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NATIONAL TRANSPORTATION SAFETY COMMITTEE

Aircraft Serious Incident Investigation Report

PT. Trigana Air Service
DHC 6-300; PK-YRF
Apalapsili Aerodrome, Papua
Republic of Indonesia
5 February 2013



NATIONAL TRANSPORTATION SAFETY COMMITTEE
REPUBLIC OF INDONESIA
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ABBREVIATIONS AND DEFINITIONS

ALA	:	Aerodrome for Light Aircraft
AOM	:	Aircraft Operation Manual
ATS	:	Air Traffic Service
°C	:	Degrees Celsius
CASR	:	Civil Aviation Safety Regulation
CPL	:	Commercial Pilot License
CRM	:	Cockpit Recourses Management
CSN	:	Cycles Since New
CVR	:	Cockpit Voice Recorder
DGCA	:	Directorate General Civil Aviation
DHC	:	De Havilland Company
ICAO	:	International Civil Aviation Organization
Km	:	Kilometer(s)
KNKT / NTSC	:	<i>Komite Nasional Keselamatan Transportasi /</i> National Transportation Safety Committee
LOSA	:	Line Operation Safety Audit
NM	:	Nautical mile(s)
PIC	:	Pilot in Command
QFE	:	Height above airport elevation (or runway threshold elevation) based on local station pressure
QNH	:	Altitude above mean sea level based on local station pressure
SIC	:	Second in Command
TT / TD	:	Ambient Temperature / Dew Point
UTC	:	Universal Time Coordinate
VFR	:	Visual Flight Rules
VHF	:	Very High Frequency
VREF	:	Reference Speed
VOR	:	Very High Frequency Omnidirectional Range
WIT	:	<i>Waktu Indonesia Timur /</i> Eastern Indonesian Standard Time

INTRODUCTION

SYNOPSIS

On 5 February 2013, a De Havilland DHC 6-300 (Twin Otter) aircraft, registration PK-YRF was being operated under Visual Flight Rules (VFR) by PT. Trigana Air Service as charter cargo flight from Sentani International Airport (DJJ/WAJJ), Jayapura, Papua to Apalapsili aerodrome (AAS), Papua.

The PIC has not been flown to Apalapsili for 2 years. Prior to the flight, the PIC collected information of the aerodrome and departed after received weather information that the weather over Apalapsili aerodrome was clear.

The aircraft departed from Sentani at 0010 UTC and climbed to 8,000 feet on radial 220 JPA VOR. The persons on board were two pilots and one engineer, the Pilot in Command (PIC) acted as Pilot Flying and the Second in Command (SIC) acted as Pilot Monitoring.

At about 25 Nm from Apalapsili aerodrome, the aircraft started descent to 6,000 feet until approaching overhead, the pilots planned to land using runway 15, with intention to observe the runway conditions. Thereafter the aircraft descent to 4,500 feet flew overhead, and then join left downwind runway 15.

The pilot decided to land with normal approach, the VREF speed (Reference Speed/ target threshold speed for landing) was 70 knots.

At 0058 UTC, the aircraft touched down on runway 15, during landing roll the aircraft skid. The pilot pushed the right rudder pedal, brake, and engaged the right engine reverse followed by nose wheel steering to the right in order to recover the aircraft to the centre of runway.

The aircraft stopped on the left of runway 15 about 500 meters from the beginning of runway 15, the nose wheel and Left main wheels trapped on the drainage line.

The marks on the runway found that the aircraft touched down on not align with the runway bearing the centre of the runway. The marks indicated that the aircraft constantly moved to the left as indicated by straight lines and did not parallel with the runway bearing.

The marks also showed that the mark of the nose wheel was closer to the right wheel compare to the left on the last part of the aircraft movement. This indicated that the aircraft was faced to the right (skid) while the movement was constant.

The PIC action to recover the situation by applying thrust reverser, brake and nose wheel steering were differed to the technique and statement in the AOM and worsening the condition.

Prior to issuing this final report, the NTSC has been informed several safety actions taken by PT. Trigana Air Services as mention on the chapter 4 (four) on this report.

