

**COMANDO DA AERONÁUTICA**  
**CENTRO DE INVESTIGAÇÃO E PREVENÇÃO DE**  
**ACIDENTES AERONÁUTICOS**



**FINAL REPORT**  
**IG - 145/CENIPA/2016**

<b>OCCURRENCE:</b>	<b>SERIOUS INCIDENT</b>
<b>AIRCRAFT:</b>	<b>PP-MHJ</b>
<b>MODEL:</b>	<b>PZL-SW4</b>
<b>DATE:</b>	<b>08NOV2016</b>



## NOTICE

*According to the Law n  7565, dated 19 December 1986, the Aeronautical Accident Investigation and Prevention System – SIPAER – is responsible for the planning, guidance, coordination and execution of the activities of investigation and prevention of aeronautical accidents.*

*The elaboration of this Final Report was conducted taking into account the contributing factors and hypotheses raised. The report is, therefore, a technical document which reflects the result obtained by SIPAER regarding the circumstances that contributed or may have contributed to triggering this occurrence.*

*The document does not focus on quantifying the degree of contribution of the different factors, including the individual, psychosocial or organizational variables that conditioned the human performance and interacted to create a scenario favorable to the accident.*

*The exclusive objective of this work is to recommend the study and the adoption of provisions of preventative nature, and the decision as to whether they should be applied belongs to the President, Director, Chief or the one corresponding to the highest level in the hierarchy of the organization to which they are being forwarded.*

*This Report does not resort to any proof production procedure for the determination of civil or criminal liability, and is in accordance with Appendix 2, Annex 13 to the 1944 Chicago Convention, which was incorporated in the Brazilian legal system by virtue of the Decree n  21713, dated 27 August 1946.*

*Thus, it is worth highlighting the importance of protecting the persons who provide information regarding an aeronautical accident. The utilization of this report for punitive purposes maculates the principle of “non-self-incrimination” derived from the “right to remain silent” sheltered by the Federal Constitution.*

*Consequently, the use of this report for any purpose other than that of preventing future accidents, may induce to erroneous interpretations and conclusions.*

**N.B.: This English version of the report has been written and published by the CENIPA with the intention of making it easier to be read by English speaking people. Taking into account the nuances of a foreign language, no matter how accurate this translation may be, readers are advised that the original Portuguese version is the work of reference.**

## SYNOPSIS

This is the Final Report of the 08NOV2016 serious incident with the PZL-SW4 aircraft, registration PP-MHJ. The serious incident was classified as “[SCF-NP] System/Component Failure or Malfunction Non-Powerplant – with windshield / window / door”.

During a local flight, with the aircraft leveled, a passenger informed the pilot that the upward vision window right had detached from the aircraft.

The pilot returned to landing on the same take-off helipad.

The aircraft had minor damage.

The pilot and the passengers left unharmed.

An Accredited Representative of the State Commission on Aircraft Accidents Investigation (SCAAI) - Poland, (State where the aircraft was designed) was designated for participation in the investigation.

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**GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS**

CA	Airworthiness Certificate
CIV	Pilot's Flight Logbook
CMA	Aeronautical Medical Certificate
DCTA	Department of Science and Airspace Technology
EACAR	Rotorcraft Civil Aviation School
HMNT	Single Turbo Helicopter Rating
METAR	Meteorological Aerodrome Report
PCH	Commercial Pilot License – Helicopter
PPH	Private Pilot License – Helicopter
SBJV	ICAO locator designator – Joinville Aerodrome - SC
SCAAI	State Commission on Aircraft Accidents Investigation
SDNY	ICAO locator designator – Dolores Helipad, Rio Negrinho - SC
SERIPA V	Fifth Aeronautical Accident Investigation and Prevention Service
TPP	Registration Category of Private Aircraft Service
UTC	Universal Time Coordinated

## 1. FACTUAL INFORMATION.

Aircraft	<b>Model:</b> PZL-SW4	<b>Operator:</b> Sekalog Transports LTD.
	<b>Registration:</b> PP-MHJ	
	<b>Manufacturer:</b> PZL-SWIDNIK	
Occurrence	<b>Date/time:</b> 08NOV2016 - 1615 UTC	<b>Type(s):</b> [SCF-NP System/Component Failure or Malfunction Non-Powerplant
	<b>Location:</b> SDNY	
	<b>Lat.</b> 26°15'52"S <b>Long.</b> 049°30'59"W	<b>Subtype(s):</b> With windshield / window / door
	<b>Municipality – State:</b> Rio Negrinho – SC	

### 1.1 History of the flight.

The aircraft took off from the Dolores helipad, in the municipality of Rio Negrinho - SC (SDNY), to conduct a local flight, at about 1615 (UTC), to transport personnel, with a pilot and two passengers on board.

