KOMITE NASIONAL KESELAMATAN TRANSPORTASI
REPUBLIC OF INDONESIA

FINAL

KNKT.15.08.16.04

Aircraft Accident Investigation Report

PT. Komala Indonesia

PAC-750XL; PK-KIG

Ninia Airstrip, Yakuhimo, Papua

Republic of Indonesia

12 August 2015

2016

This Final report was produced by the Komite Nasional Keselamatan Transportasi (KNKT), Transportation Building, 3rd Floor, Jalan Medan Merdeka Timur No. 5 Jakarta 10110, Indonesia.

The report is based upon the investigation carried out by the KNKT in accordance with Annex 13 to the Convention on International Civil Aviation Organization, the Indonesian Aviation Act (UU No. 1/2009) and Government Regulation (PP No. 62/2013).

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ABBREVIATIONS AND DEFINITIONS

ACL	:	Authorization Condition and Limitation
ALA	:	Aerodrome Directory for Light Aircraft
ALAR	:	Approach and Landing Accident Reduction
AMA	:	Associated Mission Aviation
AOC	:	Aircraft Operator Certificate
ASI	:	Airspeed Indicator
CASR	:	Civil Aviation Safety Regulation
CFIT	:	Controlled Flight into Terrain
CMM	:	Company Maintenance Manual
COM	:	Company Operating Manual
CPL	:	Cockpit Pilot License
DGCA	:	Directorate General of Civil Aviation
FAA	:	Federal Aviation Administration
ft	:	Feet
HIRA	:	Hazard Identification and Risk Assessment
ICAO	:	International Civil Aviation Organization
KNKT	:	Komite Nasional Keselamatan Transportasi (National Transportation Safety Committee)
lbs	:	Pounds
LOFT	:	Line Oriented Flight Training
m	:	Meter
MEL	:	Minimum Equipment List
OTM	:	Operator Training Manual
psi	:	Pounds per square inch
RBMU	:	Regions Beyond Missionary Union
RVSM	:	Reduce Vertical Separation Minimum
SOP	:	Standard Operating Manual
UTC	:	Universal Time Coordinated
VFR	:	Visual Flight Rules

INTRODUCTION

SYNOPSIS

On 12 August 2015, a PAC-750XL aircraft, registered PK-KIG, was being operated by PT. Komala Indonesia on an unscheduled passenger flight from Wamena Airport (WAJW) Papua to Ninia airstrip, Yahukimo, Papua that was located on radial 127° from Wamena with distance approximately 26 Nm. On board the aircraft were one pilot, one engineer and 4 passengers.

Video footage made by a passenger captured the cockpit situation and surrounding area during the final approach. The video also recorded that during approach, at an altitude of approximately 6,500 feet, the airspeed indicators indicated zero and the aural stall warning activated. The aircraft then flew to the left side and parallel to the runway. Thereafter it climbed, turned left and impacted the ground about 200 meters south-west of the runway.

The engineer on board was fatally injured, one passenger has minor injuries and the other occupants, including the pilot, were seriously injured.

The investigation determined the contributing factors to this accident were:

- Continuing the flight with both airspeed indicators unserviceable increased the complexity of the flight combined with high-risk aerodrome increased the pilot workload.
- The improper corrective action at the time of the aural stall warning activating on the final approach, and the aircraft flew to insufficient area for a safe maneuver.
- The unfamiliarity to the airstrip resulted in inappropriate subsequent escape maneuver and resulted in the aircraft stalling.
- The pilot was not provided with appropriate training and familiarization to fly into a high-risk airstrip.

Until the issuance of this final report, the Komite Nasional Keselamatan Transportasi (KNKT) had not been informed any safety action resulting from this accident.

KNKT issued recommendations to PT. Komala Indonesia and Directorate General of Civil Aviation to address the safety issues identified during the investigation.

1 FACTUAL INFORMATION

1.1 History of the Flight

On 12 August 2015, a PAC-750XL aircraft, registered PK-KIG, was being operated by PT. Komala Indonesia on an unscheduled passenger flight from Wamena Airport (WAJW) Papua to Ninia Airstrip[1], Yahukimo, Papua that was located on radial 127° from Wamena with a distance of approximately 26 Nm.

At 0733 LT (2233 UTC[2]), the aircraft departed from Wamena Airport with an estimated time of arrival at Ninia of 2248 UTC. The flight was uneventful until approaching Ninia. On board the aircraft were one pilot, one engineer and 4 passengers.

According to the pilot statement, an airspeed indicator malfunction occurred during flight.

Video footage taken by a passenger showed that, during the approach at an altitude of approximately 6,500 feet, the airspeed indicators indicated zero and the aural stall warning activated. The aircraft then flew on the left side and parallel to the runway. Thereafter the aircraft climbed, turned left and impacted the ground about 200 meters south-west of the runway.

The engineer on board was fatally injured, one passenger had minor injuries and the other occupants, including the pilot, were seriously injured. Two occupants were evacuated to a hospital in Jayapura Airport and four others, including the fatally injured, were evacuated to a hospital in Wamena.

Figure 1: The archive photo of PK-KIG

1 Ninia Airstrip, Yahukimo, Papua will be named as Ninia for the purpose of this report

2 The 24-hour clock used in this report to describe the time of day as specific events occurred is in Coordinated Universal Time (UTC). The local time, Indonesian East Time Zone (WIT) was UTC + 9 hours.

1.2 Injuries to Persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	1	1	-
Serious	1	3	4	-
Minor/None	-	1	1	-
TOTAL	1	5	6	-

1.3 Damage to Aircraft

The aircraft was substantially damaged.

1.4 Other Damage

There was no other damage to property and/or the environment.

1.5 Pilot Information

Gender	:	Male
Age	:	37 years old
Nationality	:	Indonesia
Marital status	:	Married
Date of joining company	:	April 2014
License	:	Commercial Pilot License (CPL)
Date of issue	:	19 September 2012
Aircraft type rating	:	PAC 750XL
Instrument rating validity	:	3 July 2015
Medical certificate	:	First Class
Last of medical	:	3 August 2015
Validity	:	29 February 2016
Medical limitation	:	Holder shall wear corrective lenses
Last line check	:	3 July 2015
Last proficiency check	:	3 July 2015
Flying experience		
Total hours	:	1,537 hours 34 minutes
Total on type	:	395 hours 24 minutes
Last 90 days	:	18 hours 38 minutes
Last 60 days	:	18 hours 38 minutes
Last 24 hours	:	54 minutes

This flight : 20 minutes

The pilot had completed Mountainous Flying Training on 24 January 2014. The Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR) training had not been provided to the pilot prior to the accident.

The accident flight was the first flight for the pilot to Ninia.

1.6 Aircraft Information

1.6.1 General

Registration Mark	:	PK-KIG
Manufacturer	:	Pacific Aerospace
Country of Manufacturer	:	New Zealand
Type/Model	:	PAC-750XL
Serial Number	:	170
Year of Manufacture	:	1 October 2010
Certificate of Airworthiness		
Issued	:	16 June 2015
Validity	:	15 June 2016
Category	:	Normal
Limitations	:	None
Certificate of Registration		
Number	:	3681
Issued	:	16 June 2015
Validity	:	15 June 2016
Time Since New	:	757.60 hours
Cycles Since New	:	1,315 cycles
Last Major Check	:	30 June 2015
Last Minor Check	:	30 June 2015

1.6.2 Engines

Manufacturer	:	Pratt Whitney Canada
Type/Model	:	PT6A-34
Serial Number engine	:	PCE-RB0502
▪ Time Since New	:	757.60 hours
▪ Cycles Since New	:	1,315 cycles

1.6.3 Propellers

Manufacturer	:	Hartzell
Type/Model	:	HC-B3TN-3DY
Serial Number-1 propeller	:	BUA-32200
▪ Time Since New	:	42.40 hours
▪ Cycles Since New	:	N/A

1.6.4 Maintenance Records

The maintenance log showed that there was no abnormal report related to aircraft systems on July up to 12 Augustus 2016 at time 2200 UTC.

