FINAL REPORT

SERIOUS INCIDENT 2022/2076

State Commission on Aircraft Accidents Investigation (PKBWL)

UL. CHAŁUBIŃSKIEGO 4/6, 00-928 WARSZAWA | DUTY PHONE (+48) 500 233 233

FINAL REPORT

SERIOUS INCIDENT

OCCURRENCE NO – 2022/2076

AIRCRAFT – Tecnam P2008 JC, SP-SCS

DATE AND PLACE OF OCCURENCE – 6 May 2022, Chojna

The Report is a document presenting the position of the State Commission on Aircraft Accidents Investigation concerning circumstances of the air occurrence, its causes and safety recommendations. The Report was drawn up on the basis of information available on the date of its completion.

The investigation may be reopened if new information becomes available or new investigation techniques are applied, which may affect the wording related to the causes, circumstances and safety recommendations contained in the Report.

Investigation into air the occurrence was carried out in accordance with the applicable international, European Union and domestic legal provisions for prevention purposes only. The investigation was carried out without application of the legal evidential procedure, applicable for proceedings of other authorities required to take action in connection with an air occurrence.

The Commission does not apportion blame or liability.

In accordance with Article 5 paragraph 6 of the Regulation (EU) No 996/2010 of the European Parliament and of the Council on the investigation and prevention of accidents and incidents in civil aviation […] and Article 134 of the Act – Aviation Law, the wording used in this Report may not be considered as an indication of the guilty or responsible for the occurrence.

For the above reasons, any use of this Report for any purpose other than air accidents and incidents prevention can lead to wrong conclusions and interpretations.

This Report was drawn up in the Polish language. Other language versions may be drawn up for information purposes only.

WARSAW 2023

Table of contents

Abbreviations

AGL	Above ground level
ATOM	Actual Take-Off Mass
ANSV	Agenzia Nazionale per la Sicurezza del Volo (Italy)
CPL(A)	Commercial Pilot Licence (Aeroplanes)
EASA	European Aviation Safety Agency
FI	Flight Instructor
ft	Feet
ICAO	International Civil Aviation Organization
IR	Instrument Rating
IPC	Illustrated Parts Catalog
LMT	Local Mean Time
MEP(L)	Multi Engine Piston (Land)
METAR	Meteorological Aerodrome Report
MTOM	Maximum Take-Off Mass
PPL(L)	Private Pilot Licence (aeroplanes)
P/N	Part Number
RWY	Runway
SEP(L)	Single Engine Piston (Land)
ULC	Polish Civil Aviation Authority

General Information

<table>
<tr><td>Occurrence reference number:</td><td colspan="4">2022/2076</td></tr>
<tr><td>Type of occurrence:</td><td colspan="4">SERIOUS INCIDENT</td></tr>
<tr><td>Date of occurrence:</td><td colspan="4">6 May 2022</td></tr>
<tr><td>Place of occurrence:</td><td colspan="4">Chojna (52°38’08.10”N 017°27’23,66”E)</td></tr>
<tr><td>Type and model of aircraft:</td><td colspan="4">Airplane, Tecnam P2008 JC</td></tr>
<tr><td>Aircraft registration marks:</td><td colspan="4">SP-SCS</td></tr>
<tr><td>Aircraft user/operator:</td><td colspan="4">SKY CITY</td></tr>
<tr><td>Aircraft Commander:</td><td colspan="4">CPL(A)</td></tr>
<tr><td rowspan="2">Number of victims/injuries:</td><td>Fatal</td><td>Serious</td><td>Minor</td><td>None</td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>2</td></tr>
<tr><td>Domestic and international authorities informed about the occurrence:</td><td colspan="4">ULC, ICAO, EASA, ANSV</td></tr>
<tr><td>Investigator-in-charge:</td><td colspan="4">Roman Kamiński</td></tr>
<tr><td>Investigating authority:</td><td colspan="4">State Commission of Aircraft Accidents Investigation (PKBWL)</td></tr>
<tr><td>Accredited Representatives and their advisers:</td><td colspan="4">ANSV representative,
Tecnam technical advisor</td></tr>
<tr><td>Document containing results:</td><td colspan="4">FINAL REPORT</td></tr>
<tr><td>Safety recommendations:</td><td colspan="4">YES</td></tr>
<tr><td>Addressees of the recommendations:</td><td colspan="4">CA.TECNAM S.R.L</td></tr>
<tr><td>Date of completion of the investigation:</td><td colspan="4">28.04.2023</td></tr>
</table>

Synopsis

On 6 May 2022 at 15:09 hrs LMT, the crew of the Tecnam P2008 JC aircraft, during an aerodrome circuit flight in the area of the Chojna aerodrome, at an altitude of 1000 ft AGL, noticed increased resistance during stabilator movement.