According to factual information, findings and the contributing factors, the National Transportation Safety Committee issued several safety recommendations to PT Trigana Air Service and The Directorate General of Civil Aviation in this report as mention on the chapter 5 (five) on this report.

1 FACTUAL INFORMATION

On 5 February 2013, a De Havilland DHC 6-300 (Twin Otter) aircraft, registration PK-YRF was being operated under Visual Flight Rules (VFR) by PT. Trigana Air Service as charter cargo flight from Sentani International Airport (DJJ/WAJJ), Jayapura, Papua to Apalapsili aerodrome (AAS), Papua¹.

Prior to the flight, the PIC collected information of the aerodrome. The pilot decided to depart after received weather information from other pilots who flew from Sentani to Wamena via Apalapsili aerodrome area, and informed that the weather over Apalapsili aerodrome was clear.

The aircraft departed from Sentani at 0010 UTC² and climbed to 8,000 feet on radial 220 JPA VOR³. The persons onboard were two pilots and one engineer, the Pilot in Command (PIC) acted as Pilot Flying and the Second in Command (SIC) acted as Pilot Monitoring.

At about 25 Nm from Apalapsili aerodrome, the aircraft started descent to 6,000 feet until approaching overhead, the pilots planned to land using runway 15, with intention to observe the runway conditions. Thereafter the aircraft descent to 4,500 feet flew overhead, and then join left downwind runway 15.

The pilot decided to land with normal approach, the VREF speed (Reference Speed/target threshold speed for landing) was 70 knots.

Approximately at 0058 UTC, the aircraft touched down on runway 15, during landing roll the aircraft skid to the left. The pilot pushed the right rudder pedal, brake, and engaged the right engine reverse followed by nose wheel steering to the right in order to recover the aircraft to the centre of runway.

The aircraft stopped on the left of runway 15 about 500 meters from the beginning of runway 15, the nose wheel and Left main wheels trapped on the drainage line.

The crews evacuated from the aircraft via cargo door, the left and right cockpit doors could not be open as a result of the impact.

No one injured on this occurrence, the aircraft suffered substantial damage. There was no other damage to property and/or the environment.

The runway surface of Apalapsili was clay and sandy base; grass surface; smooth; generally hard; can be very soft and rutted during rainy season; slippery surface after rain on the previous night. There was no ground-based navigation aids on Apalapsili aerodrome.

1 Apalapsili aerodrome, Papua will be named as Apalapsili for the purpose of this report.

2 The 24-hours clock in Universal Time Coordinated (UTC) is used in this report to describe the local time as specific events occurred. Local time is UTC+9 hours.

3 JPA is the name of VHF Omni directional Range (VOR) which used in Sentani International Airport.

Apalapsili Aerodrome did not have ground to air radio communication and navigation facilities. The aircraft operator did not have ground support personnel on the Apalapsili aerodrome.

No medical or pathological examinations were conducted as a result of this occurrence, nor were they required.

1.1 Personnel Information

1.1.1 Pilot in Command

Gender	: Male
Age	: 52 years old
Nationality	: Indonesian
Marital status	: Married
Date of joining company	: 11 October 1995
License	: ATPL
Date of issued	: 9 June 2009
Validity	: 31 July 2013
Aircraft type rating	: DHC 6
Instrument rating validity	: 31 January 2014
Medical certificate	: First class
Last of medical	: 19 September 2012
Validity	: 19 March 2013
Medical limitation	: Holder shall wear lenses that correct for distant vision and posses glasses that correct for near vision
Last line check	: 19 December 2012
Last proficiency check	: 19 December 2012
Flying experience	
Total hours	: 6,666 hours 32 minutes
Total on type	: 5,748 hours 37 minutes
Last 90 days	: 212 hours 57 minutes
Last 60 days	: 132 hours 13 minutes
Last 24 hours	: 6 hours 28 minutes
This flight	: 55 minutes