1.6.5 Weight and balance

Aircraft empty weight	:	3,929 lbs
Passenger and cargo weight	:	979 lbs
Estimated fuel on board	:	2,025 lbs (equal to 4 hours 30 minutes endurance)
Estimated takeoff weight	:	6,933 lbs
Estimated landing weight		6,813 lbs

1.7 Meteorological Information

According to witnesses the weather was clear and the wind was calm. The video footage from the aircraft showed that the weather was clear and met the requirement for Visual Flight Rules (VFR) flight.

Figure 2: The weather condition from the video footage and the aircraft position toward Ninia (red dash circle)

1.8 Aids to Navigation

Ninia was not equipped with any ground-based navigation aids. The aircraft on-board navigation aids were functioning properly and not related to this occurrence.

1.9 Communications

Ninia was not equipped with two-way radio communication and the communication was not related to this occurrence.

1.10 Aerodrome Information

1.10.1 Aerodrome Information Based on Aerodrome Directory for Light Aircraft

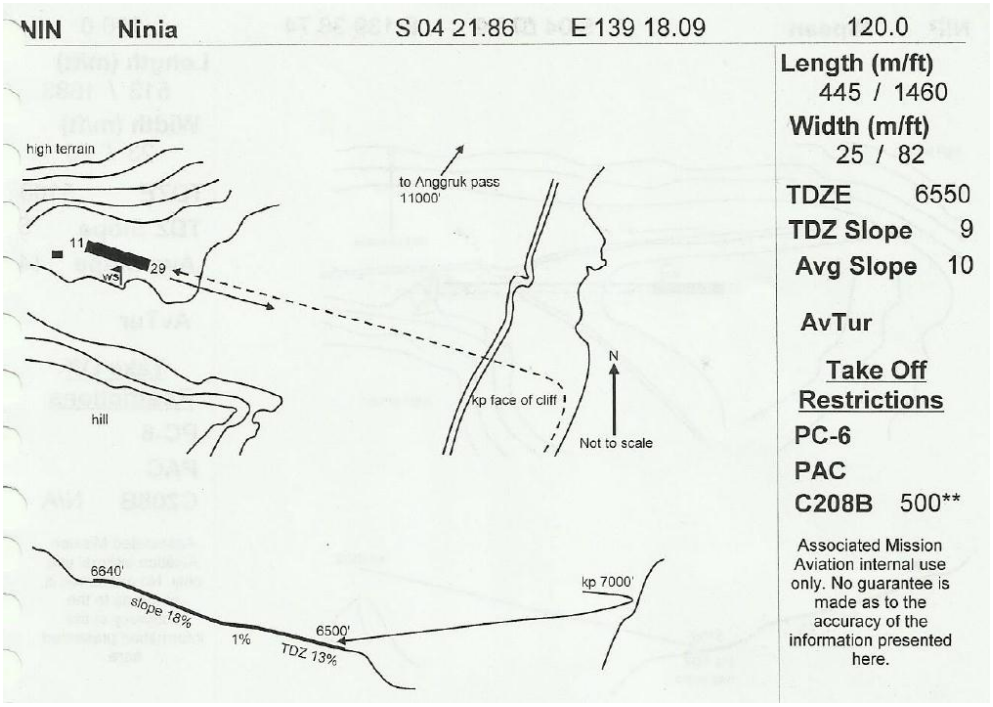
The Aerodrome Directory for Light Aircraft (ALA) published by the Directorate General of Civil Aviation (DGCA) contained information of aerodrome for light aircraft operation.

The aerodrome information of Ninia described on the ALA was as follows:

Airport Name	:	Ninia
Airport Operator	:	Regions Beyond Missionary Union (RBMU)
Coordinate	:	4°23’S 139°16’E
Elevation	:	3,648.47 feet
Runway Direction	:	12 – 30
Runway Length	:	440 meters
Runway Width	:	23 meters
Runway Slope	:	11%
Surface	:	Grass
Landing Facility	:	Windsock

1.10.2 Aerodrome Information Based on Associated Mission Aviation

The Associated Mission Aviation (AMA) issued guidance for pilot to fly to several aerodromes. This guidance was issued for internal use. The AMA guidance for flying to Ninia was as follows:



Surface:

Hard, clay and dirt grass. Smooth at lower end. Rough and eroded at steeper upper end. Clay on top gets slippery when wet.

Obstacles:

None.

Weather & Wind:

Normally good weather in the morning. Upvalley wind by midmorning causes strong down draft on short final. Do not land if you need to crab down valley approach.

Aborted Landing:

300m final, right turn out. Go straight into bank at top of airstrip.

Aborted Take Off:

Shortly after brake release. Swerve to the right; DO NOT go off end.

Hazards:

Land only if wind is calm. Watch for illusions.

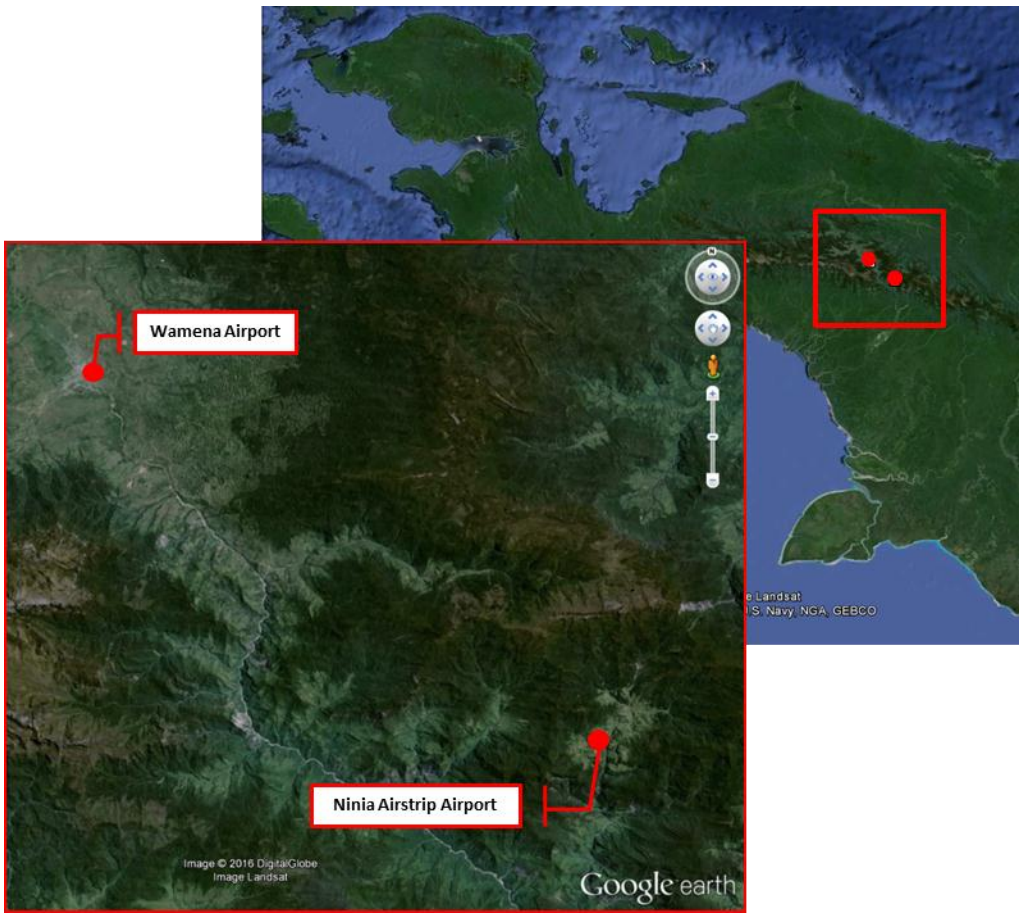


Figure 3: The airports location

1.11 Flight Recorders

The aircraft was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by current Indonesian aviation regulations.

1.12 Wreckage and Impact Information

The crash site of the aircraft was about 6,800 feet above mean sea level and 200 meters south-west of the runway, which having a slope angle of approximate 45°. The aircraft last position was on heading of approximately 120°.