The instructor immediately took over the controls and decided to land on the runway. On the final to RWY 27, about 10 seconds before touchdown, the instructor noticed that the stabilator was completely blocked and he was forced to land using the trim. The landing was uneventful.

The investigation was conducted by:

Roman Kamiński – Investigator-in-Charge (PKBWL)

Cause of the occurrence:
The cause of the serious incident was a design flaw in the stabilator control system, resulting in the breakage of the bolt fastening the stabilator suspension, which led to its jamming.

After completing the investigation PKBWL proposed one safety recommendation – 1/2022/2076 addressed to CA.TECNAM S.R.L – the manufacturer of the Tecnam P2008 JC aircraft.

1. FACTUAL INFORMATION

1.1. History of the flight

On 6 May 2022 at 13:09 hrs UTC, during an aerodrome traffic circuit training flight (7th circuit near the Chojna aerodrome), at an altitude of about 1000 ft AGL the crew of the Tecnam P2008-JC aircraft noticed increased resistance in the stabilator control system.

The instructor immediately took over the controls and made the decision to land on the aerodrome. He started descending at low speed in order to reduce the force acting on the stabilator. On the RWY 27 final approach, about 10 seconds prior to touchdown, the instructor noticed greater resistance of the control system and then its complete jamming. The pilot was forced to land with application of the trim. The landing was uneventful.

1.2. Injuries to persons

Injuries	Crew	Passengers	Others	Total
Fatal	**-**	**-**	**-**	**-**
Serious	**-**	**-**	**-**	**-**
Minor	**-**	**-**	**-**	**-**
None	**2**	**-**	**-**	**2**

1.3. Damage to aircraft

Two bolts of the stabilator suspension system were damaged (Fig. 1).

Fig. 1. Broken (1) and damaged (2) bolt of the stabilator suspension [source: PKBWL]

1.4. Other damage

None

1.5. Personnel information (crew data)

Flight instructor: Male, aged 22, holder of the CPL(A) issued on 8 January 2021, with ratings:

- SEP(L) (valid until 31 December 2022);
- MEP(L) (valid until 31 March 2023);
- IR (valid until 31 October 2022);
- FI (valid until 30 September 2024).

Total flight time: 487:50 FH
Tecnam P2008-JC flight time: 27:23 FH

Student-pilot, during training for PPL(A).
Total flight time: 23:54 FH

The pilots had a valid aero-medical certificates.

1.6. Aircraft information

Tecnam P2008-JC is a single-engine, two-seat, high-wing, metal-laminate construction aircraft, intended for basic training. The fuselage and the vertical stabilizer are made of carbon fiber. Wings and a stabilator are made of metal. The single-slot type flaps are electrically driven. The stabilator is equipped with an electric trimmer. Fixed landing gear with a nose wheel.
Fuel tanks with a total capacity of 110 litres are located in the wings.

Airframe:

Year of manufacture	Manufacturer	Serial Number	Registration marks	Register number	Register date
2014	**Tecnam**	**1038**	**SP-SCS**	**5390**	**14.12.2020**

Certificate of Airworthiness valid until:	18 April 2023
TSN:	3386 FH
Flights since new:	11484
Time Since Overhaul:	48,5 FH
Remaining overhaul life:	6,5 h
Date of the last periodic works - 100 H:	25 March 2022
after TSN:	3337 FH
carried out by:	Zonda sp. z o.o.

Engine

Year of manufacture	Manufacturer	Serial number
2018	**Rotax 912 S2-01**	**9564675**

Date of installation on airframe:	2018
Maximum take-off power:	100 HP
TSN:	1386 h
Remaining overhaul life:	613 h
Date of the last periodic works - 100 H	25.03.2022
after TSN:	1338 h
carried out by:	Zonda sp. z o.o.

