NATIONAL BUREAU
OF AIR ACCIDENTS INVESTIGATIONS

FINAL REPORT OF INVESTIGATION INTO SERIOUS INCIDENT – DETACHMENT OF THE NOSE WHEEL AND COLLAPSE OF THE FRINT LANDING GEAR, DURING TRAINING FLIGHT

A/C OPERATOR:	Avia-Soyuz Airline LLC
A/C TYPE:	TECNAM P2002 JF
REGISTRATION NUMBER:	UR-ASC
OCCURRENCE SITE:	Mayske Airfield, Synelnykivskyi District, Dnipropetrovsk Region
COUNTRY:	UKRAINE
DATE:	November 1st, 2021

The report is published with the sole purpose to prevent air accidents in the future

APPROVED BY
Deputy Director
of the National Bureau of
Air Accidents Investigation
_____Mykola MASHAROVSKY
December 23rd , 2021

FINAL REPORT

of Investigation into Serious Incident with TECNAM P2002 JF UR-ASC Aircraft, Avia-Soyuz Airline LLC, That Took Place on November 1, 2021, During Training Flight, at Mayske Airfield, Synelnykivskyi District, Dnipropetrovsk Region

The Investigation Team of the National Bureau of Air Accidents and Incidents Investigation of Civil Aircraft, appointed by NBAAI Order dated 01.11.2021 No. 72, conducted an investigation into the serious incident with TECNAM P2002 JF UR-ASC aircraft, Avia-Soyuz Airline LLC, which occurred on 01.11.2021 during a training flight, in the area of Mayske Airfield, Dnipropetrovsk region.

According to the Part 1 of the Article 119 of the Air Code of Ukraine, paragraph 6 of the Regulation on National Bureau of Accidents and Incidents Investigation with Civil Aircraft, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 13.05.2021 No. 417 and paragraph 3.1 of ICAO Annex 13, the sole purpose of investigating an air accident or incident is to prevent air accidents or incidents in the future. The purpose of this activity is not to establish anyone's share of guilt or responsibility.

According to the paragraph 5 of the Article 119 of the Air Code of Ukraine, this report and technical investigation file shall not be used by administrative, service, prosecutor, judicial authorities, insurers for establishment of guilt or liability.

According to NBAAI's Order dated 19.05.2015 No. 45/1, the investigation is conducted using the provisions of Annex 13 to the Convention on International Civil Aviation and NBAAI's Manual on Air Accidents and Incidents Investigation.

The Final Report shall be sent to the following addresses:

- State Aviation Administration of Ukraine;
- Avia-Soyuz Airline LLC;
- Italian civil aviation safety investigation authority.

Investigation was instituted on 01.11.2021
Investigation was completed on 23.11.2021

Note: This report is a translation of the Ukrainian original investigation report. The text in Ukrainian shall prevail in the interpretation of the report.

Synopsis. Brief Description of Serious Incident.

On 01.11.2021, the NBAAI and the State Aviation Administration of Ukraine received a report from Avia-Soyuz Airline LLC about a serious incident occurred on 01.11.2021 during a training flight at the Mayske Airfield, Dnipropetrovsk Region.

On 01.11.2021, at 07:17 UTC (hereinafter, time is indicated as the Universal Time Coordinated (UTC)), according to the PIC's preliminary explanation, during the daytime, in the visual meteorological conditions, during a training flight, for the purpose to practice an engine failure simulation at TECNAM P2002JF UR-ASC aircraft, after the exercise, the aircraft landed on the runway. During the landing run, the nose wheel detached, and the front landing gear collapsed. The aircraft sustained minor damage, the pilot and student pilot were not injured.

Note. The difference between the local time and UTC is 3 hours. Use of UTC in the report is caused by the fact that UTC time is used in the initial reports, abstracts from the pilot logbook.

1. Factual Information

1.1 Flight History

On 01.10.2021, a serious incident took place with the TECNAM P2002JF UR-ASC aircraft operated by Avia-Soyuz Airline LLC, Ukraine, 52511, Dnipropetrovsk Region, Sinelnykivskyi District, Mayske village, Radhospnyi lane 5.

