



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI  
REPUBLIC OF INDONESIA**

**FINAL**

**KNKT.15.10.24.04**

**Aircraft Serious Incident Investigation Report**

**PT. Asian One Air**

**Tecnam P2006T Aircraft; PK-LTK**

**Nusawiru Airport, Pangandaran, West Java**

**Republic of Indonesia**

**20 October 2015**



**2016**

This Final report was produced by the *Komite Nasional Keselamatan Transportasi* (KNKT), 3<sup>rd</sup> Floor Ministry of Transportation, 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

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AC	: Advisory Circular
AFIS	: Aerodrome Flight Information Services
AFM	: Aircraft Flight Manual
AMO	: Aircraft Maintenance Organization
AOC	: Air Operator Certificate
ARFF	: Airport Rescue and Fire Fighting
ATPL	: Air Transport Pilot License
ATZ	: Aerodrome Traffic Zone
C of A	: Certificate of Airworthiness
C of R	: Certificate of Registration
CASR	: Civil Aviation Safety Regulation
CMM	: Company Maintenance Manual
CRM	: Crew Resource Management
DGCA	: Directorate General Civil Aviation, Republic of Indonesia
FAA	: Federal Aviation Administration, United States of America
FSP	: Flight Safety Program
ICAO	: International Civil Aviation Organization
KNKT	: <i>Komite Nasional Keselamatan Transportasi</i> (National Transportation Safety Committee)
LT	: Local Time
QRH	: Quick Reference Handbook
SI	: Staff Instruction
SRM	: Single-Pilot Crew Resource Management
UTC	: Universal Time Coordinate
VFR	: Visual Flight Rules
VOR/DME	: VHF Omni-directional Range / Distance Measurement Equipment
WIB	: <i>Waktu Indonesia Barat</i> (Western Indonesia Standard Time)

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# INTRODUCTION

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## SYNOPSIS

A Tecnam P2006T aircraft, registration PK-LTK was being operated by PT. Asian One Air on 20 October 2015 as unscheduled solo flight training. The purpose of this flight was to gain flight hour for a new recruited pilot. The flight was planned from Husein Sastranegara Airport (WICC) Bandung, West Java to Nusawiru Airport (WICN) Pangandaran, West Java and return to Bandung.

The aircraft departed Husein Sastranegara Airport, Bandung at 0950 LT (0250 UTC), cruised at altitude of 7,500 feet and scheduled to arrive Nusawiru Airport at 0310 UTC. The pilot was the only occupant in this flight.

There was no aircraft technical system abnormality or problem reported prior to the departure until the time of occurrence. The flight from Husein Sastranegara Airport until descend was uneventful.

At 0257 UTC the pilot reported to Nusawiru Aerodrome Flight Information Services (AFIS) officer the position over TASIK (Tasikmalaya) at 7,500 feet.

The weather during approach applicable for Visual Flight Rules (VFR) and the wind was easterly with velocity of 7 knots.

There were eight other aircraft flying in the vicinity of the airport which consisted of five aircraft conducting area training exercise, one on touch and go training, one departure aircraft and one arrival aircraft. There were also two other aircraft on the ground ready for taxi out.

At the about 15 Nm before Nusawiru Airport, the aircraft descended to altitude 2,000 ft then direct to final runway 07 for landing. The pilot stated that during on final he set the landing configuration and read the checklist.

At 0316 UTC, the aircraft landed on runway 07 of Nusawiru Airport. After touchdown, the pilot informed to the AFIS personnel that the aircraft landing gear was not extended. The pilot did not recall activation warning. The pilot shut down engines and evacuated the aircraft. The aircraft stop about 400 meters from touchdown point.

No one injured in this serious incident. The aircraft lower fuselage skin and the VOR/DME antenna damage.

The investigation concluded the contributing factors to this serious incident were:

- The flap full down position with landing gear UP did not trigger the landing gear warning lead to the pilot did not aware that the landing gear had not been extended.
- Stress and fatigue might degrade the human performance combined with inappropriate checklist execution resulted to the landing gear not extended.

*Komite Nasional Keselamatan Transportasi* issued safety recommendations to the aircraft operator, aircraft maintenance provider, and Directorate General of Civil Aviation to address the safety issues identified in this investigation.

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# 1 FACTUAL INFORMATION

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## 1.1 History of the flight

A Tecnam P2006T aircraft, registration PK-LTK was being operated by PT. Asian One Air on 20 October 2015 as unscheduled solo flight training. The purpose of this flight was to gain flight hour for a new recruited pilot. The flight was planned from Husein Sastranegara Airport (WICC) Bandung, West Java to Nusawiru Airport (WICN) Pangandaran, West Java and return to Bandung.

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There were eight other aircraft flying in the vicinity of the airport which consisted of five aircraft conducting area training exercise, one on touch and go training, one departure aircraft and one arrival aircraft. There were also two aircraft on the ground ready for taxi out.

At the about 15 Nm before Nusawiru Airport, the aircraft descent to altitude 2,000 ft then direct to final runway 07 for landing. The pilot stated that during on final the landing configuration has been set and the check list has been read.

At 0316 UTC, the aircraft landed on runway 07 of Nusawiru Airport. After touchdown, the pilot informed to the AFIS personnel that the aircraft landing gear was not extended. The pilot did not recall activation warning. The pilot shut down engines and evacuated the aircraft. The aircraft stop about 400 meters from the touchdown point.

The Airport Rescue and Fire Fighting (ARFF) personnel and company employees came to assist and lifted up the aircraft. The pilot then selected the landing gear switch to down position than all landing gears extended and locked normally.

The aircraft then pushed to the hangar. At 0350 UTC, the aircraft evacuation process completed and airport re-opened for operation.

No one injured in this serious incident. The aircraft lower fuselage skin and the VOR/DME antenna damage.

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1 The 24-hour clock used in this report to describe the time of day as specific events occurred is in Coordinated Universal Time (UTC). Local time for Nusawiru is Western Indonesia Standard Time / *Waktu Indonesia Barat* (WIB) is UTC + 7.

2 AFIS: Aerodrome Flight Information Services. A service to provide useful information for the safe and efficient conduct of flight in the Aerodrome Traffic Zone (ATZ) and to give taxi instructions on the apron and maneuvering area.





**Figure 1: The aircraft position after the serious incident**

## **1.2 Personnel Information**

The pilot was 53 years old, male Indonesian pilot, held Airline Transport Pilot License (ATPL) and instrument rating that valid until 28 February 2016. The last medical examination was performed on 18 May 2015 and the first class medical certificate was valid up to 30 November 2015 with remark “*Holder shall wear lenses that correct for distant vision and possesses glasses that correct for near vision*”. The pilot held total flight hours of 9,535 hours including 22 hours on type. This type of aircraft was the first aircraft type that operated by single pilot. On the last 90 days the pilot accumulated 14.33 flight hours and one hour on this flight.

The pilot conducted the Tecnam P2006T type rating while joining the Kencana Plantation company that was on a process for Air Operator Certificate (AOC) 135 certification. The pilot completed the training including 10 flight training hours.