Propeller: 2-blade, wooden, fixed pitch

Year of manufacture	Manufacturer	Serial number
2021	**Hoffman HO17G HM-A174**	**81476**

Date of installation on airframe:	2021
TSN:	275 h
Date of the last periodic works - 100 H	25.03.2022
after TSN:	226 h
carried out by:	Zonda sp. z o.o.

Fuel quantity prior to the flight:

fuel: PB95, 70 l;

Mass data:

- empty aircraft : 421,5 kg
- fuel: 50,4 kg
- oil: 4,0 kg
- crew: 165,0 kg
- luggage: 3,0 kg

Total mass:

- permissible: 650 kg
- actual: 643,9 kg

1.7. Meteorological information

METARs from the nearest aerodromes:

METAR 061200Z EPSC 31013KT 280V340 CAVOK 17/05 Q1024

(EPSC is located 78 km north east of Chojna aerodrome)

METAR 061200Z EPZG 34003KT 220V030 CAVOK 19/05 Q1024

(EPZG is located 130 km south east of Chojna aerodrome)

The weather conditions had no impact on the course of the occurrence.

1.8. Aids to navigation

The aircraft was equipped with standard radio and navigation equipment.

1.9. Communications

The crew did not maintain communication with air traffic control, which was not required according to the regulations.

1.10. Aerodrome information

Area of Chojna aerodrome (N52°56'21.9" E14°25'51.3").

Concrete RWY 1000 x 40 m, direction 09/27.

Elevation – 161 ft

1.11. Flight recorders

The airplane was not equipped with flight recorders (they were not required according to the regulations).

1.12. Wreckage and impact information

Not applicable.

1.13. Medical and pathological information

Not applicable.

1.14. Fire

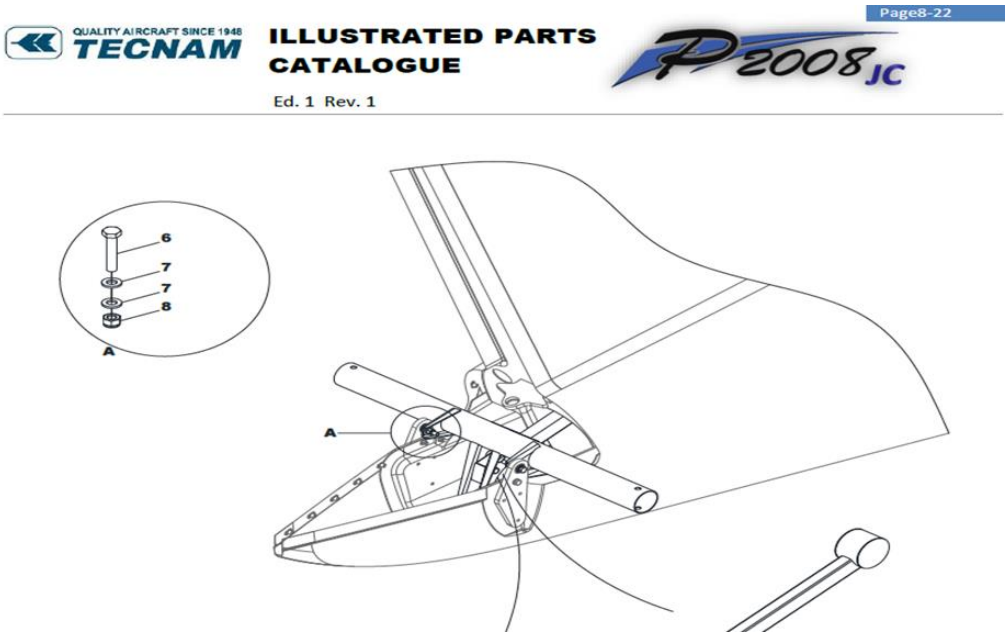
Fire did not occur.