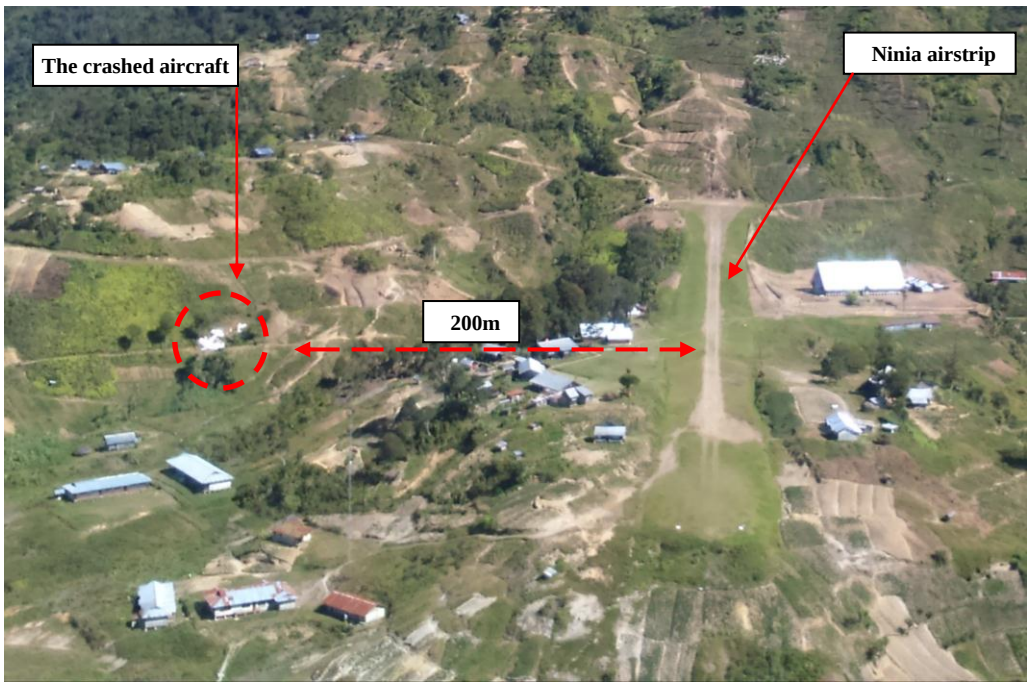


Figure 4: The accident site and Ninia Airstrip

The observation of the wreckage found:

- The outer right wing detached and was found behind the main wreckage;
- The flap was on position of approximately 20;
- Flap selector was on full up;
- Power lever and propeller lever were on full forward position;
- Fuel condition lever was on flight / high idle.

Figure 5: The main wreckage

Figure 6: The flap condition

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence.

1.14 Fire

There was no evidence of pre and post impact fire.

1.15 Survival Aspects

The local people who saw the aircraft accident immediately approached the site and found a person on the right front seat was fatally injured then assisted the other occupants. The pilot and the passengers were seriously injured.

Komala branch office at Wamena received information of the accident 11 minutes after, and made arrangements for the evacuation of passengers and crew. All occupants were evacuated using one aircraft and one helicopter to hospitals at Jayapura and Wamena.

1.16 Tests and Research

There was no test and research required in the investigation.

1.17 Organizational and Management Information

1.17.1 Aircraft Operator

Aircraft owner	:	Aviation Capital Limited
Address	:	Level 11, 191 Queen Street, Auckland 1010, New Zealand
Aircraft operator	:	PT. Komala Indonesia
Address	:	Graha Aries Niaga, Jalan Taman Aries Blok E1-1A, Jakarta Barat, Republic of Indonesia

PT. Komala Indonesia was approved under Air Operator Certificate (AOC) number 135-051 to conduct unscheduled passenger transport. The operator had operated 2 AS-350 B3 helicopters and 1 Bell 206 helicopter. The PAC-750XL aircraft was the first fixed-wing added to the operator fleet.

The PAC-750XL aircraft operation was based in Wamena and was planned to serve several airports in Papua.

Ninia had a slope gradient of 11%, required takeoff using runway 12 and landing using runway 30. There was no ground to air radio communication. Considered to the particular condition, the operator's management classified Ninia as an airstrip with high risk and required route familiarization for the pilot.

1.17.2 Pilot's Operating Handbook and Approved Flight Manual

The table below shows the variant of engine and propeller settings and limitations. The red box shows the parameters that are used as reference for the analysis.

SECTION 2 – LIMITATIONS

2.5 POWER PLANT LIMITATIONS

POWER SETTING	TORQUE psi	MAX. ITT °C	GAS GEN. RPM % Ng	PROP RPM % Np (RPM)	OIL PRESS psi	OIL TEMP. °C	SHAFT HORSE-POWER
Takeoff	64.5 (2)	790	101.6	91.2 (2006)	85-105	10-99	750 (31 °C)
Maximum Continuous	54	740	101.6	91.2 (2006)	85-105	10-99	633
Maximum Climb	54	740	101.6	91.2 (2006)	85-105	0-99	633
Maximum Cruise	64.5 (2) 54	790 740	101.6 101.6	91.2 (2006) 91.2 (2006)	85-105 85-105	0-99 0-99	750 633
Idle	-	685	52-54	-	40	-40-99	-
Maximum Reverse	64.5 (2)	790	101.6	86 (1892)	85-105	0-99	-
Transient	68.4 (5)	850 (3)	102.6 (3)	100 (2200)	85-105	0-99	-
Starting	-	1090 (3) (4)	-	-	-	-40	-

(1) All limits are based on sea level
(2) 5 minute time limit
(3) These values are limited to two (2) seconds
(4) Starting temperatures above 850°C should be investigated for cause
(5) Time limited to 20 seconds

2.6 POWER PLANT INSTRUMENT MARKINGS

INSTRUMENT	RED LIGHT	GREEN LIGHTS	YELLOW LIGHTS	RED LIGHTS
	MINIMUM LIMIT	NORMAL OPERATING	CAUTION RANGE	MAXIMUM LIMIT
Torque Indicator		10-53 psi	54-64.5 psi	>64.5 psi
Inter Temperature Indicator		1-789 °C		790 °C
Gas Generator % RPM Indicator		1-101.6%		>101.6%
Propeller RPM Indicator		1-91.2% (22-2006 RPM)		>91.2% (>2006 RPM)
Oil Temperature Indicator		15-99 °C	0-14 °C	>99 °C
Oil Pressure Indicator	25 psi	85-105 psi	26-84	>105 psi

NOTE

Refer to the digital display for accurate instrument readings. Analogue lights will display within 1% of digital reading.

SECTION 4 – NORMAL PROCEDURES

4.27 AMPLIFIED PROCEDURES

STALLS

The airplane stall characteristics are conventional. As speed approaches the stall speed the flying controls, while effective, are less responsive. In normal flight and loading conditions an audible stall warning horn will sound at least 5 knots prior to the stall.

SECTION 5 - PERFORMANCE

5.6 STALL SPEEDS

CONDITIONS

Power Lever: Idle

Fuel Condition Lever: Flight Idle

NOTE

Altitude loss during stall recovery may be as much as 300 ft from a wings level stall, or even greater from a turning stall.

Stall speeds shown are at most forward center of gravity

WEIGHT lbs	FLAP SETTING	ANGLE OF BANK							
		0°		30°		45°		60°	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
7,500	UP	69	71	74	76	82	84	99	100
	20°	61	63	67	68	74	75	89	89
	40°	58	59	62	63	70	70	83	83
7,125	40°	57	58						
5,500	40°	51	53						
4,000	40°	45	47						

5.10 CRUISE

Pressure Altitude: 5,000 ft

Prop rpm	Torque (psi)	(ISA -20°C)		Standard Temperature (ISA)		(ISA +20°C)	
		KTAS	LPH (pph)	KTAS	LPH (pph)	KTAS	LPH (pph)
91.2% Np	61*	166	252 (444)	-	-	-	-
2006 rpm	53	156	225 (397)	162	228 (402)	168	231 (408)
	50	152	212 (374)	158	215 (379)	164	219 (386)
	45	146	195 (344)	152	198 (349)	157	202 (356)
	40	138	178 (314)	143	181 (319)	148	185 (326)
	35	129	161 (284)	133	164 (289)	138	168 (296)
85% Np	63*	157	252 (444)	163	255 (449)	169	246 (433)
1870 rpm	50	145	200 (352)	151	204 (360)	156	207 (365)
	45	139	187 (330)	144	190 (335)	149	194 (342)
	40	132	170 (300)	137	174 (307)	141	177 (312)
	35	122	155 (273)	127	158 (279)	131	162 (286)
80%	64*	160	245 (432)	166	249 (439)	-	-
1760 rpm	53	156	236 (416)	162	240 (423)	168	244 (430)
	50	144	190 (335)	150	194 (342	155	198 (349)
	45	136	178 (314)	141	182 (321)	146	186 (328)
	40	131	166 (293)	136	170 (300)	140	174 (307)
	35	117	148 (261)	122	152 (268)	126	156 (275)