The AOC certification process was terminated and the Kencana Plantation company merged with the Asian One. During this merging process, the pilot did not fly for two months.

After the merging process completed, on 15 September 2015, the pilot performed refreshing flight and the pilot was recommended by Operation Department to gain minimum of 50 flight hours on type before serving on commercial flight. This serious incident flight was the refreshing flight program for the pilot to complete the recommendation.

The pilot stated that prior to this flight, he left his home at Bekasi and travelled with the train which departed at 2100 LT and arrived at Bandung around midnight. At seven o'clock in the morning the pilot arrived at Husein Sastranegara Airport. After completed all the preparation then he started the flight.

## 1.3 Aircraft Information

### 1.3.1 General

PK-LTK was a Tecnam P2006T aircraft manufactured by Costruzioni Aeronautiche Tecnam SRL, Italy. The aircraft manufactured on 24 January 2013 with serial number 101. The aircraft was disassembled and delivered to Indonesia. The re-assembling was performed by PT. Mulya Sejahtera Technology (MS. Tech), which based at Husein Sastranegara Airport Bandung.

The Certificate of Airworthiness (C of A) was issued on 21 September 2015 and valid until 20 September 2016, stated the aircraft was normal category without limitation. The Certificate of Registration (C of R) was issued on 28 August 2015 and valid until 27 August 2016. The aircraft had total time since new of 14 hours and total cycle since new of 15 cycles.

The aircraft was not fitted with flight recorder and was not required according to the current Indonesian aviation regulations.

The post occurrence aircraft landing gear system test which was recorded on video found that the landing gear extension and retraction system were functioning normally. The landing gear warning was active when at least one of the throttle at idle position and the landing gear not on down and lock position. The landing gear warning did not active when the landing gear not at down and lock, flap full down and throttles were not at idle position.

After temporary repair completed, on 9 January 2016, the aircraft was ferry flight to Husein Sastranegara Airport Bandung for permanent repair. On 13 January 2016, the investigation observed the landing gear warning system was functioning normally.

PK-LTK was the second aircraft assembled by MS Tech and was the first aircraft that was assembled without observation of the aircraft manufacturer. Currently MS Tech has assembled five Tecnam P2006T aircraft.

The investigation then observed the landing gear warning system check on the other aircraft which the assembling process was supervised by the aircraft manufacturer. The check resulted that the system was functioning properly.

The investigation then observed the landing gear warning system check on the other aircraft which the assembling process was not supervised by the aircraft manufacturer. The check resulted that the system did not active when the landing gear not at down and lock and the flap full down.

### 1.3.2 Landing gear warning system

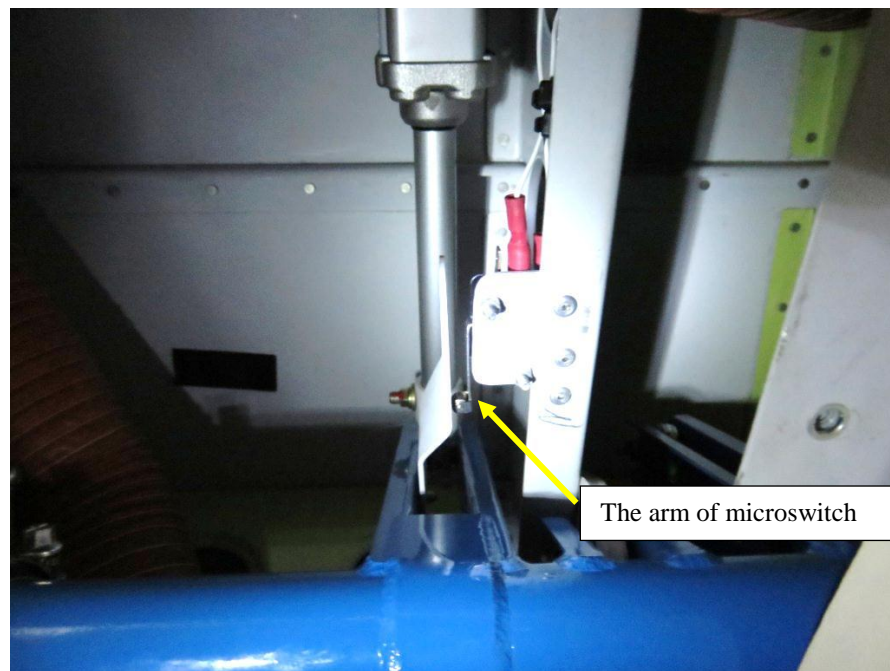
The Aircraft Flight Manual (AFM),<sup>3<sup>rd</sup></sup> Edition – Revision 4, issued on 5 May 2014, chapter 7 described the landing gear warning system on two separated pages.

On page 7-7 on section 2.4 flight control system, the AFM described: *An aural warning is generated whenever the flaps are lowered to the FULL position and the landing gear is not down-locked.*

On page 7-23 on section 9 landing gear system, described: *A warning horn alerts the pilot when the LG control knob is in UP position and at least one of the two throttle levers and/or flaps are respectively set to idle and to LAND position.*

The sensor for the landing gear warning system which triggered by flap position used

a micro switch located on the upper side of the central cabin. Installation of this micro switch was not part of assembling process by MS Tech.



**Figure 2: Micro switch of the landing gear warning on the flap system**

#### **1.4 Aerodrome Information**

Airport Name : Nusawiru Airport  
Airport Identification : WICN  
Airport Operator : Government of West Java  
Coordinate : 07°42' 13.79" S 108°29' 24.41" E  
Elevation : 16 feet  
Runway Direction : 07/25  
Runway Length : 1400 m  
Runway Width : 30 m  
Surface : Asphalt

Nusawiru Airport, Pangandaran was a base of several flying schools for training. Most of the traffics were training flights.

## 1.5 Wreckage and Impact Information

There was white mark on the runway surface indicating scratch mark of painted metal on the runway.



**Figure 3: Metal scratch mark on the runway**



**Figure 4: The landing gear handle found at UP position**

## 1.6 Organizational and Management Information

Aircraft owner : Kencana Plantations PTE. LTD, Singapore  
Aircraft operator : PT. Asian One Air  
City lofts Sudirman, 21st Floor Suite 16  
Jl. KH. Mas Mansyur No. 121  
Jakarta 10220, Indonesia  
Air operator certificate : AOC/135-007

### 1.6.1 PT. Asian One Air

PT. Asian One Air was an air charter company operated under Air Operator Certificate (AOC) 135. Asian One Air operated three aircraft consist of two Cessna 208B Caravan and 1 Tecnam P2006T.

PT. Asian One Air had an agreement with Kencana Plantation company to operate their Tecnam P2006T aircraft. Kencana Plantation company also provided with one pilot who rated Tecnam P2006T aircraft.

Other than one pilot, the Asian One Air did not have operation and maintenance personnel rated on Tecnam P2006T aircraft.

The maintenance for the Tecnam P2006T aircraft was handled by MS Tech. Following this agreement, on 8 July 2015 the Asian One performed audit to MS Tech to ensure the maintenance quality of the aircraft comply with Asian One standard.