After take-off, the aircraft started a left turn, rising to 500ft, with the intention of maintaining the west sector of the city. After reaching and leveling to 500ft, already in the west sector, away 2 NM from the helipad, with indicated speed of 80kt, the pilot was alerted by the passenger that the upward vision window right had detached from the aircraft.

The aircraft returned to landing, without any other abnormality.

The aircraft had minor damage.

The pilot and the passengers left unharmed.

### 1.2 Injuries to persons.

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor	-	-	-
None	1	2	-

### 1.3 Damage to the aircraft.

The aircraft had minor damage. The damages were limited to the loss of the upward vision window right.

### 1.4 Other damage.

None.

### 1.5 Personnel information.

#### 1.5.1 Crew's flight experience.

Hours Flown	
	Pilot
Total	911:44
Total in the last 30 days	06:40
Total in the last 24 hours	01:10
In this type of aircraft	207:25
In this type in the last 30 days	06:40
In this type in the last 24 hours	01:10

**N.B.:** The data related to the flown hours were obtained through the Pilot's Flight Logbook (CIV) records.

#### **1.5.2 Personnel training.**

The pilot took the Commercial Pilot course – Helicopter (PCH) at Rotorcraft Civil Aviation School (EACAR), in Joinville - SC, in 2010.

#### **1.5.3 Category of licenses and validity of certificates.**

The pilot had the PCH and had valid HMNT Rating.

#### **1.5.4 Qualification and flight experience.**

The pilot was qualified and had experience in that kind of flight.

#### **1.5.5 Validity of medical certificate.**

The pilot had valid Aeronautical Medical Certificate (CMA).

#### **1.6 Aircraft information.**

The aircraft, serial number 60.04.03, was manufactured by PZL-SWIDNIK, in 2011, and it was registered in the TPP category.

The aircraft had valid Certificate of Airworthiness (CA).

The airframe and engine logbook records were outdated.

The last inspection of the aircraft, the "600 hours/biannual" type, was carried out on 10OCT2016 by the Agusta Westland do Brasil Ltd. shop, in Osasco – SP, having flown 7 hours and 10 minutes after the inspection.

#### **1.7 Meteorological information.**

The weather conditions were favorable for the visual flight.

The meteorological bulletins (METAR) of Joinville Aerodrome (SBJV), away 31 nautical miles from the place of the occurrence, had the following information:

METAR SBJV 081600Z 11011KT 9999 SCT030 27/20 Q1013=

METAR SBJV 081700Z 10007KT 9999 SCT030 27/21 Q1012=

It was found that the conditions were favorable for the visual flight with visibility over 10km and scattered clouds at 3,000ft. The wind had intensity between 07 and 11kt.

#### **1.8 Aids to navigation.**

Nil.

#### **1.9 Communications.**

Nil.

#### **1.10 Aerodrome information.**

The occurrence took place outside the Aerodrome.

#### **1.11 Flight recorders.**

Neither required nor installed.

#### **1.12 Wreckage and impact information.**

Upward vision window right was not found.

The aircraft was not damaged, apart from the loss of the upward vision window right.



Figure 1 - View of the aircraft damage.

### **1.13 Medical and pathological information.**

#### **1.13.1 Medical aspects.**

Not investigated.

#### **1.13.2 Ergonomic information.**

Nil.

#### **1.13.3 Psychological aspects.**

Not investigated.

### **1.14 Fire.**

There was no fire.

### **1.15 Survival aspects.**

Nil.

### **1.16 Tests and research.**

When checking the aircraft's airframe logbook, it was found that the upward vision window, which came off in the serious incident, had been replaced in the last inspection / review of the aircraft, on 10OCT2016, by the Agusta Westland do Brasil Ltd.

The aircraft maintenance manual included, among other things, the use of the Betaseal 1407 sealant to exchange the upward vision window. However, the sealant used by the shop was the so-called Essex U-438RF.

When checking the opening in which the upward vision window was installed, it was found that the residue from the glue used for the fixture had remained in place.