Figure 5-11, Cruise Table (Sheet 1 of 2)

SECTION 7 – DESCRIPTION OF THE AIRPLANE AND ITS SYSTEM

ANNUNICATOR PANEL

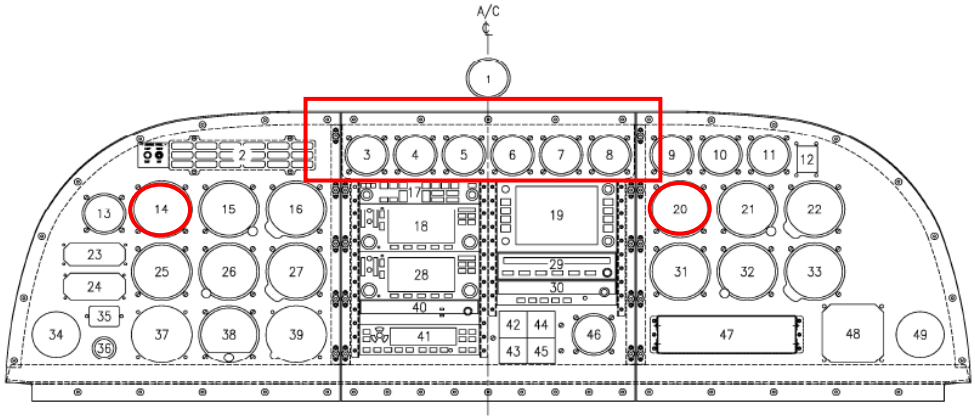
The annunciator panel is mounted in the instrument panel and provides an indication to the pilot of the status of various airplane systems. The illumination of a green light indicates a safe and normal condition. The illumination of a blue light indicates the operation of a piece of equipment not normally used for normal operations. The illumination of an amber light indicates a cautionary condition which may or may not require immediate corrective action. The illumination of a red light indicates a hazardous condition requiring immediate corrective action.

Refer to Section 3 Emergency Procedures for the actions in the event of the illumination of an annunciator panel light requiring corrective action.

The annunciator panel is fitted with day/night dimming capability and a press to test

facility. Selecting NIGHT will dim all lights apart from the red coloured lights.

7.4 INSTRUMENT PANEL



VIEW LOOKING FORWARD ON INSTRUMENT PANELS

KEY					
1	Compass	18	GPS VHF NAV/COMM	35	HSI Slaving Control
2	Annunciator Panel	19	Radar	36	Vacuum Indicator
3	Torque Indicator	20	Airspeed Indicator	37	Radio Magnetic Indicator
4	Np Indicator	21	Artificial Horizon	38	Artificial Horizon
5	ITT Indicator	22	Altimeter	39	Radar Altimeter
6	Ng Indicator	23	GPS Annunciator	40	Distance Measuring Equipment
7	Oil Temperature/Pressure Indicator	24	Auto Pilot Annunciator	41	Transponder
8	Fuel Pressure/Flow Indicator	25	Turn and Slip	42	Aileron Trim Indicator
9	Fuel Contents Indicator Front Tanks	26	Directional Gyro	43	Rudder Trim Indicator
10	Fuel Contents Indicator Rear Tanks	27	Vertical Speed Indicator	44	Elevator Trim Indicator
11	Outside Air Temperature Indicator	28	GPS VHF NAV/COMM	45	Flap Indicator
12	Emergency Locator Beacon Switch	29	Auto Pilot	46	Volt/Ammeter
13	Clock	30	Automatic Direction Finder	47	Stereo
14	Airspeed Indicator	31	Turn and Slip	48	Engine Condition Trend Monitoring
15	Artificial Horizon	32	Directional Gyro	49	Cabin Air Vent
16	Altimeter	33	Vertical Speed Indicator		
17	Audio Panel	34	Cabin Air Vent		

7.5 FLIGHT INSTRUMENTS

AIRSPEED INDICATOR

The airspeed indicator is calibrated in knots. The operating ranges are marked in green, white, yellow and red as detailed in Section 2 Limitations. The pitot static system provides pitot and static pressure to the airspeed indicator. The instrument is internally lit.

VERTICAL SPEED INDICATOR

The vertical speed indicator provides an indication of the rate of climb and rate of descent in feet per minute. The vertical speed indicator is supplied static pressure from the airplane pitot static system. The instrument is internally lit.

7.13 ENGINE

ENGINE INDICATING SYSTEMS AND INSTRUMENTS

TORQUE INDICATING SYSTEM

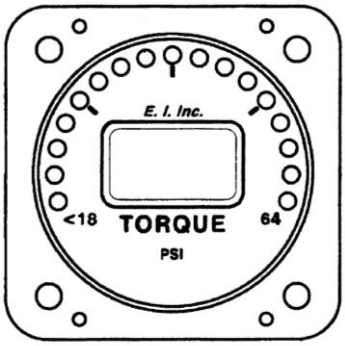


Figure 7-8, Torque Indicator

The engine torquemeter system comprises an indicator, a transmitter, torquemeter (engine), rigid pipes, flex hoses and a restrictor union.

Rigid pipes (routed along the engine) and flex hoses connect the transmitter to a restrictor union in the outlet port of the torquemeter which is located in the forward upper right hand face of the gearbox housing and a balance gearbox case fitting in the forward upper left face of the gearbox housing.

Torque reaction between gears in the power transmission train is applied to the torque meter, which transmits the force as pressure oil to the transmitter which sends an electrical signal to the indicator

The Electronics International electronic pressure indicator as shown in Figure 7-8 is mounted in the instrument panel. The dial of the indicator is graduated in pounds per square inch. The torque indicator comprises a digital and an analogue display. The analogue display comprises green lights signifying the normal operating range, yellow lights signifying that the torque is above the maximum continuous limit and a red light indicating that the torque has exceeded the maximum limit. The display may be dimmed using the airplane lighting controls; however, the red light will always be displayed at full intensity.

The analogue display lights provide a visual indication of the current operating torque and where this is in respect to the various ranges. The digital display provides torque indications in 1 psi increments.

CAUTION

The digital display should be used for precise torque indications.

7.21 STALL WARNING SYSTEM

The lift detector vane / switch, located in the right hand leading edge of the centre wing, operates the stall warning system to provide audible warning to the pilot of impending stall. The warning horn will sound approximately 5 -10 knots above stalling speed. The horn is located in the overhead panel adjacent to the pilot's seat. The system can be checked by turning on the airplane BATTERY MASTER switch and then lifting the vane on the wing and checking for an audible noise from the horn.

A voice alert is also transmitted through the pilot headset in airplane's fitted with the cockpit voice annunciator.

1.17.3 PAC 750 XL Maintenance Manual

Chapter 34 – Navigation

Pitot / Static Description & Operation (page 1)

1. General

The Pitot / Static pressure system supplies impact (Pitot) and atmospheric (Static) pressure air to various instruments. The two systems operate independently of each other and consist of nylon tubing connecting the

Pitot Head or Static Ports to the appropriate instruments. Moisture drains are provided in both systems.

2. Pitot System

A. Standard

The Pitot system employs a simple tube type Pitot Head attached to the outer face of the centre wing LH outboard nose rib, immediately forward of the main beam. Ram air is routed by tubing running from the head inboard to a moisture drain rear of STA 166.6, then forward to the horizontal bulkhead LH side and the Airspeed Indicator.

3. Static System

The Static system consists of a two heated Static Vents (or Ports) passing through the fuselage skin LH/RH sides immediately aft of ST 240.0 and connecting to 'Elbow' junctions in the fuselage which acts as attachments for the system tubing. The tubing is routed forward and parallel with the Pitot tubing up to the Airspeed Indicator.

The Static system is bridged between the Airspeed Indicator, Altimeter and VSI (if fitted) by nylon tubing.