Until the issuance of this report, Asian One had not performed training of Tecnam P2006T aircraft for operation and maintenance personnel.

#### **Asian One Air Operational Checklist**

The operation checklist was available on the Quick Reference Handbook (QRH). The before landing checklist consists of several item includes landing gear down.

### 1.6.2 PT. Mulya Sejahtera Technology (MS Tech)

Mulya Sejahtera Technology (MS Tech) was an aircraft maintenance provider certified under Aircraft Maintenance Organization (AMO) 145/59800, based at Husein Sastranegara Airport, Bandung. MS Tech was certified for airframe maintenance of several aircraft including Boeing B737, Airbus A320, Fokker F27, Cessna 172, Tecnam P2006T and NBO 105. MS Tech was also approved for line maintenance authorization for Cessna 172.

MS Tech provided line maintenance service for Cessna 172 aircraft operated by Bandung Pilot Academy.

MS Tech has been certified to reassembly Tecnam P2006T aircraft. The first reassembly was supervised by aircraft manufacturer.

MS Tech organization included Quality Control, Safety and Standard division. This division had total of three persons including the manager as the head of the division.

### **1.6.3 Civil Aviation Safety Regulation (CASR)**

#### **CASR Part 43 – Maintenance, Preventive Maintenance, Rebuilding and Alteration**

##### ***43.15 Additional performance rules for inspections.***

*(a) General. Each person performing an inspection required by part 91 or 135 of the CASRs shall–*

- (1) Perform the inspection so as to determine whether the aircraft, or portion(s) thereof under inspection, meets all applicable airworthiness requirements; and,*
- (2) If the inspection is one provided for in part 135 or 91 section 91.409(e), perform the inspection in accordance with the instructions and procedures set forth in the inspection program for the aircraft being inspected.*

#### **CASR Part 135 – Certification and Operating Requirements: For Commuter and Charter Air Carrier**

##### ***135.85 Flight Safety Program***

*(a) An air carrier shall develop and maintain on a continuing basis, a Flight Safety Program (FSP), that is appropriate to the scope and size of its operation and has a high capability to detect, analyze and mitigate any risks which may pose a threat to the safety of that air carriers operations.*

##### ***135.363 Responsibility for airworthiness.***

*(a) Each certificate holder is primarily responsible for:*

- (1) The airworthiness of its aircraft, including airframe, engines, propellers, rotors, appliances, and parts thereof; and*
- (2) The performance of the maintenance, preventive maintenance, and alteration of its aircraft, including airframes, engines, propellers, rotors, appliances, emergency equipment, and parts thereof, in accordance with its CMM and the CASR Part 43.*

*(b) Each certificate holder may make arrangements with another person for the performance of any maintenance, preventive maintenance, or alteration. However, this does not relieve certificate holder of the responsibility specified in paragraph (a) of this section.*

##### ***135.373 Continuing analysis and surveillance.***

*(a) Each certificate holder shall establish and maintain a system for the continuing analysis and surveillance of the performance and effectiveness of its inspection program and the program covering other maintenance, preventive maintenance, and alterations and for the correction of any deficiency in those programs, regardless of whether those programs are carried out by the certificate holder or another person.*

*(g) The procedure for management review shall:*

- (1) specify the frequency of management reviews of the quality assurance system taking into account the need for the continuing effectiveness of the system;*



- (2) *identify the responsible manager who shall review the quality assurance system; and*
- (3) *ensure the results of the review are evaluated and recorded.*

## **SUBPART N - TRAINING AND CHECKING PROGRAMS AND VALIDITY PERIODS**

### ***135.401 Applicability***

*(a) This subpart prescribes the requirements for the training and checking programs of air carriers operating under this part and the validity periods for such training and checking.*

*(b) Unless a person has been trained and certified pursuant to this subpart, as being competent to perform their assigned duties, no air carrier shall assign a person to act and no person shall act as;*

- (1) a flight crew member,*
- (2) a crew member,*
- (3) a flight operations officer, or*
- (4) a person performing any ground handling, or service related duty to an aircraft, except those duties performed by certified maintenance personnel .*

### **Flight Crew Assessment**

For the purpose of flight crew assessment, the Directorate General of Civil Aviation (DGCA) referred to CASR 61 and CASR 135 subpart N with detail guideline described in the Staff Instruction No. SI PTS 8081 – 5 amendments 0:Airline Transport Pilot and Aircraft Type Rating for Airplane. The SI PTS 8081-5, the flight crew should implement several requirements including the requirement described in the AC 120-51:Crew Resource Management (CRM) Training. However, the investigation could not find particular Advisory Circular (AC) on DGCA website.

The FAA aviation safety bulletin that was issued on March 2015 recommended the operator who utilized single pilot airplane conduct a single pilot crew resource management as stipulated in Federal Aviation Administration (FAA) Advisory Circular 120-51E – Crew Resource Management Training. The AC contained guideline for developing, implementing, reinforcing and assessing CRM training for flight crew members and other personnel essential to flight safety.

The information available in the website:

[https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/risk\\_management\\_handbook/media/rmh\\_ch06.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/risk_management_handbook/media/rmh_ch06.pdf).

## **CASR 145 –Approved Maintenance Organization**

### ***145.211 Quality and Safety system***

*Quality control system.*

*(a) A certificated AMO must establish and maintain a quality control system acceptable to the DGCA that ensures the airworthiness of the articles on which the AMO or any of its contractors performs maintenance, preventive maintenance, or alterations.*

*Quality assurance system.*

*(a) A certified AMO shall establish a quality assurance system that includes an independent internal audits in order to monitor compliance with required aircraft/aircraft component standards and adequacy of the procedures to ensure that such procedures invoke good maintenance practices and airworthy aircraft/aircraft components.*

*(b) A quality feedback reporting system to the accountable manager that ensures proper and timely corrective action is taken in response to reports resulting from the internal independent audits established to meet paragraph (a).*

### ***145.205 Maintenance, preventive maintenance, and alterations performed for certificate holders under parts 121, 125 and 135, and for foreign air carriers or foreign persons operating an Indonesian registered aircraft in common carriage under CASR Part 129***

*(a) A certificated AMO that performs maintenance, preventive maintenance, or alterations for an air carrier or commercial operator that has a continuous airworthiness maintenance program under CASR Part 121, 125 or Part 135 must follow the air carrier's or commercial operator's program and applicable sections of its maintenance manual.*

*(b) A certificated AMO that performs maintenance, preventive maintenance, or alterations for a foreign air carrier or foreign person operating an Indonesian registered aircraft under CASR Part 129 must follow the operator's DGCA approved maintenance program.*

*(c) Notwithstanding the housing requirement of section 145.103(b), the DGCA may grant approval for a certificated AMO to perform line maintenance for an air carrier certificated under Part 121 or Part 135, or a foreign air carrier or foreign person operating an Indonesian registered aircraft in common carriage under CASR Part 129 on any aircraft of that air carrier or person, provided:*

*(1) The certificated AMO performs such line maintenance in accordance with the operator's manual, if applicable, and approved maintenance program;*

*(2) The certificated AMO has the necessary equipment, trained personnel, and technical data to perform such line maintenance; and*

*(3) The certificated AMO's operations specifications include an authorization to perform line maintenance.*



## **1.7 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.

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## 2 ANALYSIS

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The analysis will discuss of the significant finding resulted to the aircraft landed with landing gear at up position. Therefore the analysis will discuss operational and maintenance issues.