1.1.2 Second in Command

Gender	: Male
Age	: 30 years old
Nationality	: Indonesian
Marital status	: Married
Date of joining company	: 1 July 2006
License	: CPL
Date of issue	: 3 May 2006
Validity	: 28 February 2013
Aircraft type rating	: DHC 6
Instrument rating validity	: 30 September 2012
Medical certificate	: First class
Last of medical	: 15 October 2012
Validity	: 15 April 2013
Medical limitation	: NIL
Last line check	: 5 March 2012
Last proficiency check	: 1 February 2012
Flying experience	
Total hours	: 2,876 hours 11 minutes
Total on type	: 436 hours 47 minutes
Last 90 days	: 120 hours 43 minutes
Last 60 days	: 45 hours 53 minutes
Last 24 hours	: 6 hours 28 minutes
This flight	: 55 minutes

The aircraft was properly certified, equipped, and maintained in accordance with existing Indonesia regulations.



Figure 1. Wheel marks found on the runway



Figure 2. The last aircraft position



Figure 3. The marks of the landing roll

The marks on the runway found that the aircraft touched down on the centre of the runway. The marks indicated that the aircraft constantly moved to the left as indicated by straight lines and did not align with the runway bearing (see figure 3).

The marks also indicated that the pilot tried to recover the situation by operated the nose wheel steering. The nose wheel deflected to the right, however the aircraft direction maintained toward the final position. The marks showed that the mark of the nose wheel was closer to the right wheel compare to the left on the last part of the aircraft movement. This indicated that the aircraft was faced to the right (skid) while the movement was constant.

The aircraft out of the runway at approximately 400 meters from the beginning runway crossed the runway shoulder and stopped on the left side at approximately 500 meters from the beginning of the runway. The nose section and left main landing gear trapped on the drainage line.

The significant excerpts taken from the CVR transcript between PIC and SIC from approximate 1,000 feet prior to land runway 15 were as follows:

At 00:55:05 UTC	SIC called 4,000 feet
At 00:56:06 UTC	Follow the speed
At 00:56:59 UTC	SIC called before landing
At 00:57:01 UTC	PIC requested flap 20, Prop and Brake and full flap.
At 00:57:23 UTC	PIC decided to land and SIC reminded PIC to fly center line.
At 00:57:49 UTC	SIC called 3,000 feet.

At 00:57:54 UTC	Expected aircraft touch down (2,900 feet aerodrome elevation) and the SIC confirming the aircraft landed on the middleof runway.
At 00:57:56 UTC	SIC reminded PIC to steer the aircraft to the center of the runway.
At 00:58:12 UTC	PIC informed SIC that the aircraft nose was slightly turned
At 00:58:41 UTC	Sound of aircraft impact.
At 00:01:09: UTC	Other pilot who was fying around the aerodrome was asking, who was seated on the left.
At 00:01:19 UTC	PIC asked, I was seated on the left, because I had been long time not fly to Apalapsili.

2 ANALYSIS

The analysis part of this report will discuss the relevant issues resulting in the aircraft veered off the runway on 05 February 2013 at Apalapsili aerodrome. The investigation determined that there were no issues with the aircraft. The analysis therefore will discuss on the issue of aerodrome and route qualification, alignment with the runway and recovery technique.

2.1 Aerodrome and Route Qualification

The runway surface of Apalapsili was clay and sandy base; grass surface; smooth; generally hard; can be very soft and rutted during rainy season; slippery surface after rain on the previous night. The PIC last flight to Apalapsili was two years prior to this flight. The PIC might not aware to current information of Apalapsili aerodrome.

2.2 Alignment with the runway

During final approach, the PIC had perceive that the aircraft was centre to the middle runway, while the SIC had perceive that the aircraft was slightly on the left of centre of the runway, and reminded the PIC. This different perception was an unresolved discrepancy which occurred on final.

The PIC aimed to touch down on the dry gravel surface area on the runway. The marks on the runway found that the aircraft touched down on the centre of the runway, however the marks indicated that the aircraft constantly moved to the left and did not align with the runway bearing (see figure 3). This indicated that the aircraft did not align to the runway bearing since touchdown as result of misalign with the runway on final, as stated by the SIC. This conclusion was supported by CVR transcription.