The pilot-instructor performed a training flight in the Mayske Airfield area, flight assignment No. 2251, namely, exercise No. 23, under the SEP(L) student pilot training program for obtaining a PPL(A) Certificate approved by the State Aviation Administration of Ukraine (SAA.)

According to the PIC's explanatory note, he arrived at Mayske Airfield on 01.11.2021, at 06 hours 02 minutes (UTC), to perform training flight for the student pilot – according to the flight assignment No. 2251, to practice an engine failure simulation in the area of Mayske Airfield on the TECNAM P2002JF UR-ASC plane, fueled up with 39 kg, maximum takeoff weight - 599 kg, Center-of-Gravity position - 27% CAX. A briefing was conducted to explain and set to the student pilot the tasks, which should have been practiced in flight. The actions to be practiced in the air were also thoroughly reviewed. The meteorological conditions corresponded to the visual flights.

At 06:35, the pre-flight inspection of the aircraft commenced. The TECNAM P2002JF UR-ASC on 01.11.2021 was prepared by the PIC together with a student pilot. During the preflight inspection of the aircraft, no deviations and deficiencies were found. The PIC did not make any critical comments on the technical condition of the aircraft. After that, the aircraft's technical logbook was drawn up. According to the training assignment, the aircraft should have been piloted by the student pilot. At 07:09, the engine was started (with no critical comments.) After receiving clearance for takeoff, at 07:17, the flight began according to the assignment.

After take-off and climb to 10 meters, the PIC simulated an engine failure on take-off. The aircraft control during landing onto the runway was performed by the PIC together with the student pilot.

Having landed on the main landing gear wheels, after the landing run, the PIC set the aircraft on three landing gears and continued the landing run for about 200 meters more. On the run, at an aircraft speed of 30 kts, the PIC felt that the aircraft deviated from its heading to the left and, at the same time, saw the nose wheel detached. After the runway touchdown by the nose gear, the nose gear retracted under the fuselage, and the aircraft came to rest. The PIC turned off the fuel valve, fuel pump, and battery. After that, the PIC and student pilot immediately left the aircraft cockpit. There was no fire at the aircraft. Upon aircraft inspection, the damage to the propeller and nose landing gear was found.

The runway was inspected in the direction of the aircraft run. On the runway, destroyed parts of the nose gear wheel attachment and the wheel itself were found.

1.2 Injuries

According to Chapter 1 of Annex 13 to the Convention on International Civil Aviation – Aircraft Accident and Incident Investigation

Injuries	Crew	Pax	Others
Fatal	0	0	0
Serious	0	0	0
Minor/ None	2	0	0

1.3. Aircraft Damage.

According to the aircraft inspection results, the following was found:

- broken NOSE LANDING LEG P/N 92-8-100-000 at the nose gear wheel levers attachment point;
- detached nose gear wheel;
- damaged nose gear control system;
- broken nose gear WHEEL ROD P/N 92-8-240-7;
- both propeller blades broken;
- damaged upper engine cowl;
- damaged lower engine cowl;
- bent engine mounting frame links.


UR-ASC
UR-ASW


P200

Engine and engine systems.

Engine and engine systems have no visible damage. The engine mounting frame links were bent. The engine piping and wiring have no visible damage. Radiators and their mountings also have no visible damage.

Nose landing gear

- Nose landing gear is broken at the nose gear wheel levers attachment point.
- Nose gear wheel rod is broken.
- Nose gear wheel control links are damaged.
- Main landing gear has no damage.

1.4 Other Damage

No other damage was found.

1.5 Personnel Information

Aircraft PIC:

Date of birth 22.01.1967.

Flight Crew Member Certificate UA.FCL.010009 issued on 08.06.2021. Valid until 31.10.2022.

Medical Certificate of Class 1/2 No. 99416 issued on 06.10.2021, valid until 23.10.2022.

SEP (land) IR (A), Acts of qualification and certification examinations dated **18.10.2021**.

Citizenship - Ukraine.

Education: higher education, Chernihiv Higher Military Aviation School of Pilots, 1991.