Trouble Shooting - Pitot / Static Pressure System (page 101)

WARNING:	PROPER MAINTENANCE OF THE PITOT AND STATIC SYSTEMS IS ESSENTIAL FOR THE CORRECT OPERATION OF THE ALTIMETER, AIRSPEED AND VERTICAL SPEED INDICATORS. PITOT AND STATIC SYSTEMS MUST BE TESTED FOR LEAKS WHENEVER A CONNECTION IS DISTURBED OR WHENEVER THE SYSTEM IS SUSPECT.

TROUBLE	*PROBABLE CAUSE*	*REMEDY*
Airspeed indicator fails to indicate	*Pitot head blocked.* *Obstruction in Pitot line.* *Water in Static system.* *Pitot line kinked or disconnected.*	*Remove and inspect all lines and fittings. Remove obstruction or replace as required.* *Drain Static system.* *Check all Pitot lines and repair as required.*

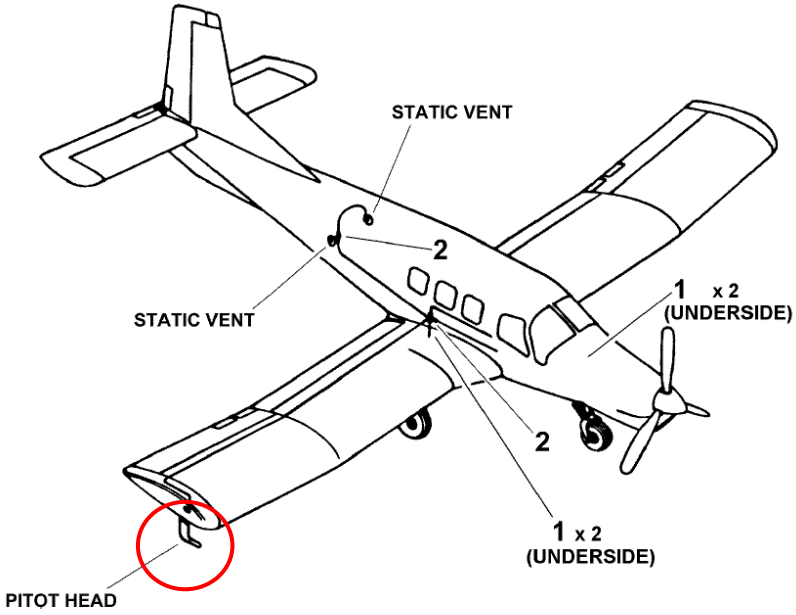


FIGURE 301 PITOT / STATIC SYSTEM

1.17.4 Operation Training Manual

According to the Operation Training Manual (OTM), the aircraft operator had several trainings for the flight crew as follows:

- Basic Indoctrination Training is initial introduction training for all crewmembers and dispatchers who are enrolled in an initial new-hire to the aircraft operator manner of conducting operations.
- Aircraft Ground Training is to provide flight crewmembers with the necessary knowledge for understanding the basic functions of aircraft systems, the use of the individual system components, the integration of aircraft systems, and pertinent operational procedures. The modules of the ground training consisted of the following subjects:
  - General Operational (flight operations manuals; crew resource management; adverse weather; flight planning / air traffic; performance; and weight and balance).
  - Aircraft Systems (airplane general description; electrical system; air conditioning; fuel system; power plant; ice and rain; emergency equipment; hydraulic systems; landing gear; flight controls; automatic flight system; communications; flight instruments; navigation systems).
  - System Integration Training (system operation; normal operating procedures; checklist usage; system abnormal procedures; emergency procedures / checklist).
- Line Oriented Flight Training (LOFT).
- Mountain Flying Training.

- Special Training is a training that is conducted to qualify crewmembers beyond the scope of basic training. The special training consisted of Windshear Training, Special Airport Qualification / Training, Hazardous Material Training for Flight Crew, Crew Resource Management, and Reduce Vertical Separation Minimum (RVSM).
- Emergency Training consisted of general emergency and emergency training specific to the aircraft.

On 19 to 21 August 2015, the DGCA conducted a special audit following the accident, and the findings related to the OTM was the contents of the OTM which did not include CFIT and ALAR, Basic Indoctrination, Dangerous Goods, Emergency Equipment and Procedures Training, and Proficiency Training as described on CASR part 135.403 (b).

1.17.5 Hazard Identification and Risk Assessment

As a result of this accident, the Directorate General of Civil Aviation (DGCA) conducted a special audit to the aircraft operator on 19 until 21 August 2015.

Followed the audit, the operator performed Hazard Identification and Risk Assessment (HIRA) associated to the documents of fixed-wing operation that were not in accordance to the DGCA standard and regulation. The documents were the Authorization Condition and Limitation (ACL), Company Maintenance Manual (CMM) and Company Operating Manual (COM). Several other documents had not been developed such as Standard Operating Procedures (SOP), Minimum Equipment List (MEL) and Checklists.

The aircraft operator decided to postpone the fixed-wing aircraft operation and focus on the rotary-wing operation.

1.17.6 Master Minimum Equipment List of PAC 750XL

According to Chapter 34 – 02, in the case of dual instrumented aircraft, the airspeed indicator may be inoperative on the co-pilot's side, providing for single pilot operations. No Check and Training operations shall be performed if there is only one operative airspeed indicator. This chapter categorized this situation as C, which allows operation with such a deviation for 10 days.

1.17.7 Civil Aviation Safety Regulation Part 135

135.403 Training Program

(a) Every certificate holder shall establish and maintain a ground and flight training program that is;

(1) designed to ensure that each person who receives training, acquires the competency to perform that persons assigned duties, and

(2) approved by the Director in accordance with Section 421 of this Subpart.

(b) A certificate holder's ground and flight training program shall, include the following individual components, as applicable to the certificate holder and each person receiving training. The syllabus for each training component shall, be in written form and include the assigned period of time allotted to the individual subject, during both initial and recurrent phase of training as designated below. Each syllabus published pursuant to this part shall be of

sufficient detail to clearly illustrate the depth of the material contained in each individual subject. Where specific training is required for different functional rank, such syllabus must make appropriate clarification as to the intended recipient.

No	Required Training Component	Initial	Recurrent
1	Company Indoctrination Training	Yes	No
2	Windshear Training,	Yes	Yes
3	Crew Resource Management Training,	Yes	Yes
4	Transportation of Dangerous Goods Training,	Yes	Yes
5	Emergency Equipment and Procedures Training,	Yes	Yes
6	Aircraft Surface Contamination Training,	Yes	Yes
7	Category II and Category III Operations Training,	Yes	Yes
8	Extended Twin-engine Range Operations Training, Aircraft	Yes	Yes
9	Technical Ground Training,	Yes	Yes
10	Aircraft Flight Training,	Yes	Yes
11	Differences Training,	Yes	Yes
12	Upgrade Training,	Yes	No
13	Line Indoctrination Training for Flight Crew Members	Yes	No
14	Recency of Experience Training	As req.	As req.
15	Flight Attendant Ground Training,	Yes	Yes
16	Flight Attendant Operational Training,	Yes	Yes
17	Flight Operations Officer Ground and Flight Training,	Yes	Yes
18	Aircraft Servicing and Ground Handling Training,	Yes	No

1.18 Additional Information

1.18.1 Stall Warning Calculation by Aircraft Manufacturer

As of the aircraft manufacture statement, at an estimate landing weight of 6,813 lbs, the stall speed is 112 KTAS at 6,500 feet, ISA temperature and the stall warning would sound at approximately 117 KTAS. From the Pilot's Operating handbook cruise table, at 5,000 feet ISA and torque setting of 35 psi, the airspeed should be 133 KTAS. A torque setting of at least 35 psi would have been more appropriate. With only 25 psi, a stall is imminent.

1.18.2 Video Footage

The investigation utilized a video recording made by a passenger that captured the cockpit situation and surrounding area during the final approach phase to Ninia. The recorder time started from 08:03:15 with the duration of 18 minutes and 5 seconds. The investigation assumed the time was Eastern Indonesia standard time or UTC+9, which was a local time of Ninia. The time used on this section was taken from the time of the recording device.

The flight events recorded were as the following figures and descriptions.

