



**AIRCRAFT SERIOUS INCIDENT  
FINAL REPORT  
SI 05/19  
Air Accident Investigation Bureau (AAIB)  
Ministry of Transport Malaysia**

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**Serious Incident involving Diamond DA 40  
Registration 9M - ITG  
at Malacca International Airport (WMKM) Malaysia  
on the 6 July 2019**



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**FINAL REPORT SI 05/19**

**AIR ACCIDENT INVESTIGATION BUREAU (AAIB)  
MALAYSIA**

**SERIOUS INCIDENT REPORT NO. : SI 05/19**

**OPERATOR : INTERNATIONAL AERO TRAINING  
ACADEMY SDN. BHD.**

**AIRCRAFT TYPE : DIAMOND DA 40**

**NATIONALITY : MALAYSIA**

**REGISTRATION : 9M-ITG**

**PLACE OF OCCURRENCE : MALACCA INTERNATIONAL  
AIRPORT, MALAYSIA**

**DATE AND TIME : 6 JULY 2019 AT 1130LT**

This investigation is carried out to determine the circumstances and causes of the accident with a view for preservation of life and the avoidance of accident in the future. It is not the purpose of this investigation to apportion blame or liability (Annex 13 to the Chicago Convention and Civil Aviation Regulations 2016).

## INTRODUCTION

### **The Air Accident Investigation Bureau of Malaysia**

The Air Accident Investigation Bureau (AAIB) is the air accident and serious incident investigation authority in Malaysia and is responsible to the Minister of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and serious incidents.

The AAIB conducts the investigations in accordance with Annex 13 to the Chicago Convention and Civil Aviation Regulations of Malaysia 2016.

In carrying out the investigations, the AAIB will adhere to ICAO's stated objective, which is as follows:

*“The sole objective of the investigation of an accident or incident shall be the prevention of accident and incident. It is not the purpose of this activity to apportion blame or liability”.*

Accordingly, it is inappropriate that AAIB reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

**AIRCRAFT SERIOUS INCIDENT REPORT**

**Aircraft Type** : **Diamond**

**Model** : **DA 40**

**Owner** : **International Aero Training Academy  
Sdn. Bhd.**

**Nationality** : **Malaysia**

**Year of Manufacture** : **2013**

**Aircraft Registration** : **9M-ITG**

**Serial Number** : **40.N087**

**State of Registration** : **Malaysia**

**Place and State of Occurrence** : **Malacca International Airport (WMKM),  
Malaysia**

**Date and Time of Occurrence** : **6 July 2019 1130LT**

**All times in this report are in Local Time (LT). LT is UTC + 8 hours.**

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**GLOSSARY OF ABBREVIATIONS**

**A**

AAIB	Air Accident Investigation Bureau
AFI	Assistance Flight Instructor
AFM	Aircraft Flight Manual
AFRS	Airport Fire and Rescue Services
APFT	Asia Pacific Flight Training
ATC	Air Traffic Controller
ATIS	Automatic Terminal Information Service
ATO	Approved Training Organization

**C**

C	Celsius
CAAM	Civil Aviation Authority Malaysia
CASIA	Civil Aviation Safety Investigation Authority Austria
CCTV	Closed-Circuit Television
CFI	Chief Flight Instructor
cm	centimetres
CPL	Commercial Pilot's Licence
CVR	Cockpit Voice Recorder

**F**

FDR	Flight Data Recorder
FEW	few
FI	Flight Instructor
ft	feet
FTR	Flight Training Record

**G**

GGIFA	Gulf Golden International Flying Academy
GH	General Handling

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### H

HFACS Human Factors Analysis and Classification System  
hrs hours

### I

IATAC International Aero Training Academy Sdn. Bhd.  
ICAO International Civil Aviation Organisation  
ie id est or 'that is'  
ILS Instrument Landing System  
in inches  
IR Instrument Rating

### K

kg kilogram  
km kilometres  
kts knots

### L

lbs pounds  
LT Local Time

### M

m metres  
MAHB Malaysia Airports Holdings Berhad  
METAR Meteorological Terminal Air Report  
MFA Malaysia Flying Academy  
MTOW Maximum Take-Off Weight