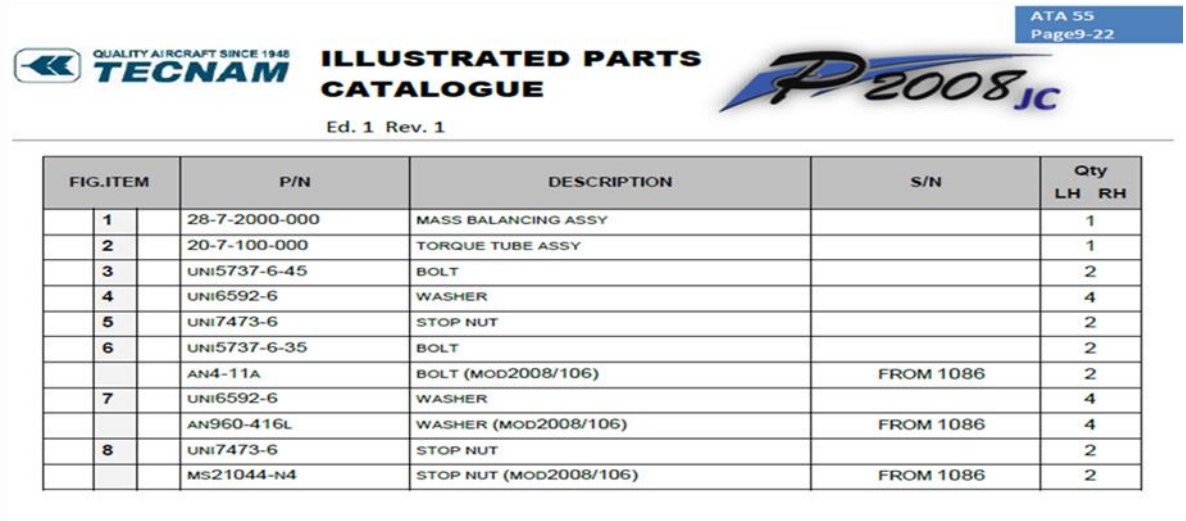
1.15. Survival aspects

Not applicable.

1.16. Tests and research

During visual inspection the left bolt of the stabilator hinge (PN UNI 5736-6-35) was found broken (Fig. 2, item 6).





ATA 55
Page9-22

QUALITY AIRCRAFT SINCE 1948 TECNAM **ILLUSTRATED PARTS CATALOGUE** P2008 JC

Ed. 1 Rev. 1

FIG.ITEM	P/N	DESCRIPTION	S/N	Qty LH RH
1	28-7-2000-000	MASS BALANCING ASSY		1
2	20-7-100-000	TORQUE TUBE ASSY		1
3	UNI5737-6-45	BOLT		2
4	UNI6592-6	WASHER		4
5	UNI7473-6	STOP NUT		2
6	UNI5737-6-35	BOLT		2
	AN4-11A	BOLT (MOD2008/106)	FROM 1086	2
7	UNI6592-6	WASHER		4
	AN960-416L	WASHER (MOD2008/106)	FROM 1086	4
8	UNI7473-6	STOP NUT		2
	MS21044-N4	STOP NUT (MOD2008/106)	FROM 1086	2

Fig.2. Broken bolt P/N UNI5737-6-35 (item.6) [source: IPC]

After dismantling the right bolt, damage in the form of dents and material losses was detected on its threaded part (Fig. 3).

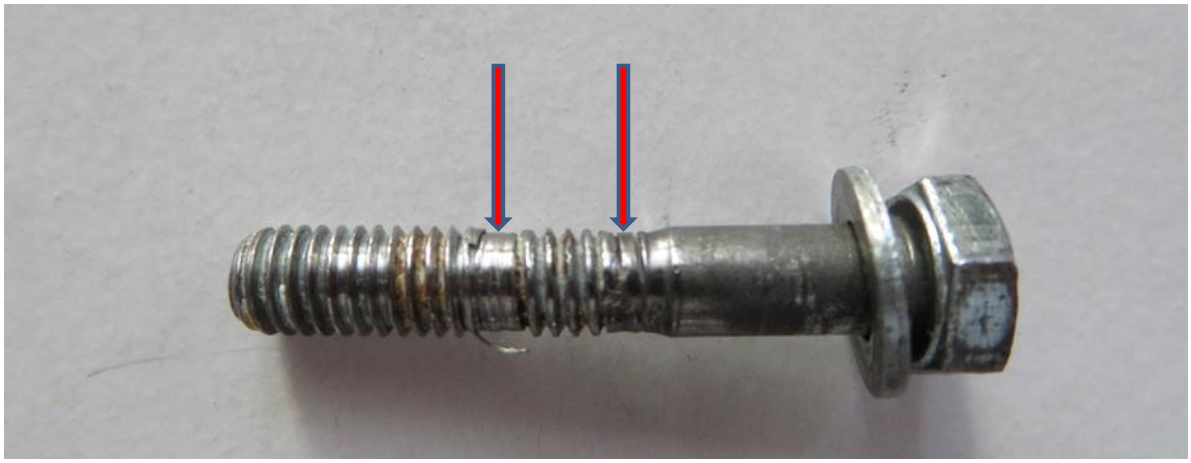


Fig.3. The bolt with damaged thread [source: PKBWL]

The thread was also damaged on the broken bolt.