### 2.1 Operational

The aircraft landed with the landing gear at up position and the pilot informed to the AFIS officer that the landing gear was not extended. This was supported by the evidence that the landing gear handle was on UP position after the aircraft stop.

During the assessment, the pilot did not show standard performance and was recommended to complete 50 flying hours on type. At the time of the serious incident, the pilot had accumulated 22 flight hours on type.

The previous day, the pilot travelled to Bandung and arrived around midnight and at 7 o'clock the following morning the pilot arrived to Husein Sastranegara Airport. This can be assumed that the pilot had slept less than 6 hours, consider the travel time from the train station to the rest facility and from the rest facility to the airport. This indicated that the pilot had sleep disturbance. The sleep disturbance may create fatigue<sup>3</sup>.

During the approach to Nusawiru, there were eight aircraft in flight and two aircraft on the ground. These numbers of traffic created additional workload for the pilot to monitor the traffic position and to maintain the separation between aircraft.

This aircraft type was the first type of single pilot operation for the pilot after approximately 9,000 flying hours experienced on two pilot operation aircraft type. This change of operation required familiarization process.

This additional workload of traffic condition and less experienced on type which required familiarization process might have induced stress<sup>4</sup> to the pilot.

The stress may reduce the human performance with additional condition of fatigue, the performance may decreases significantly. The decreasing of human performance as result of stress and fatigue might have resulted to the pilot did not select the landing gear to down and lock position.

Since the aircraft did not equipped with recorder, the investigation could not determine whether the checklist was read. Assumed that the checklist had been read, the evidence of the landing gear knob that was found at UP position was an indication of improper checklist execution.

The evidence of the landing gear handle was on UP position indicated that the pilot did not perform the checklist appropriately. This might due to decreasing of human performance as result of workload and fatigue that was induced by the solo flight to an airport with high density traffic for a pilot with low experience on type and lack of rest on the previous night.

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3 Fatigue: A feeling of lack of energy, weariness or tiredness. Fatigue is a normal response to physical exertion, emotional stress, and lack of sleep.

4 Stress: is individuals perceive of the ability to cope adequately with the demands being made on them or with threats to their well-being. (Lazarus, R.S. 1966).

## **2.2 Maintenance**

The evidence showed that the landing gear handle was on UP position after the aircraft stop was consistent with the fact that the landing gear retracted during landing. The post occurrence test of landing gear warning system performed by the MS Tech engineer at Nusawiru found that the landing gear warning did not active when the flap full down and landing gear not extended.

MS Tech had reassembled five Tecnam P2006T aircraft. The first aircraft was assembled under aircraft manufacturer supervision. This aircraft was the second aircraft reassembled by MS Tech and the first aircraft reassembled without manufacturer supervision.

Observation of the other aircraft which was reassembled without manufacturer supervision found that the landing gear warning system did not active when the flap full down and landing gear not extend.

This serious incident aircraft has been operated for 14 flying hours and 15 cycles and had not been performed any scheduled maintenance. Referring to the observation of the other aircraft reassembled without manufacturer supervision, most likely the landing gear warning system did not active when the landing gear not down and lock with flap full down in this serious incident.

MS Tech Quality Control, Safety and Standard division with three persons including the manager might not be sufficient to oversight the MS Tech activity which was approved for several maintenance activities. Insufficient quality control might have led to inactivation of landing gear warning system was not detected during reassemble process.

Insufficient quality system of MS Tech was not detected by Asian One as the audit and surveillance has not been performed. Without audit and surveillance to the maintenance provider, was an indication that Asian One unaware to the quality system.

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## 3 CONCLUSION

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### 3.1 Findings<sup>5</sup>

1. The aircraft was airworthy prior to the occurrence.
2. The pilot held valid license and medical certificate.
3. During the assessment when joining the company, the pilot was recommended to gain minimum of 50 hours on type before serving on commercial flight.
4. The pilot had slept less than 6 hours that may induce fatigue.
5. This aircraft type was the first type with single pilot operation and the pilot had accumulated 22 flying hours on type.
6. The weather during approach applicable for Visual Flight Rules (VFR).
7. The flight to Nusawiru Airport had high density traffic during the approach.
8. The landing gear handle was found at UP position after the aircraft stop and the pilot stated that he did not recall any warning.
9. The evidence of the landing gear handle was on UP position indicated that the pilot did not perform the checklist appropriately
10. The post occurrence landing gear warning system test found that the landing gear warning system did not active when the landing gear not down and lock with flap full down as stated in the aircraft flight manual.
11. This aircraft was the first aircraft reassembled by MS Tech without observation from the aircraft manufacturer. Investigation observed another aircraft which was reassembled without observation from the aircraft manufacture found that the landing gear warning system did not active when the landing gear not down and lock with flap full down.
12. The sensor for the landing gear warning system which triggered by flap position was not part of assembling process by MS Tech.
13. The aircraft has been operated for 14 flying hours and 15 cycles and had not been performed any scheduled maintenance.
14. The Asian One had not performed training of Tecnam P2006T aircraft for operation and maintenance personnel. The aircraft maintenance performed by MS Tech. Following the agreement, the Asian One had performed audit or surveillance to MS Tech to ensure the maintenance quality of the aircraft comply with Asian One standard.
15. MS Tech organization included Quality Control, Safety and Standard division, with total of three persons including the manager as the head of the division.
16. The investigation could not find the particular AC 120-51 and AC 120-53 on

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5 "*Findings*" are statements of all significant conditions, events or circumstances in the accident sequence. The findings are significant steps in the accident sequence, but they are not always causal, or indicate deficiencies. Some findings point out the conditions that pre-existed the accident sequence, but they are usually essential to the understanding of the occurrence, usually in chronological order.

DGCA website.

17. FAA provides single pilot operation in FAA aviation safety bulletin issued on March 2015 which refers to FAA AC 120-51E and AC 120-53B. The FAA AC 120-51E and AC 120-53B describes both CRM and guidance for conducting and use of flight standardization board evaluation.

### **3.2 Contributing Factors<sup>6</sup>**

The flap full down position with landing gear UP did not trigger the landing gear warning lead to the pilot did not aware that the landing gear had not been extended.

Stress and fatigue might degrade the human performance combined with inappropriate checklist execution resulted to the landing gear not extended.

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<sup>6</sup> "*Contributing Factors*" are those events which alone, or in combination with others, resulted in injury or damage. The contributing factor is an act, omission, condition, or circumstance which if eliminated or avoided would have prevented the occurrence or would have mitigated the resulting injuries or damage.