Place of employment: Avia-Soyuz Airline LLC.

Information from the certificate:

RATINGS:

An-24/26 IR (A)

SEP (land) IR (A)

SEP (land) FI

Special notes:

- Authorized for instructor's activities at the TECNAM P2002JF aircraft at Avia-Soyuz Airline LLC, Order No. 22/10-1 dated 22.10.2021.

The total flight time is 3824 hours 36 minutes.

It consists of:

AN-2	71 h 25 min.

C172	1676 h 20 min.
L-410	1329 h 38 min.
AN-26	173 h 51 min.
Flight time as PIC	2477 h 15 min.
Flight time as FI	1796 h 28 min.
Flight time at TECNAM P2002JF	17 h 59 min.
in particular, as FI	16 hours. 08 minutes

Student Pilot:

Date of birth: 20.09.2002

Certificate No.20028 was issued on 09.07.2021. Training Course for Obtaining Private Pilot License PPL(A) was passed.

Medical Certificate of Class 1/2 No. 97402 issued on 15.06.2021, valid until 15.06.2022.

Citizenship: Ukraine

Flight hours at TECNAM P2002JF aircraft: 48 h 00 min.

Aircraft crew was insured at UVSK PrJSC. INSURANCE CERTIFICATE No.1/161/CREW/21 is valid until 12.08.2022.

Insurance to third parties was issued at UVSK PrJSC.

INSURANCE CERTIFICATE No.1/160/LL/21, valid until 12.08.2022.

1.6. Aircraft Data

Aircraft: TECNAM P2002JF

State registration mark: UR-ASC

MSN: 226

Operator: Avia-Soyuz Airline LLC, 5 Yalynkovyi lane, Mayske village, Synelnykivskyi district, Dnipropetrovsk region, 52511, Ukraine

Owner: Avia-Soyuz Airline LLC

Manufacturing plant: Costruzioni Aeronautiche TECNAM S.r.I, The Italian Repablic

Aircraft manufacture date: 06.02.2013.

Operating hours since new: 5626 h 01 min.

Airworthiness Information:

Aircraft Registration Certificate No. RP 4758 was issued on 25.06.2021 by the State

Aviation Administration of Ukraine.

Airworthiness Certificate No. 0566 was issued on 02.09.2015. State Aviation Administration of Ukraine.

Airworthiness Review Certificate was issued on 10.08.2021 by the State Aviation Administration of Ukraine at 2255 hours of operating time, valid until 09.08.2022.

Flight Hours after base maintenance: 47 h 13 min.

Risks related to full aircraft loss or damage were insured at UVSK PrJSC.

INSURANCE CERTIFICATE No.1/159/HULL/21, valid until 12.08.2022.

Engine.

Type: Rotax 912 S2-01, serial number: 9.139.192.

Manufacturing plant: Rotax.

Engine total operating time (ETT): 1291 h 56 min. since new.

Date of manufacture: 25.02.2016.

All the engine developments, which were mandatory by the time of the serious incident, had been completed.

Propeller.

Type H017GHM A174-177C.

Propeller serial number: 80759.

Operating time since new: 1767 h 56 min.

Manufactured on 25.02.2021.

Maintenance

The date base maintenance: 19.10.2021 at the operating time of 5578 h 48 min. CRS # 14/21A, the works were performed by a maintenance organization, Maintenance Organization Approval Certificate: UA.MF.0010.

Before departure, on 01.10.2021, at the Mayske Airfield, the PIC performed the flight preparation of the aircraft. Logbook page No. 000815.

1.7. Meteorological Information

Actual weather at the Synelnykove meteorological station for 06:00 to 12:00 UTC on 01 November 2021, according to the letter of the Ukrainian Meteorological Center No. 1.2-1.9/518 dated 03.11.2021:

For 06.00 UTC Synelnykove 01061 34505 31996 00704 10054 20035 40225 57006

71000 33333 20032 55555 10004 30000 =

Total clouds 0 points (clear). Visibility 4 km, haze. Surface wind direction 070°, speed 4 m/s. Air temperature 5.4°C, dew-point temperature 3.5°C. Pressure reduced to mean sea level 1022.5 hPa. Barometric trend -0.6 hPa.