According to the information obtained from two users, in recent years, due to the occurrence of excessive play at the stabilator, the bolts were replaced on eight aircraft and all of them were detected during inspections or maintenance.

In order to determine the factors causing damage to the thread, measurements of bolts and connected elements (hinges, washers, adjustment washers) were taken. It was found that PN UNI 5737-6-35 bolts with a diameter of 6 mm and a length of 35 mm have a non-threaded portion of 12 mm. The measurements showed that the thickness of the joined elements exceeded 12 mm.

On 10 April 2018 the manufacturer issued Service Bulletin No. SB 298 - CS recommending the replacement of PN UNI 5737-6-35 bolts with a diameter of 6 mm and a length of 35 mm to PN AN4 - 11A with a diameter of 6,35 mm and a length of 30

mm and on 18 June 2021 issued Job Card No. 1466 describing the procedure for their replacement. The PN AN4 - 11A bolt with a diameter of 6,35 mm has the unthreaded part longer of about 7 mm.

Moreover, the bulletin clearly states that after replacing the P/N AN4 - 11A screw, P/N AN960 - 416L washers (or P/N AN960 – 416 if necessary) should be used to remove clearance in the elevator control system (fig. 4).

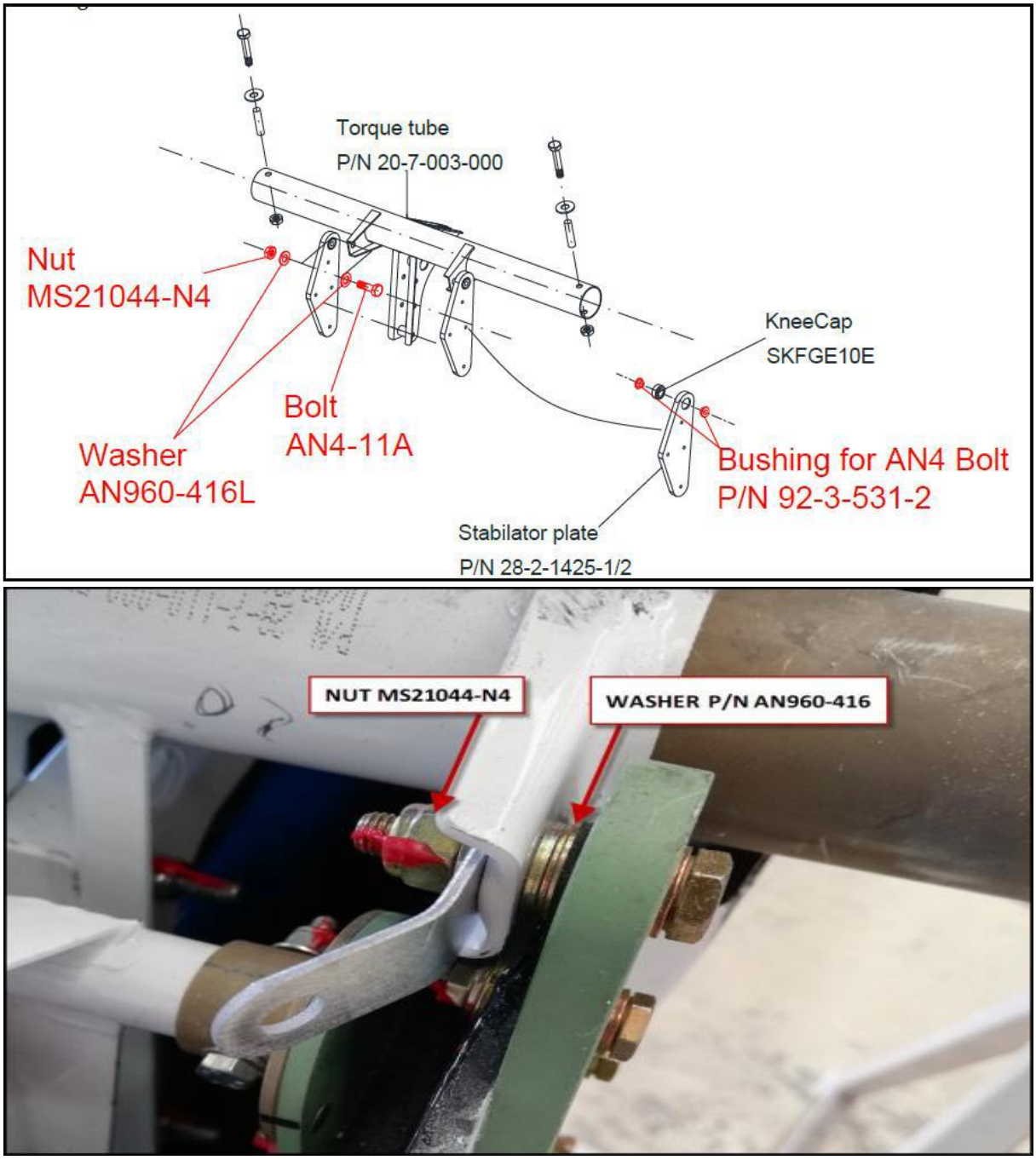


Fig. 4. Arrangement of fastening elements of the stabilator control system [source: SB298 – CS Service Bulletin].

1.17. Organizational and management information

Not formulated.

1.18. Additional information

The authorized representative of ANSV and his technical advisor to the Tecnam P2008 JC aircraft manufacturer did not respond to the recommendation No. 1/2022/2076 presented in the Preliminary Report.

EASA did not comment on the draft Report after internal review.

1.19. Useful or effective investigation techniques

Standard investigation techniques were applied.

2. ANALYSIS

During the investigation, measurements of bolts and connected elements (hinges, adjusting washers) were made. The P/N UNI 5737-6-35 bolts were found to have a 12 mm long non-threaded part. Connected elements after tightening the nut with a torque of 10 Nm should be on the non-threaded part. The measurements show that the thickness of the joined elements exceeded 12 mm.

Movement of the connected elements towards the threaded part caused that they rested on the thread and caused its damage, visible on both screws.