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## **4 SAFETY ACTION**

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At the time of issuing this final report, the *Komite Nasional Keselamatan Transportasi* (KNKT) had been informed several safety actions taken as follows.

### **4.1 PT. Asian One Air**

1. Issued Operation Notice number 10/ON-OPS/I/2016 dated 28 January 2016 as follows :
  - a. Refer to operator Standard Procedures using a memory system other than checklist is not allowed.
  - b. Flight Instructor from other company should conduct Company Basic Indoctrination prior to perform pilot training;
  - c. Normal Procedures and Emergency Procedures Checklist should always update to Aircraft Flight Manual (AFM);
  - d. The checklist should always be put in place easily accessible and visible to the pilot
2. Issued a checklist for Tecnam P2006T, see Appendix 6.1

### **4.2 PT. Mulya Sejahtera Technology (MS Tech)**

1. Conducted Basic Supervisory Training on 16 - 17 February 2016 for their employee, included maintenance and safety department personnel;
2. Conducted Basic Inspector Training on 2 - 6 February 2016 for their employee, included maintenance and safety department personnel;
3. Will conduct a toolbox meeting<sup>7</sup> before perform a daily duty;
4. Will recruit personnel for some positions in 2016 to meet the ideal number of employees.

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<sup>7</sup> "Toolbox meeting" is a common phrase in MS. Tech mechanics refer to short daily meeting before their shift duty time.

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## **5 SAFETY RECOMMENDATIONS**

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According to factual information and findings, the *Komite Nasional Keselamatan Transportasi* (KNKT) issued safety recommendations to address safety issues identified in this investigation.

The Directorate General Civil Aviation is responsible for the implementation of these recommendations addressed to the relevant parties.

### **5.1 PT. Asian One Air**

- **04.O-2016-10.1**

To improve the quality system of aircraft airworthiness to a achieve requirements of CASR 135.85; CASR 135.363 and CASR 135.373 for the internal and other organization supporting Asian One Air.

- **04.O-2016-11.1**

To improve the pilot crew resource management that may refer to the FAA safety bulletin.

- **04.O-2016-12.1**

To improve the quality system operation to achieve requirements of Indonesia regulations for the internal and other organization supporting Asian One Air operation refer to CASR 135.85.

### **5.2 PT. Mulya Sejahtera Technology (MS Tech)**

- **04.L-2016-13.1**

To improve the quality maintenance system to achieve requirements of CASR 43.15; CASR 145.205 and CASR 145.211.

### **5.3 Directorate General Civil Aviation**

- **04.R-2016-4.3**

To develop guideline of single pilot resource management as a reference for the single pilot operators.

- **04.R-2016-10.1**

To improve audit and surveillance system to organisation which have authorization to conduct maintenance activity includes assembling of aircraft.

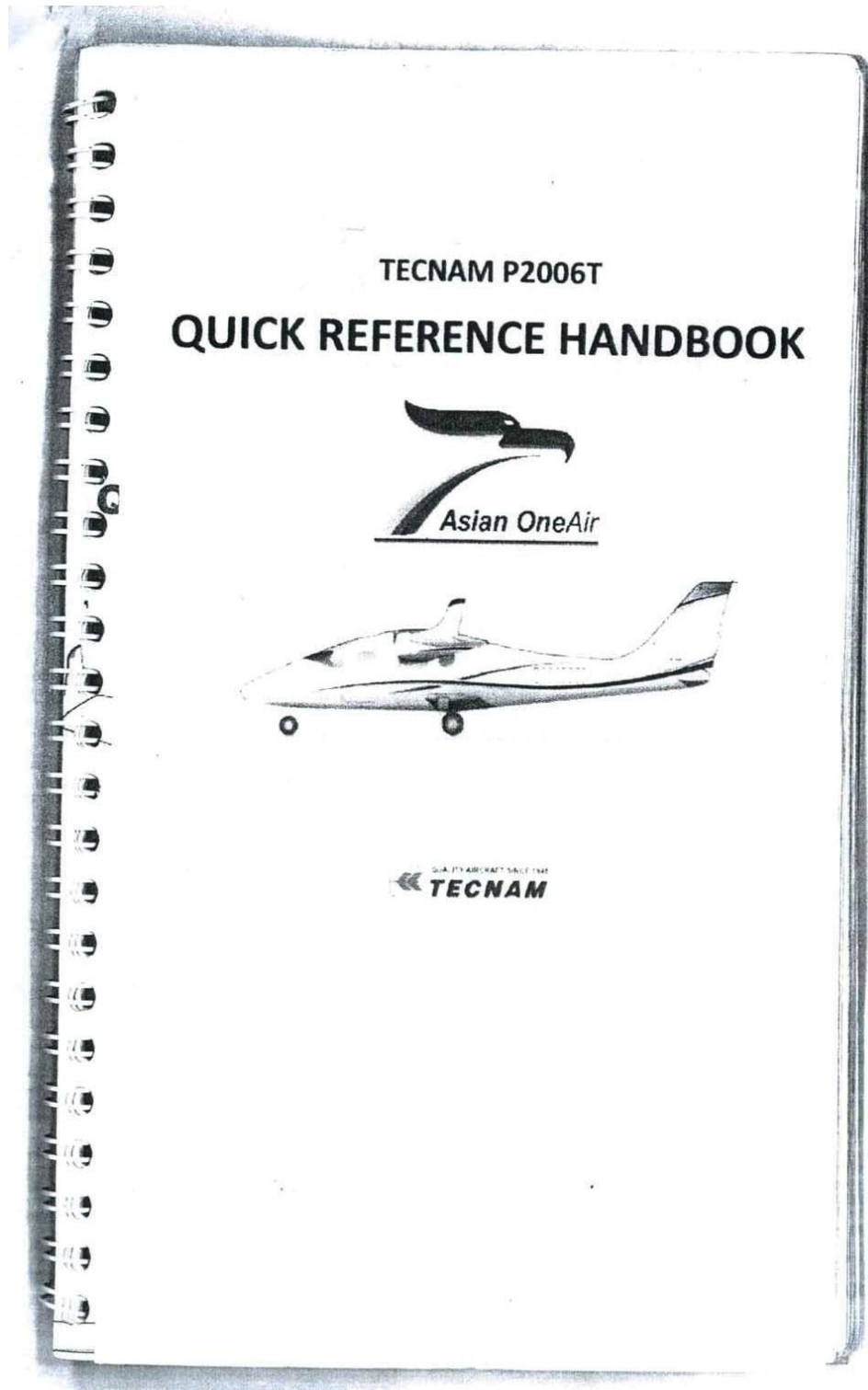
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## 6 APPENDICES

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### 6.1 Before Landing Checklist (original)

Previously, Asian One Air used a Tecnam P2006T Quick Reference Handbook for their pilot.