Figure 7: Indications of the instrument panel at 23:03:15 UTC

On the beginning of recording at 23:03:15 UTC showed: the torque indicator analog reading displayed a green light, the digital form displayed 25 psi, the altimeter displayed 6,500 feet.

Figure 8: The airspeed indicators indicated zero

The airspeed indicators were first clearly seen at 23:03:27 UTC for the pilot side and at 23:03:41 UTC for the right side. Both airspeed indicators showed zero at that time. The video did not record any change of airspeed indication up to the impact.

Figure 9: Indications of the instrument panel at 23:03:28 UTC

At 23:03:28 UTC, the video recorded: aural stall warning was recorded for 1 second, the torque indicator analog reading displayed a green light, digital form displayed 25 psi, and the altimeter indicated 6,500 feet.

Figure 10: The instrument panel indicators at 23:03:30 UTC

At 23:03:30 UTC, the video recorded: aural stall warning was heard for 2 seconds, the torque indicator analog reading displayed a green light, and digital form displayed 30 psi.

Figure 11: The instrument panel indicators at 23:03:35 UTC

At 23:03:35 UTC, the video recorded: the aural stall warning was heard for 2 seconds, the aircraft rolled to the left, the torque indicator analog reading displayed a green light.

Figure 12: The instrument panel indicators at 23:03:38 UTC

At 23:03:38 UTC, the video recorded: the aural stall warning was heard continuosly, the torque indicator analog reading displayed a green light, and digital form displayed 15 psi.

Figure 13: The instrument panel indicators at 23:04:04 UTC

At 23:04:04 UTC, the video recorded: the torque indicator analog reading displayed a yellow light, both air speed indicators at zero and the altimeter indicated 6,500 feet.

Figure 14: The instrument panel indicators at 23:04:07 UTC

At 23:04:07 UTC was the last time of the flight instrument panel indicator recorded, the torque analog indicator displayed yellow light.

Figure 15: The aircraft flew parallel runway 30 at 23:04:13 UTC

At 23:04:13 UTC, the aircraft flew on the left side parallel to the runway 30, thereafter climbed and rolled to the left.

At 23:04:23 UTC, loud noise was heard, most likely as a result of the aircraft impacting terrain.

The aircraft engine torque & altitude

The figure below shows the predicted engine torque (psi) and altitude (feet) for the last 52 seconds prior to impact.

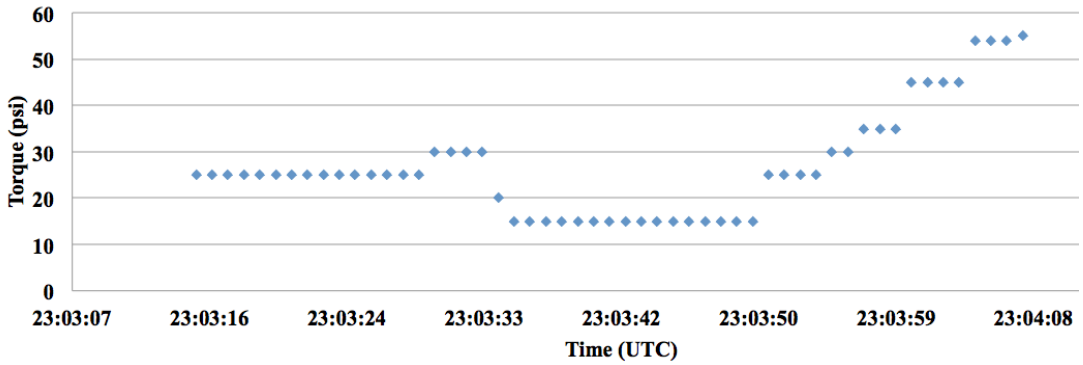


Figure 16: The predicted engine torque

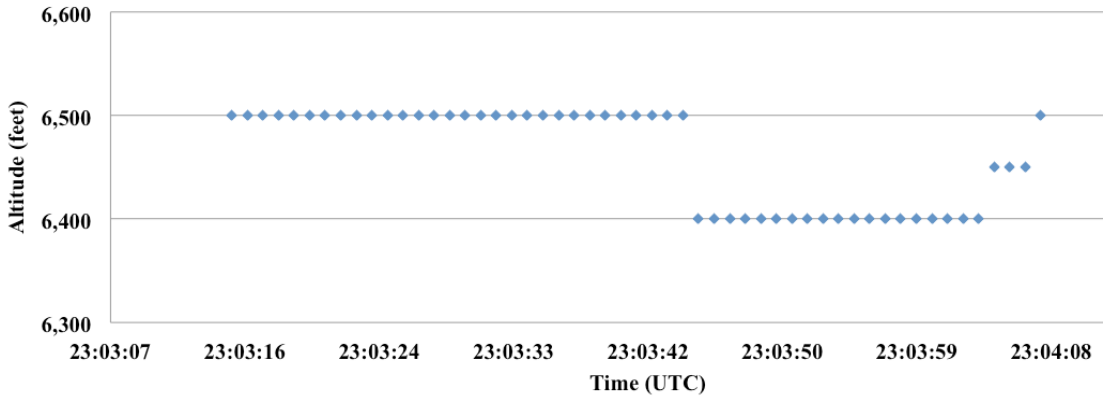


Figure 17: The predicted aircraft altitude

1.18.3 FAA Pilot's Handbook of Aeronautical Knowledge 2008

Chapter 7 Flight Instruments (page 7-10)

Blocked Pitot System

The pitot system can become blocked completely or only partially if the pitot tube drain hole remains open. If the pitot tube becomes blocked and its associated drain hole remains clear, ram air no longer is able to enter the pitot system. Air already in the system vents through the drain hole, and the remaining pressure drops to ambient (outside) air pressure.

Under these circumstances, the ASI reading decreases to zero, because the ASI senses no difference between ram and static air pressure. The ASI no longer operates since dynamic pressure can not enter the pitot tube opening. Static pressure is able to equalize on both sides since the pitot drain hole is still open. The apparent loss of airspeed is not usually instantaneous but happens very quickly.

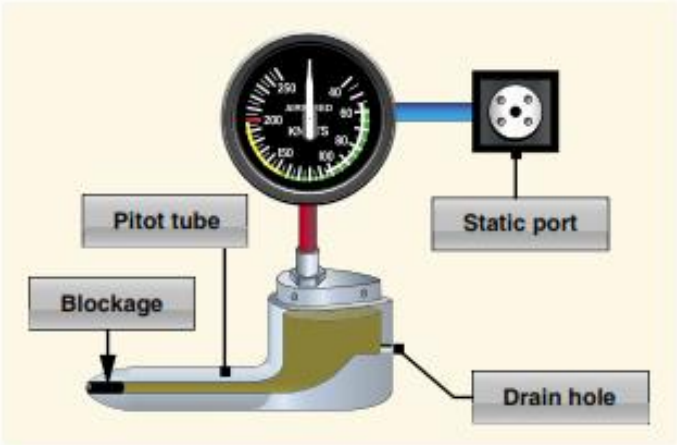


Figure 7-9. *A blocked pitot tube, but clear drain hole.*

If both the pitot tube opening and the drain hole should become clogged simultaneously, then the pressure in the pitot tube is trapped. No change is noted on the airspeed indication should the airspeed increase or decrease. If the static port is unblocked and the aircraft should change altitude, then a change is noted on the ASI.