### N

nm nautical miles  
NOTAM Notice to Airmen

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### **P**

PPL Private Pilot's Licence

### **S**

SE Single Engine

SI Serious Incident

SOP Standard Operating Procedures

### **U**

UTC Coordinated Universal Time

### **V**

VOR VHF Omnidirectional Radio Range

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### SYNOPSIS

On 6 July 2019, after completion of a dual flight with the instructor, a solo training flight was planned for the student pilot to Malacca training area. It was the student pilot's fourth solo flight which is also the first solo area flight to Malacca training area. On rejoining back to WMKM for landing, aircraft approach and speed was high, and power reduction was late.

The student pilot flared late with insufficient flare to arrest the rate of descent resulted in aircraft bouncing a few times before coming to a stop. It resulted in the aircraft's propeller blade tips striking the runway surface without student realising it. Aircraft was taxied back to dispersal area and a normal engine shutdown was performed.

Damage was noticed by ground staff after the aircraft engine was shut down and subsequently reported to the student pilot's instructor and the student. There were no reported injuries to the student pilot. All the tip of the aircraft's propeller blades were chipped off.

After being notified by the Safety Manager of the Flying Academy, an immediate runway inspection was conducted by the airport authorities. Some debris made of wood and plastic like material were found scattered on the runway. Three strike marks were also visible on the runway surface closed to the position where the aircraft made a bounce landing.

In accordance to ICAO Annex 13 paragraph 4.1, notification of the serious incident was sent on 15 July 2019 to Civil Aviation Safety Investigation Authority (CASIA), Austria as State of Manufacturer. A Preliminary Report was subsequently submitted to the Operator on 6 August 2019.

A copy of the draft Final Report was sent on 10 May 2020 to the State of Manufacturer (CASIA), State of Registry (CAAM) and the Operator (IATAC) inviting their significant and substantiated comments on the report in accordance with ICAO Annex 13 paragraph 6.3.

## 1.0 FACTUAL INFORMATION

### 1.1 History of the Flight

On 6 July 2019, a student pilot flew a dual sortie (General Handling 4 – GH4) with the instructor. After that sortie, the student pilot was cleared to fly her first solo sortie (General Handling 3 – GH3) to the training area.

Start up, taxi and take-off at approximately 1030 from WMKM to the training area were uneventful. After completing the flying exercises in the training area, on rejoining to WMKM, the control tower gave clearance to hold 1,500 feet to the east of the airfield but the student pilot misunderstood the clearance and joined left hand downwind for runway 03. The student pilot realised the mistake and was aware there was another aircraft at upwind climbing to 1,000 feet hence she maintained 1,500 feet as per clearance. There were 3 aircraft in circuits including the student's aircraft with another aircraft operating away from circuits during the rejoin.

At downwind, due to busy radio transmission from the control tower with other aircraft in circuits, the student pilot got distracted and forgot to perform the downwind checks. At late downwind, the control tower informed the student pilot was number two in sequence and the first aircraft was around the base leg. The student pilot was not in visual contact with the number one aircraft hence reported 'negative' to the control tower more than once. Later the number one aircraft was spotted at the base leg near the coastline. To ensure safe spacing between both the aircraft, the control tower instructed the student pilot to extend downwind.

On final, the aircraft's speed was high at 101 knots and final approach was high too. The student pilot corrected the final approach by reducing power and lowering the final landing flaps to reduce the speed to 75 knots. While on final approach, the control tower gave clearance to land.

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Before the threshold, the student pilot foresee that the aircraft could make a touch down on the threshold and further reduced power to 20%. At threshold, power was reduced slightly and aircraft nose attitude was slowly raised to point at the 1,000 feet marker. Reaching 1,000 feet marker, the student pilot did not realize there was still power and tried to flare to level off. The flare was late and insufficient, resulting in the aircraft bounced the first time with power. The aircraft bounced the second time before the student pilot realized about the power and quickly cut throttle to idle. There were more bounces while the student pilot was trying to recover from the initial bounce by holding the aircraft attitude level.