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## BEFORE LANDING

---

Rear Passengers seats	Seat set at full aft and lower position
Electrical fuel pump	BOTH ON
On downwind leg (Airspeed below 93 KIAS)	
LANDING GEAR	DOWN CHECK GREEN LIGHT - ON
Carburettor heat	CHECK OFF
LH and RH Propeller lever	FULL FORWARD
On final leg: below 93 KIAS	FLAPS FULL
Final Approach Speed	71 KIAS
Landing and taxi light	ON
Touchdown speed	65 KIAS

---

## BALKED LANDING / MISSED APPROACH

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LH and RH Propeler Lever	FULL FORWARD
LH and RH Throttle Lever	FULL POWER
Flaps	T/O
Speed	keep over 62 KIAS
LANDING GEAR	UP as positive climb is achieved
Flaps	UP

---

## 6.2 Before Landing Checklist (current)

Since November 2015, after this serious incident, Asian One Air used a Check List to describe material from original Tecnam P2006T Quick Reference Handbook for their pilot.



### CHECKLIST TECNAM P2006T

SAFETY INSPECTION		R&D
EMERGENCY EQUIPMENT	.....	CHECK
FUEL SELECTORS	..... LEFT & RIGHT TANK	
FUEL PUMPS (2)	.....	OFF
IGNITION (4)	.....	OFF
EMERG LIGHT & HORIZON	.....	OFF
CIRCUIT BREAKERS L & R	.....	CHECK
A/P TRIM & A/P MASTER	.....	ON
PITOT HEAT	.....	OFF
ELT	.....	ARM
RUDDER TRIM DISC	.....	ON
INTERNAL LIGHTS (3)	.....	OFF
CABIN HEATERS	.....	OFF
LND GEAR HANDLE	.....	DOWN
BATTERY & FIELD MASTER (3)	.....	OFF
AVIONIC & CROSS BUS (4)	.....	OFF
EXTERIOR & INSTRUMENT LIGHTS (5)	.....	OFF
ALTERNATE STATIC PORT	.....	CLOSED
ENGINE CONTROLS	..... IDLE, FORWARD, OFF	
CHOKES	.....	OFF

AFTER START		C&R
AVIONIC & CROSS BUS (4)	.....	ON
EXTERIOR LIGHTS	.....	
ALTIMETERS (2)	.....	QNH
DC AMPS & VOLTS	.....	CHECK
AP	.....	RDY

BEFORE START		C&R
OUTSIDE CHECK	.....	COMPLETED
PITOT COVER & CONTROL LOCK	.....	REMOVED
DOORS (3)	.....	CLOSED
TIME RECORDING	..... <b>PKE ONLY</b>	STARTED
PARKING BRAKE	.....	ON / OFF
BATTERY MASTER	.....	ON
FIRE DETECT SYSTEM & CAS	.....	CHECKED
GEAR LIGHTS	.....	CHECKED
FUEL QUANTITY	.....	
FUEL SELECTORS	..... LEFT & RIGHT TANK	

TAXI		C&R
BRAKES	.....	CHECKED
FLIGHT CONTROLS	.....	CHECKED
FLAPS	.....	0 / T/O
TRIMS	.....	SET
FLT INSTRUMENTS & XPDR	.....	CHECKED & SET
T/O & EMER BRIEFING	.....	COMPLETED

ENGINE RUN UP		R&D
CHT & OIL TEMP (GREEN ARC)	.....	CHECK
THROTTLES	.....	1650
PROP GOVERNORS	.....	CHECK
<b>RPM DROP SHOULD NOT EXCEED 200 PROP RPM</b>		
IGNITION (MAX DROP 130 / MAX DIFF 50)	.....	CHECK
CARBURETOR HEAT	.....	CHECK
THROTTLES (1100 - 1200)	.....	REDUCE

**ENSURE FUEL SELECTORS IN NORMAL POSITION  
(LEFT / RIGHT) FOR TAKE OFF**

ENGINE START		R&D
AVIONIC (2)	.....	OFF
IGNITION (4)	.....	ON
STROBE LIGHT	.....	ON / OFF
ENGINE START L & R	.....	PERFORM
OIL PRESSURE L & R	.....	CHECK
LH & RH FIELD MASTER	.....	ON
FUEL PUMPS	.....	OFF
CHOKES	.....	OFF

LINE UP		C&R
DOORS	.....	CLOSED
FLAPS	.....	T/O
FUEL PUMPS	.....	ON
PITOT HEAT	.....	AS NEC
LANDING & TAXI LIGHTS	.....	ON
CAS	.....	CHECKED
PARKING BRAKE	.....	OFF



AFTER TAKE OFF <span style="float: right;">C&amp;R</span>	
GEAR.....	UP
FLAPS.....	0
CLIMB POWER.....	SET
FUEL PUMPS.....	OFF
LANDING & TAXI LIGHTS.....	OFF
ALTIMETERS.....	QNH /STD

APPROACH & FINAL <span style="float: right;">C&amp;R</span>	
APPROACH BRIEFING.....	COMPLETED
FUEL PUMPS.....	ON
FUEL SELECTOR.....	L & R TANK
ALTIMETER SET.....	QNH
GEAR.....	DOWN, 3 GREEN
PROPELLERS.....	FORWARD
FLAPS.....	0 / T/O / FULL

AFTER LANDING <span style="float: right;">C&amp;R</span>	
FUEL PUMPS.....	OFF
PITOT HEAT.....	OFF
EXTERIOR LIGHTS.....	
FLAPS.....	0
FLIGHT TIME & FUEL.....	RECORDED

ENGINE SHUTDOWN <span style="float: right;">R&amp;D</span>	
PARKING BRAKE.....	ON
AVIONIC & CROSS BUS (4).....	OFF
IGNITION (4) $\geq$ 1 MIN IDLE.....	OFF

PARKING <span style="float: right;">C&amp;R</span>	
WHEEL CHOCKS & PARKING BRAKE.....	IN & OFF
EMERG LIGHT & HORIZON.....	OFF
EXTERIOR & INTERIOR LIGHTS.....	OFF
BATTERY & FIELD MASTER (3).....	OFF

SPEED LIMITATIONS (KIAS)	
V <sub>A</sub> (1180 KG).....	118
V <sub>FE</sub> T/O.....	119
FULL (40°).....	93
V <sub>LEILO</sub> (EXTENSION/RETRACTION).....	122
V <sub>X</sub> / V <sub>XSE</sub> .....	80 / 80
V <sub>Y</sub> / V <sub>YSE</sub> .....	80 / 80
V <sub>MCA</sub> .....	62
V (BEST GLIDE - BOTH PROPELLERS FEATHERED).....	90
WEIGHT LIMITATIONS (KG / LBS)	
MTOW & MLW.....	1230 / 2600
BAGGAGE COMPARTMENT LOAD.....	80 / 176
FUEL TANK CAPACITY (LITERS)	
MAXIMUM USABLE (EACH SIDE).....	97
OIL TANK LIMITATIONS	
MAXIMUM CAPACITY.....	3,0 LIT.
OPTIMUM.....	BETWEEN 50% & MAX
DIFFERENCE BETWEEN MIN & MAX =	0,45 LIT.
COOLING LIQUID CAPACITY (LITERS)	
MAXIMUM (EACH SIDE).....	1,4
WIND LIMITATIONS (KTS)	
CROSSWIND (DEMONSTRATED).....	17
TIRE PRESSURE (BAR / PSI)	
NOSE GEAR TIRE.....	1,7 / 24
MAIN GEAR TIRE.....	2,3 / 33