On 10 April, 2018 the manufacturer issued the SB 298 - CS Service Bulletin regarding the replacement of bolts with P/N AN4 - 11A. P/N AN4 - 11A bolts with a diameter of 6.35 mm have a much longer unthreaded part (by about 7 mm) and eliminate the main factor of the bolt damage.

The occurrences described in item 1.16 indicate that the SB 298 - CS Service Bulletin is important for safety and should be implemented urgently. However, the Bulletin is not mandatory and its implementation is decided by aircraft users, therefore, it may significantly delay the implementation, or, in extreme cases it may result in abandonment of the implementation.

3. CONCLUSIONS

3.1. Findings

1) The pilots had valid licenses and appropriate aero-medical certificates to perform the flight.
2) The flight was performed in accordance with the procedures contained in the User's Operations Manual.
3) The aircraft had a valid Certificate of Airworthiness.
4) The aircraft was fit for flight, and its maintenance was properly documented.
5) The ATOM of the aircraft before the flight was within the limits specified in the. Aircraft Fight Manual

6) The original bolts, 6 mm in diameter and 35 mm in length, had insufficient length of the unthreaded part to accommodate the connecting elements of the elevator suspension mounting system.

3.2. Cause of the serious incident

The cause of the serious incident was a design flaw in the stabilator control system, resulting in the breakage of the bolt fastening the stabilator suspension, which led to its jamming.

4. SAFETY RECOMMENDATIONS

Recommendation No. 1/2022/2076 for CA.TECNAM S.R.L - Manufacturer of the Tecnam P2008 JC aircraft:

The main factor determining high probability of another occurrence similar to the investigated serious incident is damage to the bolt thread as a result of its mating with the connected elements (hinges and washers) during normal operation, and this probability increases with an increase in an aircraft operating time.

The mandatory scope of maintenance does not provide for removal of the bolts, and thus prevent checking their mechanical condition during inspections.

SB 298 - CS Bulletin issued by the manufacturer regarding the replacement of bolts with new ones eliminates the cause of the described malfunctions, but is not mandatory, therefore, it is not performed on all aircraft.

For the above reasons, PKBWL recommends, that the Tecnam P2008 JC manufacturer, in consultation with ANSV change the status of Bulletin SB 298 - CS to mandatory.

5. ANNEXES

None.

THE END

Investigator-in-Charge

.....