For 09.00 UTC Synelnykove 01091 34505 42597 71105 10082 20055 40216 57007 87300 33333 87923 55555 1/012=

Total clouds 9 points, cumulonimbus clouds with the cloud base of 600-1000 m. Visibility 10 km. Surface wind direction 110° velocity 5 m/s. Air temperature 8.2°C, dew-point temperature 5.5°C. Pressure reduced to mean sea level 1021.6 hPa. Barometric trend -0.7 hPa.

For 12.00 UTC Synelnykove 01121 34505 32998 00904 10122 20058 40193 57020 55555 1/017=

Total clouds 0 points (clear). Visibility 20 km. Surface wind direction 090° velocity 4 m/s. Air temperature 12.2°C, dew-point temperature 5.8°C. Pressure reduced to mean sea level 1019.3 hPa. Barometric trend -2.0 hPa.

Actual weather at the Pavlograd meteorological station for 06.00 to 12.00 UTC on 01 November 2021:

For 06.00 UTC Pavlograd 01061 34502 32965 20901 10053 20028 40231 57008 82030 33333 20018 55555 10005=

Total clouds 3 points of altocumulus with cloud base above 2500 m. Visibility 15 km. Surface wind direction 090°, wind speed 1 m/s. Air temperature 5.3°C, dew-point temperature 2.8°C. Pressure reduced to mean sea level 1023.1 hPa. Barometric trend -0.8 hPa.

For 09.00 UTC Pavlograd 01091 34502 42569 61405 10098 20054 40224 57006 86500 33333 86629 55555 1/015=

Total clouds 7 points of layered cumulonimbus clouds with a cloud base of 600-1000 m. Visibility 19 km. Surface wind direction 140°, wind speed 5 m/s. Air temperature 9.8°C, dew-point temperature 5.4°C. Pressure reduced to mean sea level 1022.4 hPa. Barometric trend -0.6 hPa.

For 12.00 UTC Pavlograd 01121 34502 32970 01004 10126 20062 40201 57022 55555 1/017=

Total clouds 0 points (clear). Visibility 20 km. Surface wind direction 100°, wind speed 4 m/s. Air temperature 12.6°C, dew-point temperature 6.2°C. Pressure reduced to mean sea level 1020.1 hPa. Barometric trend -2.2 hPa.

1.8 Navigation Aids

Navigation aids have no relation to the serious incident.

1.9. Communication Means.

For flight operation provision at the Mayske Airfield, a Start Command Post (SCP) is used, which is equipped with a VHF radio and a backup emergency radio station. If necessary, a Mobile Remote Start Command Post (MRSCP) is additionally installed at the airfield.

Radio station IC-A110 s.n. 02945 was manufactured on 06.03.2000.

Radio, wire and mobile telephone communications are used for communication with ATS units and the Ukrainian Armed Forces command authority (Appendix 15.)

1.10. Aerodrome Data

The Mayske Airfield is a permanent certified civil aviation airfield registered in the State Register of Civil Aerodromes of Ukraine. Certificate of Permanent Airfield Release to Operation No. ZPM 03-249 dated 25.05.2021. Valid until 21.05.2024.

Airfield owner: Agro-Soyuz CJSC.

Airfield operator: Avia-Soyuz Airline LLC.

Airfield has one unpaved runway with the landing magnetic heading MHland=145º/326º.

Unpaved runway dimensions: 1500x21 m, pavement type – soil.

Airfield is suitable for daytime operation.

Coordinates: 48°29`10” N; 35°37`38” E.