The upward vision window was not found and therefore no type of material analysis was possible. Samples of the glue remaining in the opening were collected for laboratory analysis.

Thus, cured and uncured samples of the Betaseal 1407 and Essex U-438RF sealants were sent for analysis, in order to determine whether the two adhesives had the same composition. The cured sample of the Essex U-438RF sealant was removed from the aircraft after the serious incident.



The results of the analysis were as follows:

a) the samples were similar to each other, indicating that the materials could have the same chemical composition;

b) cured samples of the two substances, after pyrolysis (transformation by the heating of a mixture or of an organic compound into other substances), presented the same absorptions, being able to contain mixture of organic materials;

c) the cured samples were treated with hot methanol. Residues obtained after treatment, suggest the presence of an aromatic ester like "phthalate", which was compatible with the information on the products packages;

d) the pyrolysates liquid obtained after the hot methanol treatment of the samples analyzed by the transmission technique were characteristic of polyurethane type material and there were many similarities between the spectra indicating that it was basically the same type of material. However, in the region around  $2274\text{cm}^{-1}$ , concerning NCO groups of isocyanate, this part was more intense in the cured U-438 RF sample, which could be due to a higher free isocyanate content;

e) to investigate the presence of inorganic material in the cured samples, they were calcined (burnt, converted to ashes) in furnace (kind of stove) at  $600^{\circ}\text{C}$  for 6 hours. Absorptions were found, common in both samples. However, in the sample called Betaseal 1407 absorptions were verified around  $3645$ ,  $1427$ ,  $875$  and  $713\text{cm}^{-1}$ , which did not appear in the sample called U-438 RF. Possibly by the position of these absorptions, it could be the presence, at lower levels, of some type of silicate and / or carbonate;

f) the soluble part, in hot distilled water, the white powder obtained after calcination of the cured Betaseal 1407 sample, suggested the presence of calcium carbonate;

g) a fraction of the soluble part in hot distilled water, the white powder obtained after calcination was treated with hydrochloric acid in water and centrifuged. The powder obtained was analyzed through potassium bromide tablet and indicated that this sample could contain some calcium sulphate content;

h) the same treatments were given to the cured U-438 RF sample, but it was not possible to guarantee unequivocally the presence of other components;

i) the use of the Thermo gravimetric analysis (TGA) technique up to  $800^{\circ}\text{C}$  for calcination of the cured samples only confirmed the result found by the analysis performed in the furnace at  $600^{\circ}\text{C}$ ;

j) the test with hydrochloric acid in water with calcination residues of the "uncured" samples, showed that the appearance of bubbles indicated the reaction of hydrochloric acid with calcium carbonate, leading to the formation of  $\text{CO}_2$ , and the "uncured" sample Betaseal 1407 "bubbled" and the "uncured" sample U-438 RF "did not bubble". This indicated that the presence of calcium carbonate is evident for the Betaseal 1407 sample, proving the result obtained by spectroscopy;

k) the absence of bubbles indicated that there was no presence of calcium carbonate or it was in a non-detectable content by the applied test nor by the Spectroscopy in the uncured sample U-438 RF;

l) the test to determine the amount of ashes in the samples showed that the "uncured" U-438 RF sample had a content of approximately 11.21% load, and the "uncured" Betaseal 1407 sample had a load value of approximately 26.80%, that is, presented more than twice as much inorganic material in its composition; and

m) the Shore D Hardness test corroborated the load test results, since the Betaseal 1407 sample had a much higher hardness value than the one found for the U-438 RF

sample, which could be attributed to the higher inorganic load content in the Betaseal 1407 sample.

Thus, in view of the obtained results, it was verified that, although the samples were similar, it was not possible to be affirmed that the composition was exactly the same, mainly with respect to the inorganic loads.

### 1.17 Organizational and management information.

Sekalog Transports Ltd. operated the aircraft. The pilot had no employment relationship with the company, performing non-regular flights according to the company demand.

The pilot demonstrated knowledge about the conditions of the aircraft, both in operation and in maintenance. The operator did not exert effective supervision over the pilot's work, since he did not have trained personnel for this purpose.

Maintenance was carried out by approved shop. Records of inspections and revisions were posted in the engine and airframe logbooks, but in Part I of the engine and airframe logbooks, the monthly usage record was outdated. In this way, the flown hours control was done only by the aircraft's logbook.