The change is not related to a change in airspeed but a change in static pressure. The total pressure in the pitot tube does not change due to the blockage; however, the static pressure will change. Because airspeed indications rely upon both static and dynamic pressure together, the blockage of either of these systems affects the ASI reading. Remember that the ASI has a diaphragm in which dynamic air pressure is entered. Behind this diaphragm is a reference pressure called static pressure that comes from the static ports. The diaphragm pressurizes against this static pressure and as a result changes the airspeed indication via levers and indicators. [Figure 7-10]

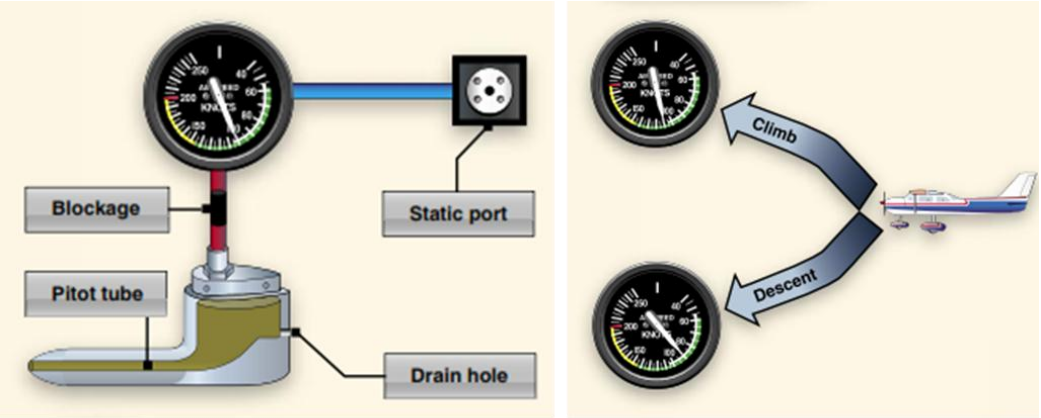


Figure 7-10. *Blocked pitot system with clear static system.*

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with the KNKT approved policies and procedures, and in accordance with the standards and recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

The video footage recorded the last part of the accident flight, which contained significant information of activation of stall warning, the flight and engine instruments. The investigation utilized this data, combined with other information gathered to support the analysis. The analysis will focus on safety issues as follows:

- Stall and Escape maneuver;
- Indication of aircraft speed;
- Familiarization of the airstrip.

2.1 Stall and the Escape Manoeuvre

Ninia had a runway with an upslope gradient of 11%. The airstrip is surrounded by mountainous area. There was high terrain at the extension of runway 30. Based on the management interview, the operator had a procedure to use runway 12 for takeoff and runway 30 for landing.

At 23:03:28 UTC, the video recorded the aircraft altitude was at about 6,500 feet, and aural stall warning was heard for one second and the torque indicator displayed value of 25 psi. Two seconds later, the video showed torque pressure changed from 25 psi to 30 psi.

The common technique and procedure, once the stall warning was heard, the pilot should recover by pitching down the aircraft to reduce the angle of attack and increases engine power to gain speed.

The video showed at the first stall warning activation, the surrounding area was sufficient for the pilot to recover the stall and abandon the approach. The pilot did not react properly to the stall warning.

The flight continued toward the area with higher terrain and reducing space. The video recorded reactivations of the stall warning continuously until the aircraft impacted terrain. The video also recorded the torque indication increased from 30 psi to yellow light indicated range of 54 to 64.5 psi, which is close to the maximum limit. The altitude remained at 6,500 feet before the aircraft climbed and turned to the left.

The formula to determine the bank angle is as follows:

$$R = \frac{V^2}{G \times \tan \alpha}$$

The aircraft wreckage was found 200 meters east of the runway. Assuming the gravity force (G) = 9.8 m/s^2 and aircraft speed 5 knots above stall speed = 66 knots. Tan α = bank angle. The radius (R) = 100 m (half distance of the wreckage to the runway). Referred to this formula, the bank angle was 49.7°.

The action of increasing engine torque, climb and turn indicated that the pilot intended to escape from the area. This maneuver was not suitable on that aircraft position and environment condition. The bank angle increases the stalling speed. Maneuver at low speed and high bank angle resulted in the aircraft stall.

2.2 Airspeed Indicators

The video footage recorded that both airspeed indicators indicated zero and did not record any change of airspeed indication until the aircraft impacted terrain. According to the pilot, the airspeed indicator malfunction occurred during the flight.

The FAA Pilot's Handbook of Aeronautical Knowledge 2008, described that the airspeed indicator reading decreases to zero, as a result, the airspeed indicator senses no difference between ram and static air pressure, this is caused by blocked pitot system, which can be completely or only partially blocked. The indication of zero airspeed on the accident flight might have been because of a blocked pitot system.

The airspeed indicator is an essential flight instrument and associated with other instruments can be used to identify the aircraft attitude and performance. If the airspeed indicators unserviceable during flight, pilot may rely on other instruments such as engine torque, altimeter and vertical speed to predict the aircraft speed. It is required pilot familiarization with the aircraft performance and instruments.

Flying with both airspeed indicators unserviceable increased the complexity of the flight, which normally requires immediate landing to the nearest suitable airport. The MEL required a minimum of one airspeed indicator should be serviceable for dispatch.

According to the operator assessment, Ninia airstrip was considered high risk. Flying with unserviceable airspeed indicators to a high-risk aerodrome increased the pilot workload.

2.3 Airstrip Familiarization

Route familiarization is intended to improve pilot awareness related to hazard, special procedures, weather phenomenon, terrain conditions and other significant issues of an aerodrome.

The company policy for fixed-wing operation requires pilots to perform a route familiarization to airports or airstrips for their first flight or those airstrips considered high risk. According to the operator's management, Ninia was considered high risk and the accident flight was the first flight for the pilot to Ninia, which requires a route familiarization.

The pilot initially flew parallel to the runway and this might be intended to familiarize himself with the runway prior to making another approach and landing or to notify ground personnel of the arrival since no radio communications were available. The subsequent maneuvers indicated that the pilot was not familiar with the terrain in the vicinity of the airport.

The investigation could not determine the factors that influenced the pilot's decisions during the initial approach. The absence of the route familiarization may have contributed to the improper judgment.

3 CONCLUSION

3.1 Findings

1. The pilot held a valid license and medical certificate, had completed mountain training flying, but had not been trained for the Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR).
2. The aircraft had valid Certificate of Airworthiness and Certificate of Registration.
3. The accident flight was the first time for the pilot flying to Ninia.
4. Video footage taken by a passenger showed that during the approach at an altitude of approximately 6,500 feet, the airspeed indicators indicated zero and the aural stall warning activated.
5. The weather at Ninia was clear and the wind was calm during the approach.
6. Ninia was not equipped with two-way radio communication.
7. The aircraft flew parallel on the left side of the runway 30, climbed and rolled to the left thereafter the aircraft stalled.
8. The aircraft last position was at approximately 200 meters south-west of the runway on heading approximate of 120°.
9. The engineer was fatally injured and the other occupants were seriously injured.
10. The pilot stated that the airspeed indicator malfunction occurred during the flight.
11. If the airspeed indicators unserviceable in flight, pilot may rely on other instruments such as engine torque, altimeter and vertical speed to predict the aircraft speed. It is required pilot familiarization with the aircraft performance and instruments. The investigation could not determine the familiarity of the pilot to the aircraft performance and instrument.
12. Flying with unserviceable airspeed indicators to a high-risk aerodrome increased the pilot workload.
13. The absence of the route familiarization might have contributed to the improper judgment.
14. Referred to the management assessment the Ninia was an airstrip having high risk and was not in the list of aerodrome to be flown by the operator.
15. The DGCA special audit following the accident indicated the OTM had not included Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR). The CFIT and ALAR have not been included as required training component in the CASR Part 135.403 (b).
16. The documents associated to the operation of fixed wing were not in accordance to the DGCA standard and regulation, such as Authorization Condition and Limitation (ACL), Company Maintenance Manual (CMM), Company Operating Manual (COM) and several other documents had not been developed such as

Standard Operating Procedures (SOP), Minimum Equipment List (MEL) and Checklist.

17. The elevation of Ninia stated in ALA was 3,648.47 feet, while the wreckage was found 200 meters from the runway at elevation of 6,800 feet. The information of runway elevation of Ninia in ALA did not represent the actual elevation.

3.2 Contributing Factors[3]

1. Continuing the flight with both airspeed indicators unserviceable increased the complexity of the flight combined with high-risk aerodrome increased the pilot workload.
2. The improper corrective action at the time of the aural stall warning activating on the final approach, and the aircraft flew to insufficient area for a safe maneuver.
3. The unfamiliarity to the airstrip resulted in inappropriate subsequent escape maneuver and resulted in the aircraft stalling.
4. The pilot was not provided with appropriate training and familiarization to fly into a high-risk airstrip.

3 Contributing Factors is defined as events that might cause the occurrence. In the case that the event did not occur then the accident might not happen or result in a less severe occurrence.

4 SAFETY ACTION

At the time of issuing this Draft Final report, the Komite Nasional Keselamatan Transportasi has not been informed any safety actions following this accident.