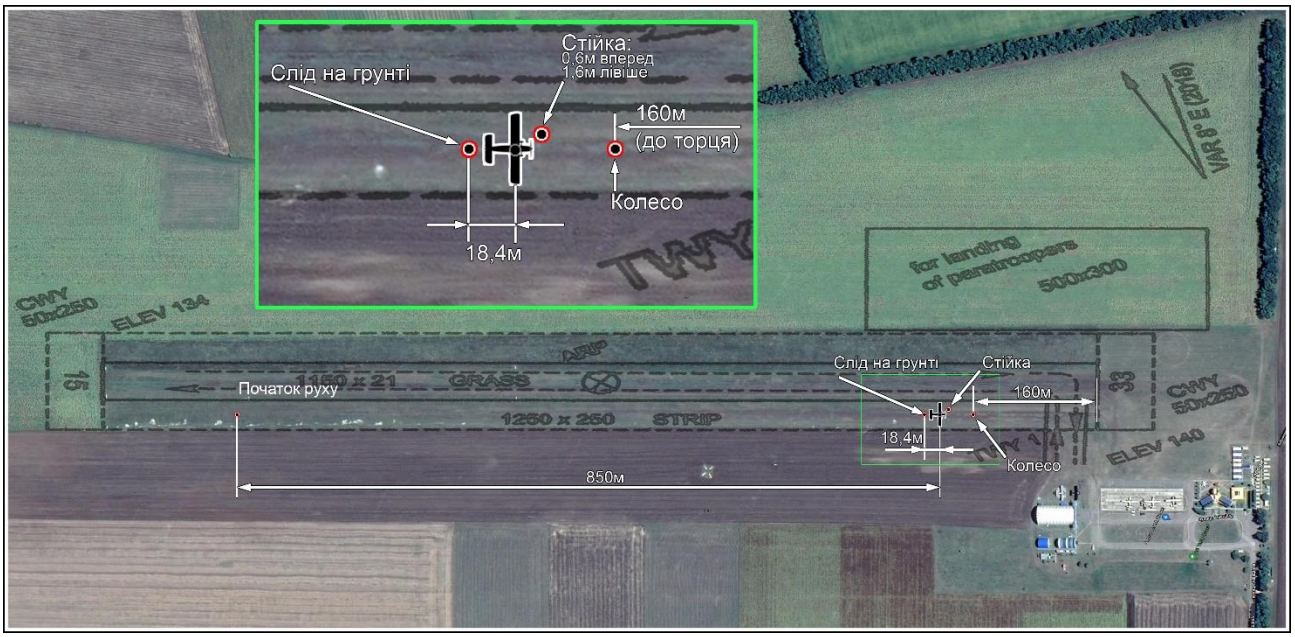
Magnetic dip is 8ºE.

Airfield elevation is 141.42 m.

1.11 Flight Recorder

The aircraft design does not provide an onboard recorder.

1.12 Information on Aircraft Components Condition and Location at Accident Site.



The nose landing gear wheel is at the distance of 40 meters from the aircraft in the direction of the aircraft movement.

The broken nose landing gear leg is near the aircraft.

1.13. Medical Information and Brief Results of Post-Mortem Examination of Crew.

As a result of the serious incident, the PIC and the student pilot were not injured. They did not seek medical aid.

1.14 Fire.

There was no fire.

1.15 Rescue and Fire Brigades Operations.

Not carried out.

1.16 Tests and Research.

Not carried out.

1.17 Information on Organizations and Administrative Activities Related to Occurrence.

Avia-Soyuz Airline LLC: 5 Yalynkovyi lane, Mayske village, Synelnykivskyi district, Dnipropetrovsk region, 52511, Ukraine.

Certificate of Operator CE No. 196 dated 01.10.2021 was issued by the State Aviation Administration of Ukraine and valid till September 30, 2022.

Certificate of Approved Training Organization UA ATO.0022 dated 18.12.2021 was issued by the State Aviation Administration of Ukraine.

1.18. New Methods Used in Investigation.

No new methods were used in the investigation.

2. Analysis

The TECNAM P2002JF UR-ASC aircraft has no fixed recorders.