SIMPLIFIED POWER SETTING TABLE		
FLT PHASE	MP	PROP RPM
T/O & GA	MAX	MAX
CLB	25	2250
CRZ & DES	24	1950 - 2250
FINAL APCH	13 - 24	MAX

ONE ENGINE INOP TRAINING PROP RPM FOR ZERO THRUST	
MP	PROP RPM
14	2250

SIMPLIFIED SPEED TABLE	
V <sub>1</sub> / V <sub>R</sub> / V <sub>LOF</sub>	64
V <sub>CLIMB</sub> MAX CONT POWER	80
V <sub>REF</sub> FLAPS 0 / T/O / FULL	82 / 75 / 65

Tecnam P2006T Check List, Rev.01  
PT. AOA SOP November 2015

## 6.3 Single-Pilot Crew Resource Management (FAA Safety Team)

General Aviation  
Joint Steering Committee  
Safety Enhancement Topic

March 2015



FAA  
Aviation Safety

# Single-Pilot Crew Resource Management

There is no one right answer in aeronautical decision-making. Each pilot is expected to analyze each situation in light of experience level, personal minimums, and current physical and mental readiness level, and make his or her own decision.

Single-pilot resource management (SRM) is the art of managing all onboard and outside resources available to a pilot before and during a flight to help ensure a safe and successful outcome. Incorporating SRM into GA pilot training is an important step forward in aviation safety. A structured approach to SRM helps pilots learn to gather information, analyze it, and make sound decisions on the conduct of the flight.

### 5P Approach to SRM

To get the greatest benefit from SRM, you also need a practical framework for application in day-to-day flying. One such approach involves regular evaluation of: *Plan, Plane, Pilot, Passengers, and Programming*.

The point of the 5P approach is not to memorize yet another aviation mnemonic. You might simply write these words on your kneeboard, or add a reference to 5Ps to your checklist for key decision points during the flight. These include preflight, pre-takeoff, cruise, pre-descent, and just prior to the final approach fix or, for VFR operations, just prior to entering the traffic pattern.

Items to consider in association with the 5Ps might include the following:

### Plan

The plan includes the basic elements of cross-country planning: weather, route, fuel, current publications, etc. The plan also includes all the events that surround the flight and allow the pilot to accomplish the mission. The pilot should review and update the plan at regular intervals in the flight, bearing in mind that any of the factors in the original plan can change at any time.

### Plane

The plane includes the airframe, systems, and equipment, including avionics. The pilot should be proficient in the use of all installed equipment as well as familiar with the aircraft/equipment's performance characteristics and limitations. As the flight proceeds, the pilot should monitor the aircraft's systems and instruments in order to detect any abnormal indications at the earliest opportunity.

*Continued on Next Page*



[www.FAASafety.gov](http://www.FAASafety.gov)

Produced by FAA Safety Briefing | Download at [1.usa.gov/SPANS](http://1.usa.gov/SPANS)



## Pilot

The pilot needs to pass the traditional “IMSAFE” checklist (see below). This part of the 5P process helps a pilot identify and mitigate physiological hazards at all stages of the flight.

## Passengers

The passengers can be a great help to the pilot by performing tasks such as those listed earlier. However, passenger needs — e.g., physiological discomfort, anxiety about the flight, or desire to reach the destination — can create potentially dangerous distractions. If the passenger is a pilot, it is also important to establish who is doing what. The 5P approach reminds the pilot-in-command to consider and account for these factors.

## Programming

The programming can refer to both panel-mounted and hand-held equipment. Today’s electronic instrument displays, moving map navigators, and autopilots can reduce pilot workload and increase pilot situational awareness. However, the task of programming or operating both installed and handheld equipment (e.g., tablets) can create a serious distraction from other flight duties. This part of the 5P approach reminds the pilot to mitigate this risk by having a thorough understanding of the equipment long before takeoff, and by planning in advance when and where the programming for approaches, route changes, and airport information gathering should be accomplished, as well as times it should not be attempted.



Whatever SRM approach you choose, use it consistently and remember that solid SRM skills can significantly enhance the safety of “crew of you” flights.

### I'M SAFE Checklist

- ◆ **Illness:** Do I have any symptom?
- ◆ **Medication:** Have I been taking prescription or over-the-counter drugs?
- ◆ **Stress:** Am I under psychological pressure from the job? Am I worried about financial matters, health problems, or family discord?
- ◆ **Alcohol:** Have I been drinking within 8 hours?
- ◆ **Fatigue:** Am I tired and not adequately rested?
- ◆ **Emotion:** Am I emotionally upset?

### Resources

- ◆ **FAA Risk Management Handbook (Chapter 6)**  
<http://1.usa.gov/1Lyumk4>
- ◆ **Advisory Circular 120-51E, Crew Resource Management Training**  
<http://go.usa.gov/ZECw>



[www.FAASafety.gov](http://www.FAASafety.gov)

Produced by *FAA Safety Briefing* | Download at [1.usa.gov/SPANS](http://1.usa.gov/SPANS)

## 6.4 Safety Actions taken by MS. Tech



No. : 018 / BIA-BAJA /I/2016

Bandung : 15 Januari 2016

Kepada Yth.  
Ketua Sub. Komite Invertigasi Kecelakaan Penerbangan  
Komite Nasional Keselamatan Transportasi  
Kementerian Perhubungan  
Lantai 3  
Jln Medan Merdeka Timur – Jakarta Pusat

Perihal : **Rencana peningkatan kualitas SDM PT. MSTech**

Tembusan : Direktur PT. Mulya Sejahtera Technology

Dengan hormat,

1. Untuk meningkatkan kemampuan PT. Mulya Sejahtera technology (MSTech) dalam menuju pengurangan jumlah kecelakaan di dunia penerbangan pada tingkat kewajaran sehingga dapat bersaing dalam bisnis penerbangan, maka dengan ini kami sampaikan rencana rencana kegiatan bidang Quality Control tahun 2016 dalam rangka meningkatkan kualitas sumber daya manusia PT. MSTech (schedule kegiatan terlampir).
2. Demikian disampaikan, atas perhatiannya diucapkan terimakasih