The marks also indicated that the pilot tried to recover the situation by operated the nose wheel steering. The nose wheel deflected to the right, however the aircraft direction maintained toward the final position. The marks showed that the mark of the nose wheel was closer to the right wheel compare to the left. This indicated that the aircraft moved to the left (constantly) with the aircraft faced to the right. The aircraft was skid.

The aircraft out of the runway at approximately 400 meters from the beginning runway, crossed the runway shoulder and stopped on the left side at approximately 500 meters from the beginning of the runway. The nose section and left main landing gear trapped on the drainage line.

2.3 Recovery technique (cornering technique)

The aircraft experienced skid on the slippery runway. The technique to counter this condition is states as follows:

As the aircraft starts to skid, the reverse thrust side force component adds to the skid inertia and will drift the aircraft to the side of the runway. High braking force reduces the capability of the tires to corner.

To correct back to centre line, release the brakes and reduce the reverse thrust. Release the brake increases the tire cornering capability and contributes to maintaining or regaining the directional control. Reducing the reverse thrust will

reduces the reverse side force component. Use rudder pedal and/or differential braking as required to regain the centre line. Avoid over correction not to pass the runway centre line. When the directional control is regained and the aircraft is correcting toward the runway centerline, apply maximum braking and symmetrical reverse thrust to stop the aircraft. This technique will increase the required landing distance.

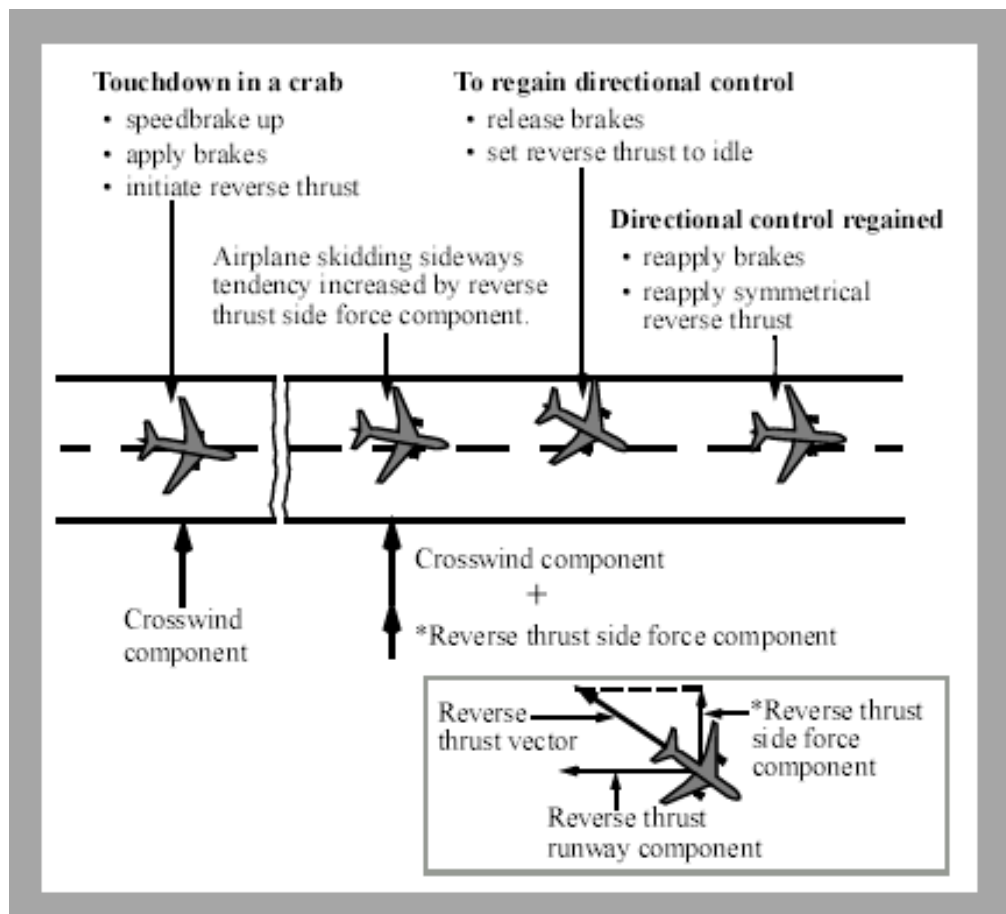


Figure 4: Recovery technique for landing on slippery runway

The DHC 6 Aircraft Operation Manual (AOM) stated:

If the aircraft weathervanes into the wind and drifted away from centre line, recover by cancelling reverse, release brakes, regain and keep centre line with use of rudder, nose wheel and differential reverse as necessary.