In the process of the serious incident circumstances analysis, the following materials were used by the Investigation Team:

- Explanatory notes of witnesses and other persons involved in the occurrence;
- TECNAM P2002JF Aircraft Flight Operation Manual.
- Instruction on Flight Operations at Mayske Airfield;
- Aircraft registration and flight operation permit documentation;
- Meteorological documentation;
- Results of the inspection of the serious incident site;
- Results of the aircraft inspection;
- Technical Report on Inspection of TECNAM P2002JF UR-ASC Aircraft After Landing at Mayske Airfield compiled by specialists of Avia-Soyuz Airline LLC who are the aircraft operators, together with Members of the Investigation Team for the serious incident;

- Video footage that recorded the serious incident with the TECNAM P2002JF UR-ASC aircraft;

- Materials provided by the Ukrainian State Air Traffic Services Enterprise.

The following factors of the serious incident were considered during the investigation:

- meteorological conditions.

It was established that the meteorological conditions in the flight area were fully consistent with the visual meteorological conditions and could not have influenced the onset and development of the serious incident. The flight took place in the first half of the day, there were no dangerous phenomena;

- causes, which were related to the of aviation equipment failure.

On 01.11.2021, the aircraft PIC wrote down "No Comments" in the technical logbook of the TECNAM P2002JF UR-ASC aircraft during the pre-flight inspection of the aircraft.

The PIC’s explanatory note stated that there were no comments concerning the aircraft technical condition and engine operation.

At 07:17, the student pilot performed the aircraft take-off run and take-off. Having reached the altitude of 10 meters (visually), the PIC performed a simulation of an engine failure on takeoff.

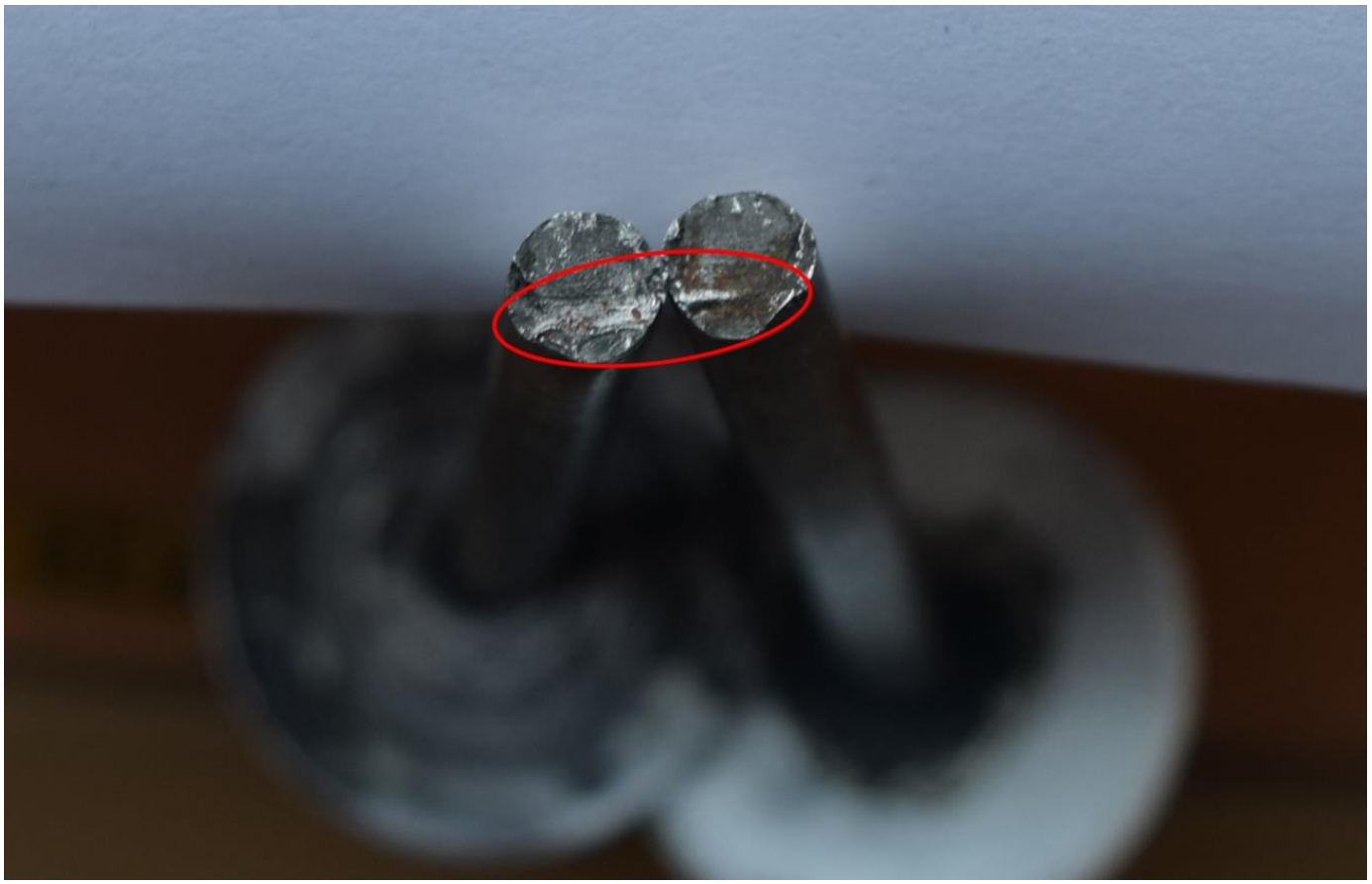
Having landed on the main landing gear wheels, after the landing run, the PIC set the aircraft on three landing gears and continued the landing run for about 200 meters more. On the run, at the aircraft speed of 30 kts, the PIC felt the aircraft deviation from its heading to the left and, at the same time, saw the nose wheel detachment. After the runway touchdown by the nose landing gear, it retracted under the fuselage and the aircraft came to rest.