### 1.18 Operational information.

The local flight was intended to show the aircraft to a passenger that was interested in its purchase.

The pilot, taking off, started a left turn, ascending to 500ft, intending to maintain the west sector of the city. After reaching and leveling at 500ft, in the west sector, away 2NM from the helipad, with indicated speed of 80kt, the pilot was alerted by the passenger that the upward vision window right had come off.

The pilot stated that he did not observe any abnormal flight conditions. Even after being alerted about the detachment of the window, he reported that the flight conditions remained normal until landing. Figure 2 shows the approximate trajectory of the aircraft from take-off to landing.



Figure 2 – Aircraft Trajectory.

### 1.19 Additional information.

The procedures for replacing the upward vision window provided for a series of processes, with several technical impositions (Figures 3, 4, 5 and 6).


 <b>PZL SW-4</b> <b>INSTRUCTIONS FOR CONTINUED AIRWORTHINESS</b> <b>MAINTENANCE MANUAL</b>	
WORK SHEET No. <b>53.00-9</b>	Number of Pages <b>3</b>
Subject: <b>REPLACEMENT OF SMALL BONDED WINDOWS (UPWARD AND DOWNWARD VISION WINDOWS AND FORWARD DOOR LOWER WINDOWS (FIG. 7)</b>	Workload (man-hours)
Actions and Technical Requirements (T.R.)	
<p><b>1. Removal of window:</b></p> <ol style="list-style-type: none"> <li>1.1. Thoroughly protect the cabin interior from window debris (chips, organic glass, adhesive residues, etc.) for example, by sticking from the inside a piece of flannel covering the area around the window to be removed.</li> <li>1.2. Using a hand-held milling machine, cut out the window pane near the edge of fuselage opening paying close attention not to damage the composite structure of the cabin.</li> <li>1.3. Remove the window outside.</li> <li>1.4. Using a knife, remove the window pane edge residues from the cabin. Pay close attention not to damage the composite structure of the cabin.</li> <li>1.5. Gently remove the residues of adhesive. Pay attention not to damage the composite structure of the cabin.</li> <li>1.6. Remove residues of adhesive from the holes <math>\varnothing 3.2</math> mm used to retain the window before and during bonding.</li> <li>1.7. Using sand paper No. 80, thoroughly remove residues of adhesive on the edge of cabin</li> </ol>	

Figure 3 - Upward vision window replacement procedure.

<p><b>2. Touch up of Helicopter Cabin Paint Coat:</b></p> <p>If during the removal of the windows the paint coat is damaged in the close vicinity of the window installation area, touch up the pint coat as described in Work Sheet 20.20-8.</p> <p>Touch up damaged paint coat with paint of required color.</p> <p><b>3. Installation of Window:</b></p> <ol style="list-style-type: none"> <li>3.1. Preparing the window pane surface for bonding:             <ol style="list-style-type: none"> <li>3.1.1. Remove protective film from the window pane.</li> <li>3.1.2. Place the window pane onto the cabin so that the gap between the pane edge and the cabin recess edge is <math>3\pm 1</math> mm. If necessary, grind the excess pane to obtain required shape and dimension.</li> <li>3.1.3. While maintaining the clearance required above, using two holes <math>\varnothing 3.2</math> in the cabin, make the same holes in the window pane paying attention not to break the pane within the drilling area.</li> <li>3.1.4. Using two retaining pins <math>\varnothing 3</math>, protect the pane from moving around.</li> <li>3.1.5. From the inside, on the entire periphery of window opening in the cabin, in a distance of 2-3 mm from the edge, mark on the pane a contour of the opening (the adhesive application area).</li> <li>3.1.6. Bond a narrow (approx. 25 mm wide) adhesive tape along the marked line from the inside and outside surface of the pane on its entire periphery.</li> </ol> </li> </ol>
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Figure 4 - Upward vision window replacement procedure.