The PIC action to recover the situation by applying thrust reverser, brake and nose wheel steering were differed to the technique and statement in the AOM and worsening the condition.

3

CONCLUSION

3.1 Findings

1. Both pilots held valid license and medical certificate.
2. The aircraft was certified, equipped, and maintained in accordance with the current Indonesia regulations, there was no discrepancy on the aircraft system recorded and reported.
3. The day of the occurrence, the weather was clear.
4. The PIC did not fly to Apalapsili Aerodrome for two years, and collected the aerodrome information prior to conduct the flight.
5. The PIC and the SIC had different perception related to the aircraft position toward centre of the runway during the final approach.
6. The SIC reminded the PIC that the aircraft position was slightly left side of the centre of runway.
7. After touched down the aircraft constantly moved to the left of the runway.
8. The PIC action to recover the condition was differed to the common technique and AOM.

3.2 Contributing Factors⁴

- The PIC has not flown to Apalapsili Aerodrome for more than 2 years.
- The aircraft did not align to the runway bearing since touchdown as result of misalign with the runway on final.
- The PIC action to recover the situation by applying thrust reverser, brake and nose wheel steering were differed to the technique and statement in the AOM.

⁴ “Contributing factors” is an event or condition that, if it occurred in the future, would increase the likelihood of an occurrence and/ or severity of the adverse consequences associated with an occurrence.

4 SAFETY ACTION

At the time of issuing this final investigation report, the National Transportation Safety Committee had been informed of safety actions resulting from this occurrence.

4.1 PT. Trigana Air Service

Following this accident, The Safety Department of PT. Trigana Air Services had performed internal investigation and issued Safety Notice on 11 February 2013, as follows:

- a) PT. Trigana Air Services temporary stop the operation to Apalapsili Aerodrome until risk assessment to this aerodrome has been performed.
- b) Jayapura flight operation shall perform active flight following by VHF or HF radio until the end of the operation.
- c) Jayapura flight operation shall provide update information of all airport or airstrip operates and its surrounding contain of runway condition, weather on the day and the day before the operation, security and community activity.
- d) Board of DHC 6 Instructors shall review the check list on Emergency on Ground and Emergency Evacuation Procedure.

Following the Safety Notice, the Chief Pilot issued a pilot instruction especially on the Papua's Aerodrome with the effective date 15 February 2013, the instruction detailed as follows;

- a) Improved the accuracy of the weather data collection and the runway condition related to the flight operation.
- b) No landing operation on the wet/slippery grass runway.
- c) Review the hydro planning effect on the take-off and landing operation.
- d) No landing operation on the new runway or the runway which was not used for long time unless the proving flight has been performed.

5 SAFETY RECOMMENDATIONS

As a result of this investigation, the National Transportation Safety Committee issued safety recommendations to address safety issues identified in this report.

5.1 Directorate General of Civil Aviation

To provide all relevant safety information such as the runway will may become slippery after raining on the previous day to be included in the Aerodrome for Light Aircraft (ALA). Up to date the ALA has not issued yet by the DGCA.

5.2 PT. Trigana Air Service

In addition to the safety actions taken by PT. Trigana Air Services, the NTSC issue safety recommendations to address safety issues identified in this report:

- To develop a system or procedure to ensure a safe operation to aerodrome or airport that has not been flown for more than 12 months as it has not been included in the Company Operation Manual for VFR flight.
- During the final approach, there was unresolved discrepancy between the pilots. It is require to ensuring pilot compliance to the good CRM as such during the Line Operation Safety Audit (LOSA), line check and proficiency check.
- The PIC action to recover the situation was differed to the technique and statement in the AOM. The cornering technique shall be well briefed to ensure the understanding to all pilots.