The PIC disengaged the fuel valve, fuel pump, and battery. After that, the PIC and student pilot immediately left the aircraft cockpit.

During the training flight, at 07:18, the operation of the emergency location beacon, which is installed at the aircraft, was recorded by the KOMPAS-SARSAT search-and-rescue system (letter of the Ukrainian State Air Traffic Services Enterprise No.1-14.1/10438/21 dated 12.11.2021.)

The Investigation Team established that the cause of the serious incident with the TECNAM P2002JF UR-ASC aircraft was the destruction of the nose wheel mounting rod shown on drawing of FIG 3 as itm 8 WHEEL ROD P/N92-8-240-7. Old corrosion of the metal can be seen at the rod fracture points. This indicates that the rod destruction had been taking place for a certain time.

The Investigation Team notes that the operation of this aircraft for the purpose of training flights had been taking place for a long time on the unpaved runway.



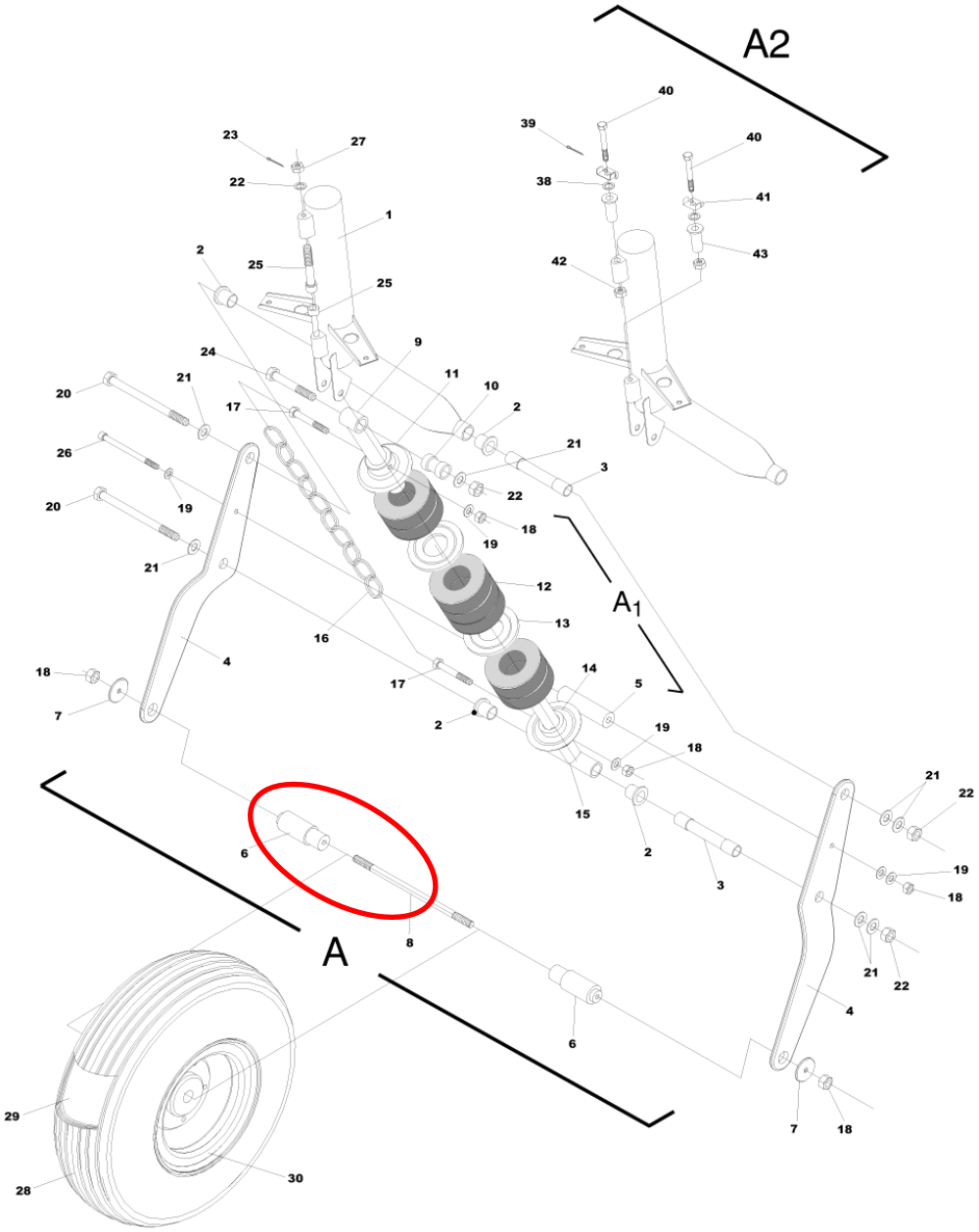


Figure 3 – NLG (sheet 1)

Revision Date:
Revision Number:

3. Conclusion

3.1 Conclusions

1. PIC had a visual flying rating for the TECNAM P2002JF aircraft, valid medical certificate and all required ratings, theoretical and practical skills, experience as a pilot on different aircraft types.

2. The aircraft was prepared for the flight according to the current regulations and procedures.

3. The aircraft weight and Center-of-Gravity position were within the operational limits.

4. The aircraft controls were in serviceable and in a satisfactory condition.