Hormat kami,

PT. Mulya Sejahtera Technology  
General Manager



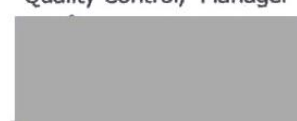
NO	KEGIATAN	PESERTA	SCHEDULE	TARGET
01	BASIC INSPECTOR training	AMEL holder dan Basic License holder	Januari 2016	<ul style="list-style-type: none"> <li>Memperdalam pemahaman tentang Airworthy</li> <li>Mendapatkan pemahaman tentang Approved data /type design</li> <li>Mendapatkan pemahaman tentang Airworthiness data/dokumen.</li> <li>Mendapatkan pemahaman tugas dan tanggung jawab sebagai Inspektur/Engineer</li> </ul> <p>Dengan demikian bisa diharapkan untuk setiap orang yang terlibat didalam project perawatan pesawat di MSTech dapat menjalankan tugasnya sesuai dengan konsep Airworthy.</p>
02	POTENTIAL HAZARD/ SMS training	Semua karyawan PT. MSTech dan orang yang bekerja di lingkungan PT. MSTech	Januari 2016 s/d juni 2016	<ul style="list-style-type: none"> <li>Memberikan pemahaman tentang suatu kondisi, tentang benda benda dan lainnya yang mempunyai potensi membahayakan atau yang dapat membuat seseorang celaka atau yang dapat merugikan perusahaan.</li> <li>Menumbuhkan budaya melapor tentang adanya potensi bahaya di setiap kegiatan bisnis MSTech dan di setiap tempat di lingkunganMSTech.</li> </ul>
03	HUMAN FACTOR (recurrent training)	AMEL holder dan Basic License holder	Juli 2016	<ul style="list-style-type: none"> <li>Mengingatkan kembali tentang adanya campur tangan manusia di setiap kecelakaan yang terjadi dan potensi potensi yang bisa membuat kecelakaan tersebut bisa terjadi.</li> </ul>
04	TROUBLE SHOOTING training	AMEL holder	Maret 2016	Meningkatkan pemahaman tentang technical publication yang dikeluarkan oleh manufacturer dan yang dikeluarkan oleh badan authority (DGCA, FAA dsb) dan mengembangkan kemampuan analisis bagi setiap engineer dalam penyelesaian masalah masalah yang dihadapi sesuai dengan prosedur dan approved data yang up to date
05	STAND UP MEETING	Yang terlibat didalam suatu project	Januari 2016	Menjalankan Stand Up meeting setiap pagi sebelum melakukan pekerjaan untuk memberikan pengarahannya tentang target pekerjaan hari ini dan bagaimana seharusnya pekerjaan tersebut dikerjakan sesuai prosedur dan untuk memenuhi aspek airworthy

Bandung, 15 Januari 2015

Disetujui oleh  
General Manager



Direncanakan oleh  
Quality Control, Manager





MAN POWER PLANNING SBU MSTech PERIODE 2016

NO	JOB DESCRIPTION	IDEAL JUML KARY	JUML KARY SKRANG	KKURANGN KARY	MINIMUM QUALIFIKASI	PERSONEL RECRUITING											
						JAN	FEB	MAR	APR	MEI	JUN	JUL	AGUS	SEP	OKT	NOV	DES
0	<b>GENERAL MANAGER (GM)</b>	1	1	0													
	Staff GM	1	0	1	SLA		1										
1	<b>QA &amp; SAFETY MANAGER</b>	1	1	0	AME Lic.												
	• Inspektur lapangan	4	0	4	AME Lic.+ INSP			4									
	• Inspektur gudang/receiving	1	0	1	SLA		1										
	• Staff safety (officer)	1	0	1	experience				1								
	• Quality Standard & Training	1	1	0	experience												
	• NDT	1	0	1	Certify					1							
2	<b>PPC MANAGER</b>	1	1	0	experience												
	• Production Planning & Control	2	1	1	experience		1										
	• Material Planning & Supply	1	1	0	experience												
	<b>STORE SUPERVISOR</b>	1	0	1	experience					1							
	• Receiving & Distribution	1	1	0	SLA												
	• Store, Inventory & Mat. request	1	1	0	SLA												
3	<b>MAINTENANCE MANAGER</b>	1	1	0	AME Lic.												
	• Engineer																
	General Aircraft	13	12	1	AME Beechcraft				1								
	Jet	5	4	1	AME Lic					1							
	Helicopter	4	2	2	AME Bell 412			2									
	• Mechanic	10	7	3	BASIC Lic				1			1				1	
	• Helper Mechanic	8	2	6	SLA				6								
	• Tool Store & Ground Support Equip	1	1	0	SLA												
	• Line Maintenance	3	0	3	AME Lic.												3
	<b>Sub Total karyawan (1)</b>	63	37-3	26			3	6	9	3		1				4	





MAN POWER PLANNING SBU MSTech PERIODE 2016

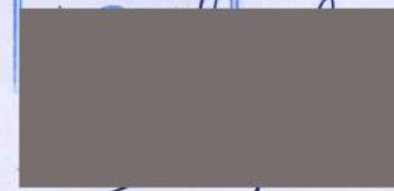
REVISI : 000

NO	JOB DESCRIPTION	IDEAL JUML KARY	JUML KARY SKRANG	KKURANGN KARY	MINIMUM QUALIFIKASI	PERSONEL RECRUITING											
						JAN	FEB	MAR	APR	MEI	JUN	JUL	AGUS	SEP	OKT	NOV	DEC
4	<b>SHOP MANAGER</b>	1	1	0	BASIC Lic.												
	• IERA	2	2	0	BASIC Lic.												
	• Hydraulic	1	0	1	experience								1				
	• Airframe repair	2	1	1	experience									1			
	• Propulsions	2	0	2	BASIC Lic.												2
5	<b>MARKETING &amp; CUST. SUP. MGR</b>	1	1	0	experience												
	• TNI/POLRI & Government	3	2	1	experience			1									
	• Civil Aviation	2	0	2	experience				1				1				
	• Customer Relation	1	0	1	experience					1							
	<b>GENERAL AFFAIRS</b>	1	1	0	experience												
	• Human resource	1	0	1	experience				1								
	• Finance	1	1	0	experience												
	• Fasilitas/umum	1	1	0	SLA												
	<b>Sub Total Karyawan (2)</b>	19	10	9				1	1	1	1		1	1	1		2
	<b>Total karyawan (1+2)</b>	83	47	36			3	7	11	4	1	1	1	1	5		2

NOTE

1. kekurangan Inspektur lapangan bisa dengan menaikkan Engineer dengan mendapatkan training Inspektur
2. Kekurangan Engineer Rating Beechcraft (1 Org) untuk menggantikan Budhisantoso
3. Kekurangan Rating Bell 412 dimaksud untuk menambah Cap List Bell 412
4. Helper Mechanic untuk ditempatkan di Nusawiru
5. Pada Sub Total Karyawan 37-3 dimaksud adalah sebenarnya jumlah karyawan adalah  $(37 - 3 = 34)$  orang yang 3 orang oleh karena Mempunyai double rating (jet dan General A/C)

Bandung, 07 Januari 2016  
General Manager MSTech



**KOMITE NASIONAL KESELAMATAN TRANSPORTASI REPUBLIK INDONESIA**

Jl. Medan Merdeka Timur No.5 Jakarta 10110 INDONESIA

Phone : (021) 351 7606 / 384 7601 Fax : (021) 351 7606 Call Center : 0812 12 655 155

website 1 : <http://knkt.dephub.go.id/webknkt/> website 2 : <http://knkt.dephub.go.id/knkt/>

email : [knkt@dephub.go.id](mailto:knkt@dephub.go.id)