- 3.1.7. Cut out 5 x 10 mm spacer blocks from composite material or hard PU foam having thickness and outer contour ensuring exact adherence of the blocks to the pane so that the outside contour of the window pane matches the cabin contour.
- 3.1.8. Bond the spacer blocks inside the cabin structure recess on the entire periphery every approx. 100 mm within the window bonding area, paying close attention the opening corners and place where the rating holes are made. Ensure the 3-4 mm clearance between the blocks and the edge of recess and the edge of pane opening. Bond the blocks with Multiband 24 adhesive.
- 3.1.9. Clean the pane area to be bonded with Betaclean 3350. Apply a small amount of Betawipe VP 04604 activator using a clean flannel. Wipe off the excess activator with clean dry flannel. Pay attention not to leave too much activator on the surface.
- 3.1.10. Wait for 30 seconds to 5 minutes.
- 3.1.11. Apply a thin layer of Betaprime 5001 or Betaprime 5500 primer.
- 3.1.12. Dry the primer for 2+15 minutes.
- 3.2. Preparing the surface of cabin frame for bonding:
- 3.2.1. Sand the area on the cabin frame to be bonded using the No. 80 adhesive paper.
- 3.2.2. Clean the sanded area with Betaclean 3350. Apply a small amount of Betawipe VP 04604 activator using a clean flannel cloth. Wipe off the excess activator with clean dry flannel. Pay attention not to leave too much activator on the surface. Wait for 30 seconds to 5 minutes.
- 3.2.3. Apply a thin coat of Betaprime 5404 primer.
- 3.2.4. Dry the primer for 2+15 minutes.
- 3.2.5. Bond a wide (approx. 50 mm wide) adhesive tape to the edge of the cabin opening from the outside to protect the surfaces not to be bonded.
- 3.3. Bonding window pane:
- 3.3.1. Apply Betaseal 1407 on the cabin frame within a bonding area directly from the original package using the application nozzle (width of sealant flowing out from the application nozzle approx. 1 cm).
- Note:** Install window pane not later than 5 minutes since the sealant application.
- 3.3.2. Using two Ø3 retaining pins in the retaining holes, protect the window pane from moving around.
- 3.3.3. Fill with adhesive and blend the gaps created while bonding. Filling the surface and removing possible adhesive flash must be done immediately after assembling and immobilizing the parts to be bonded.
- 3.3.4. Remove masking tape.
- 3.3.5. Press the window panes against cabin structure with four rubber cords. Ensure evenly distributed and full pressure of the window against the cabin structure by installing locally thin pads made of soft material under the rubber cords.
- 3.3.6. Leave the window undisturbed for minimum 10 hours. After curing remove pressure pads, rubber cords and retaining pins. Fill the Ø3.2 tooling holes with adhesive and blend the adhesive surface with the pane profile.
- Note:** The helicopter storage/handling is prohibited during that time.

Figure 5 - Upward vision window replacement procedure.

Actions and Technical Requirements (T.R.)
<p>3.3.7. Remove excess adhesive.</p> <p><b>Note:</b> The adhesive achieves its full strength after approx. 7 days. This is then when the windshield can be exposed to high stress generated by the helicopter engine run or rapid fuselage shocks.</p>

Figure 6 - Upward vision window replacement procedure.

In this procedure, several references were observed regarding the fulfillment of times and distances.

The sealant provided for the upward vision window replacement was the Betaseal 1407 (Figure 7).

Testers	Tools	Materials
Ruler, MLTb-630mm	Knife	Downward vision window, P/N 60.01.600.06.15
Slide caliper, Maub-140	Hand-held milling machine	Downward vision window, P/N 60.01.600.06.25
Balance, (accurate to within 1g)	Retaining pin, Ø3 mm	Fwd door lower window, P/N 60.01.600.24.10
	Drill gun	Fwd door lower window, P/N 60.01.600.24.20
	Drill, Ø3.2 mm	Blocks, PU foam, 5 x 10 mm
	Saw, D-144T	Primer, Betaprime 5404
	Sawing disc, 32732	Cleaning agent, Betaclean 3350
	Marker	Activator, Betawipe VP 04604
	Rubber cords	Adhesive, Multibond 24
		Primer, Betaprime 5001 or Betaprime 5500
		<u>Sealant, Betaseal 1407</u>
		Adhesive tape, 25 mm and 50 mm wide
		Flannel
		Sand paper, No. 80, 180, 240, 400, 800
		Extraction naphtha
		Flannel, cotton, white
		Brush

Figure 7 - Sealant provided for the upward vision window replacement. (Betaseal 1407)

In addition to the Betaseal 1407 adhesive, in the aircraft manufacturer's maintenance manual, it was prevised the use of the Betaclean 3350 cleaner, the Betawipe VP 04604 activator and the Betaprime 5404 primer.

However, a tax invoice was provided, proving traceability only of the substitute adhesive (Essex U-438 RF) and the Betaprime 5404 primer.