5. There were no PIC's critical remarks about the technical condition and engine operation of the aircraft during the flight.

6. The aircraft was fueled up according to the flight assignment.

7. The actual weather and weather forecast for the Mayske Airfield and alternate aerodromes corresponded to the visual meteorological conditions without hazardous phenomena.

8. The aircraft maintenance was performed in accordance with the maintenance program.

9. The aircraft operation takes place on an unpaved runway for the purpose of training flights. The aircraft structure sustains increased loads.

3.2 Serious Incident Causes and Contributing Factors.

The Investigation Team has established that the cause of the serious incident with the TECNAM P2002JF UR-ASC aircraft, which took place at the Mayske Airfield on 01.11.2021, was the destruction of the nose wheel mounting rod.

Safety Recommendations.

To: Senior Management of Avia-Soyuz Airline LLC:

Conduct a debriefing with the engineering and technical personnel on the causes and consequences of the serious incident with the TECNAM P2002JF UR-ASC aircraft;

To: Owners of TECNAM P2002JF Airplanes:

- Conduct a one-time inspection of the nose wheel mounting rod (WHEEL ROD P/N92-8-240-7) for traces of the rod destruction by the instrumental method;

- During the maintenance after 100 flight hours, conduct the inspection of the nose wheel mounting rod (WHEEL ROD P/N92-8-240-7) by the instrumental method.

Factor: Technical.

Categories: SCF-NP, LOC-G.