5 SAFETY RECOMMENDATIONS

Komite Nasional Keselamatan Transportasi (KNKT) identified the several safety issues on this investigation associated with the Controlled Flight into Terrain (CFIT) accident. Concerning to the safety issues, KNKT issued several safety recommendations intended for the safety improvement.

The relevant parties shall consider that the condition might possibly extend to other pilots and operators.

The Directorate General of Civil Aviation (DGCA) is responsible to monitor the implementation of the recommendation to the relevant parties.

5.1 PT. Komala Indonesia

- **04.O-2016-40.1**

  To ensure pilot familiarization in conducting a flight to airport or airstrip.

- **04.O-2016-41.1**

  To provide pilot training in decision making especially in abnormal condition.

- **04.O-2016-42.1**

  To conduct proper risk assessment including document preparation for additional fleet.

5.2 Directorate General of Civil Aviation

- **04.R-2016-43.1**

  To include Controlled Flight into Terrain (CFIT) and Approach and Landing Accident Reduction (ALAR) as a required training component in the CASR Part 135.

- **04.R-2016-44.1**

  The information of runway elevation of Ninia in ALA did not represent the actual elevation. KNKT recommends reviewing the ALA to ensure the information contents are valid.

- 04.R-2016-63.1

  Concerning to the loss of airspeed indicator of this accident flight, KNKT recommends DGCA to provide a regulation which requires pilot to be trained for flight with unreliable airspeed.

6 APPENDICES

6.1 Hazard Identification and Risk Assessment

HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

PENGOPERASIAN 1 (SATU) UNIT PAC-750XL

No.	Activity	Hazard Identification	Person Risk			Probability					Consecquencies					Risk Level	Exisiting Control	Rev Risk	Additional/Ongoing Requirement (Mitigation)	Determining Control/PIC	Final Risk	Risk Index				Remarks
			Employee	Contractor/Other	Public	5 Frequent	4 Occasional	3 Remote	2 Improbable	1 Ext. Improbable	A Catastrophic	B Hazardous	C Major	D Minor	E Negligible							Extreme	High	Medium	Low	
A.	Mengoperasikan tipe pesawat dengan tipe berbeda (fixed wing dan rotary wing) PAC-750XL dan AS-350 Series	1 Kurang (lack) Kontrol (monitoring)	✓	✓			✓						✓			4C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
		2 Manual-manual pendukung operasional pesawat lebih banyak	✓	✓				✓					✓			3C	Manual operasi yang berkaitan dengan operasional fixed wing telah direvisi, fokus hanya pada rotary wing	2D	Revisi manual-manual untuk rotary wing akan dikirimkan ke DKUPPU untuk mendapatkan pengesahan	CASO/ManOps/ManTek/CI	2E				✓	Acceptable
		3 Rencana kegiatan operasi PAC750XL	✓	✓			✓						✓			4C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
		5 Utilisasi penggunaan pesawat belum dihitung	✓	✓				✓						✓		3C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
B.	Sumber Daya Manusia (SDM) / Human Resource	1 Ketersediaan SDM Pilot	✓	✓				✓				✓				3C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
		2 Ketersediaan SDM Mechanic	✓	✓				✓				✓				3D	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
C.	Manual	1 ACL belum direvisi	✓	✓				✓					✓			3C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing, Manual operasi yang berkaitan dengan operasiaonal fixed wing telah direvisi, fokus hanya rotary wing	1E	Revisi manual-manual untuk rotary wing akan dikirimkan ke DKUPPU untuk mendapatkan pengesahan	Direktur/CASO/Man Ops/Man Tek/CI	1E				✓	Acceptable
		2 CMM belum direvisi	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
		3 COM belum direvisi	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
		4 AAIP belum dibuat	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
		5 SOP belum dibuat	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
		6 MEL belum dibuat	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
		7 Checklist belum dibuat	✓	✓				✓					✓			3C		1E			1E				✓	Acceptable
E.	Pengoperasian Pesawat	1 Bekerja dekat dengan propeller pesawat	✓	✓				✓					✓			3C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable
		2 Flight Following							✓						✓		Seluruh armada AS-350 Series PT. Komala Indoensia telah menggunakan spidertracks untuk flight following dalam operasionalnya	2E	NIL	Direktur/CASO/Man Ops/Man Tek/CI	2E				✓	Acceptable
		3 Bekerja di tanah area yang licin	✓	✓				✓					✓			3C	PT. Komala Indonesia memutuskan untuk tidak mengoperasikan pesawat fixed wing	1E	NIL	Direktur	1E				✓	Acceptable

6.2 Accredited Representative Comments

Transport Accident Investigation Commission, New Zealand

No	Comment	Remarks
1.	*The KNKT report includes video evidence that neither airspeed indicator (ASI) was working. It would appear that the static ports were not blocked, because the altimeters were still working. A plausible scenario is that the pitot tube became blocked by an insect or some other foreign material, with the pitot tube drain hole being unaffected. That would result in the ASI readings decreasing to zero. The KNKT might like to consider another possibility, that the aeroplane departed with inoperative ASIs, either because of an existing defect or because the pitot tube cover was not removed before flight. Removal of the pitot cover is the first item of the Pre-flight Inspection checklist in the flight manual.* *The report does not mention whether there had been recent defects or maintenance involving the pitotstatic system. Nor does the report comment on the condition of the pitot-static system (especially the pitot tube) after the accident. Inclusion of this information in the report could help establish the cause of the inoperative ASIs.*	**Agreed** KNKT added subchapter 1.6.4 that describbed the aircraft maintenance record. KNKT received the evidence of inoperative ASIs from the video provided by the aircraft operator several months after the accident and the wreckage had been disposed. KNKT was unable to explore more detail about the condition of pitot-static system.
2.	*The torque indications prior to the accident showed that the pilot took inadequate action to recover from the impending stall, especially when he had no direct indication of airspeed. The first torque value referred to was 25 psi. This could potentially have been the power setting at the end of a descent*	**Agreed** KNKT added cruise table on subchapter 1.17.2 and added explanation from aircraft manufacturer regarding stall warning calculation on subchapter 1.18.1.

No	Comment	Remarks
	or during a speed reduction. However, Pacific Aerospace considered that 35 psi would have been a more appropriate torque under the circumstances described: *At an estimated landing weight of 6813 pounds, the stall speed is 112 KTAS at 6,500 ft, ISA, and the stall warning would sound at approximately 117 KTAS. From the Pilot's Operating handbook cruise table, at 5000 ft ISA and a torque setting of 35 psi, the airspeed should be 133 KTAS. A torque setting of at least 35 psi would have been more appropriate. With only 25 psi, a stall is imminent.*	
3.	*Pacific Aerospace also observed that the torque was only 15 psi at 23:03:35 UTC when the aeroplane stalled. In their opinion, this low torque could only occur under one of the following conditions:* *1. the fuel condition lever was at ground idle, because the factory minimum setting for flight idle is 21-24 psi* *2. the propeller low (fine) pitch stops were adjusted from the manufacturer's recommended setting.* *Condition 1 was unlikely because 29 seconds later the yellow light on the torque indicator was on, which showed that the torque was at least 54 psi (maximum continuous power). In addition, the fuel condition lever was found in the flight idle position after the accident. Therefore, it was more likely that the low pitch stops had been adjusted. That might be done in order to increase propeller drag during landing, which will*	KNKT considered this comment is a good advice, however, this unable to be accomodated in this report due to limited data.

No	Comment	Remarks
	reduce the landing distance on short strips. The aeroplane maintenance records might show whether that was the case.	
4.	*TAIC agrees with the KNKT's findings 12 and 13 regarding the difficulty of flying without a serviceable airspeed indicator. Flight with unreliable airspeed has been a contributory factor in some recent jet aeroplane accidents, but has not been a factor in many accidents involving smaller types like the 750 XL. The pilot of PK-KIG had valid attitude and engine information, and was flying in visual meteorological conditions. Therefore, a safe return to the departure aerodrome ought to have been possible. The KNKT might consider that the loss of control on this flight justifies their making a recommendation regarding the training given to pilots for flight with unreliable airspeed*	**Agreed** KNKT addded recommendation regarding to pilot training for flight with unreliable airspeed.

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