According to the shop, the adhesive provided in the manual and the substitute were produced by the same manufacturer produced. The replacement of Betaseal 1407 by the Essex U-438 RF was motivated by the information from the manufacturer that the adhesives were equivalent and also due to the lack of Betaseal 1407 in the local market (traded in Eastern Europe).

The team that performed the window replacement did not do a body of proof to check if the adhesive cure was successful.

No records were found that the procedures described in the maintenance manual, such as distances, fixations and times between the applications of the products, were followed in full.

### 1.20 Useful or effective investigation techniques.

Nil.

## 2. ANALYSIS.

The weather was favorable for the flight in visual conditions and did not contribute to the serious incident.

The aircraft was within the weight limit, as well as obeying the predicted center of gravity (CG) limits.

The flight occurred within the normal operating conditions of the aircraft, and the operating limits were not exceeded.

The upper right window had been replaced on the last inspection of the aircraft following the procedure described in the maintenance manual, except for the replacement of the adhesive element, using the Essex U-438RF instead of the Betaseal 1407.

This replacement was motivated by the lack of Betaseal 1407 in the local market and, believing that the sealants would be equivalent.

A laboratory analysis indicated a difference in the composition of Betaseal 1407 and Essex U-438RF sealants. As the adhesives were analyzed separately, it was not possible to determine if the adhesive properties of the substitute product were compromised when in interaction with the other elements of the system (clear panel, fuselage surface material, cleaner, primer and activator).

The unavailability of similar material to that one used in the helicopter structure was the main impediment to conducting tests involving the components of the system described above.

The procedures described in the maintenance manual were thorough, provided for the use of various products, established the distance between the transparent panel and the edge of the recess at the top of the fuselage, as well as the times to be achieved between the cleaner applications, primer, activator and adhesive.

This way there is the possibility that the detachment of the upper right window would be associated with the use of a sealant not prevised in the maintenance manual of the aircraft manufacturer, together with a possible non-compliance with the exchange of the upper right window procedure.

### **3. CONCLUSIONS.**

#### **3.1 Facts.**

- a) the pilot had valid Aeronautical Medical Certificate (CMA);
- b) the pilot had valid HMNT Rating;
- c) the pilot was qualified and had experience in that kind of flight;
- d) the aircraft had valid Airworthiness Certificate (CA);
- e) the aircraft was within the weight and balance parameters specified by the manufacturer;
- f) the airframe and engine logbook records were outdated;
- g) during the local flight, the upward vision window right detached from the aircraft;
- h) the sealant used in the fixation of the upward vision window right was not provided in the aircraft maintenance manual;
- i) the sealant used did not have the same composition as the prevised sealant;
- j) the aircraft had minor damage; and
- k) the pilot and the passengers left unharmed.

#### **3.2 Contributing factors.**

- **Aircraft maintenance – undetermined.**

The use of a sealant not prevised in the aircraft manufacturer's maintenance manual, together with the non-compliance with all parameters established in the manual for the upward vision window exchange procedure, may be associated with its detachment in flight.

#### 4. SAFETY RECOMMENDATION.

*A proposal of an accident investigation authority based on information derived from an investigation, made with the intention of preventing accidents or incidents and which in no case has the purpose of creating a presumption of blame or liability for an accident or incident. In addition to safety recommendations arising from accident and incident investigations, safety recommendations may result from diverse sources, including safety studies.*

*In consonance with the Law n°7565/1986, recommendations are made solely for the benefit of the air activity operational safety, and shall be treated as established in the NSCA 3-13 “Protocols for the Investigation of Civil Aviation Aeronautical Occurrences conducted by the Brazilian State”.*

**Recommendations issued at the publication of this report:**

**To the Brazil’s National Civil Aviation Agency (ANAC):**

**IG-145/CENIPA/2016 - 01**

**Issued on 01/29/2019**

Act with the Agusta Westland do Brasil Ltd. shop (COM N ° 0001-02 / ANAC), in order to demonstrate that it possesses and applies all the necessary resources for the adequate provision of maintenance services on PZL-SW4 aircraft manufactured by PZL-SWIDNIK, as recommended by regulations, the manufacturer's technical manuals, and the company's Capabilities List, which accompanies the Maintenance Organization Certificate.

#### 5. CORRECTIVE OR PREVENTATIVE ACTION ALREADY TAKEN.

None.

On January 29<sup>th</sup>, 2019.