 102 (according to: "Procedure manual101" original issue 1958 rev date 2008 june)	2015.06.01	[redacted]	
A/C final asembly performed (according to: "Beichteibung FW 44 J" dated 1936 Bremen)	2016.01.21	[redacted]	

FW 44 D-[redacted] performed works

List of aircraft overhaul report	Date	signature	Stamp
Right lower wing repair according drawings: Nr. 8-4430-18; 8-4430-19; 84430-1; 8-4490-13 Focke-Wulf Flugzeugbau AG	2015.03.05	[redacted]	[redacted]
Wings assembly performed (according to: "Beschreibung FW 44 J" dated 1936 Bremen)	2015.04.14	[redacted]	[redacted]
Fuselage repair (according to: LDv 372 Ausgabe 10/1936 and "Beschreibung FW 44 J" dated 1936 Bremen)	2015.05.12	[redacted]	[redacted]
A/C covering Cekonite 102 (according to: "Procedure manual101" original issue 1958 rev date 2008 june)	2015.06.01	[redacted]	[redacted]
A/C final asembly performed (according to: "Beschreibung FW 44 J" dated 1936 Bremen)	2016.01.21	[redacted]	[redacted]

Appendix 4: Excerpt work reports (Termikas) Source: Termikas

Appendix 5: Page 2 of the application for the issuance of a permit to fly in accordance with LuftVZO para 12 including safety declaration

D-[redacted]

Die Unbedenklichkeit für den beantragten Zweck der Flugzulassung wird nachgewiesen durch:

ENTFÄLLT

☐ Lufttüchtigkeitszeugnis für den Export (C of A for Export) des Herkunftslandes

Nr. ..... Ausstellungsdatum: .....

ausgestellt durch (Luftfahrtbehörde): .....

Hinweis: Das C of A for Export ist diesem Antrag als Kopie beizufügen!

oder durch die

☒ nachstehend abgegebene Unbedenklichkeitserklärung

Unbedenklichkeitserklärung

Es wird bestätigt, dass gegen die Erteilung einer Flugzulassung durch das Luftfahrt-Bundesamt für das in diesem Antrag aufgeführte Luftfahrzeug zu dem beabsichtigten Zweck keine Bedenken bestehen.

03. 06. 2016, [redacted]

Ort, Datum

[redacted]

Stempel und Unterschrift des Prüfers

Es wird gebeten, die Flugzulassung und die Gebührenrechnung zu übersenden

☒ an den Antragsteller

oder

☐ an (Name und genaue Anschrift): .....

.....

.....

Es wird versichert, dass die Angaben in diesem Antrag und den beigefügten Anlagen nach bestem Wissen und Gewissen richtig und vollständig gemacht sind. Es ist bekannt, dass bei unvollständig ausgefüllten Anträgen und Anlagen oder fehlenden Anlagen (siehe hierzu auch Seite 2) der Antrag nicht entgegengenommen werden kann und an den Einsender zurückgesendet wird.

[redacted]

Unterschrift einer autorisierten Person
(z.B. Eigentümer oder anderer Bevollmächtigter)

Nur vom Luftfahrt-Bundesamt auszufüllen

Rechnungs-Nr.: .....

☐ Nachnahme ☐ Einschreiben ☐ Abholer Datum ..... Unterschriftszeichen .....

Seite 2

Appendix 6: Excerpt Regulation (EU) No 1321/2014

COMMISSION REGULATION (EU) No 1321/2014 of 26 November 2014

on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks

Annex I (Part-M)

SECTION A - TECHNICAL REQUIREMENTS

SUBPART D - MAINTENANCE STANDARDS

M.A.402 Performance of maintenance

Except for maintenance performed by a maintenance organisation approved in accordance with Annex II (Part-145), any person or organisation performing maintenance shall:

[….]

h) ensure that an error capturing method is implemented after the performance of any critical maintenance task;

[….]

AMC1 M.A.402(h) Performance of maintenance

CRITICAL MAINTENANCE TASKS

The following maintenance tasks should primarily be reviewed to assess their impact on safety:

[….]

(d) overhaul, calibration or rigging of engines, propellers, transmissions and gearboxes.

[….]

SUBPART H - CERTIFICATE OF RELEASE TO SERVICE — CRS

M.A.801 Aircraft certificate of release to service

[….]

No aircraft can be released to service unless a certificate of release to service is issued at the completion of any maintenance, when satisfied that all maintenance required has been properly carried out, by:

1. appropriate certifying staff on behalf of the maintenance organisation approved in accordance with Section A, Subpart F of this Annex (Part M); or

2. certifying staff in compliance with the requirements laid down in Annex III (Part-66), except for complex maintenance tasks listed in Appendix VII to this Annex for which point 1 applies; or

3. by the Pilot-owner in compliance with point M.A.803

c) By derogation from point M.A.801(b)2 for ELA1 aircraft not used in commercial air transport, aircraft complex maintenance tasks listed in Appendix VII to this Annex may be released by certifying staff referred to in point M.A.801(b)2;

[….]

Appendix 7: Excerpt Regulation (EU) No 748/2012

COMMISSION REGULATION (EU) No 748/2012 of 03 August 2012

laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations

SECTION A

TECHNICAL REQUIREMENTS

SUBPART P - PERMIT TO FLY

21.A.707 Application for permit to fly

[….]

b) Each application for a permit to fly shall include:

3. the flight conditions approved in accordance with point 21.A.710.

[….]

21.A.710 Approval of flight conditions

[….]

c) Before approving the flight conditions, the Agency, the competent authority or the approved organisation must be satisfied that the aircraft is capable of safe flight under the specified conditions and restrictions. The Agency or the competent authority may make or require the applicant to make any necessary inspections or tests for that purpose. [….]

This investigation was conducted in accordance with the regulation (EU) No. 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and the Federal German Law relating to the investigation of accidents and incidents associated with the operation of civil aircraft (*Flugunfall-Untersuchungs-Gesetz - FlUUG*) of 26 August 1998.

The sole objective of the investigation is to prevent future accidents and incidents. The investigation does not seek to ascertain blame or apportion legal liability for any claims that may arise.

This document is a translation of the German Investigation Report. Although every effort was made for the translation to be accurate, in the event of any discrepancies the original German document is the authentic version.

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