The aircraft finally came to a stop and the control tower asked the student pilot whether the landing was 'ops normal'. The student pilot replied 'roger ops normal' without realizing the aircraft propeller blades had struck the runway surface. The student pilot was then instructed to taxi vacate via Taxiway Echo to IATAC dispersal slowly. The aircraft was parked and shut down normally. After filling all the documents (technical log and authorization sheets) another student and ground staff informed the student pilot and the student's instructor that a suspected propeller strike had occurred on the runway during landing.

### 1.2 Injury to Persons

<b>INJURY</b>	<b>CREW</b>
<b>Fatal</b>	Nil
<b>Serious</b>	Nil
<b>Minor</b>	Nil
<b>None</b>	1

Table 1: Injury to Persons

### 1.3 Damage to Aircraft

All 3 propeller blades tip measuring approximately 6 cm were chipped off. Propeller assembly was sent for overhaul at G & A Aviation Sdn Bhd. Propeller was overhauled, balanced and tested in accordance with MT-

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Propeller Overhaul Manual. Damage assessment report was not made available to the investigation team.



Photo 1: Chipped Off Propeller Blades Tip

### 1.4 Other Damage

No reported damages to other parts of the aircraft.

### 1.5 Personal Information - Pilot in Command (PIC)

The student pilot joins IATAC in March 2018 as Batch No 2 for the Commercial Pilot Licence (CPL) course. Below is the student pilot's personal information:

<b>Status</b>	SINGLE	
<b>Nationality</b>	MALAYSIAN	
<b>Age</b>	24	
<b>Gender</b>	FEMALE	
<b>License Type</b>	STUDENT PILOT LICENSE	
<b>License Validity</b>	31 JANUARY 2020	
<b>Medical Examination</b>	CLASS 1 5 OCTOBER 2018	
<b>Aircraft Rating</b>	DIAMOND DA40	
<b>Instructor Rating</b>	N/A	
<b>Flying Hours</b>	Total Hours	23:15 hrs
	Total on Type	23:15 hrs

Table 2: Personal Information – Pilot in Command

**1.6 Aircraft Information**

**1.6.1 Aircraft Data**

<b>Aircraft</b>	DIAMOND AIRCRAFT DA 40 NG
<b>Owner</b>	SINCERE PODIUM SDN. BHD.
<b>Registration</b>	9M – ITG
<b>Serial No.</b>	40.NO87
<b>C of A No.</b>	NIL
<b>C of A Expiry</b>	19 AUGUST 2019
<b>C of R No.</b>	NIL
<b>C of R Expiry</b>	19 AUGUST 2019
<b>Year of Manufacture</b>	2013

Table 3: Aircraft Data

**1.6.2 Aircraft Propeller Description**

Diamond DA 40 aircraft is equipped with a MT-Propeller MTV-6-R/190-69 hydraulically regulated 3-bladed constant speed propeller. The propeller blades are made of wood-composite. It has fibre-reinforced plastic coating and metal leading edge protection. In the region of the propeller hub, the leading edge is coated with adhesive PU tape. These blades combine the lowest weight whilst minimizing vibration.

**1.7 Meteorological Information**

Meteorological Aerodrome Report (METAR) at 1100 hours indicated fine weather with winds at variable direction at 3 knots and few clouds at 1,700 feet as follows:

<b>Text:</b>	WMKM 060300Z VRB03KT 9999 FEW017CB SCT140 BKN280 31/26 Q1011
<b>Temperature:</b>	31.0°C ( 88°F)
<b>Dewpoint:</b>	26.0°C ( 79°F) [RH = 75%]
<b>Pressure (altimeter):</b>	29.85 inches Hg (1011.0 mb)
<b>Winds:</b>	variable direction winds at 3 MPH (3 knots; 1.5 m/s)
<b>Visibility:</b>	6 or more sm (10+ km)
<b>Ceiling:</b>	28000 feet AGL
<b>Clouds:</b>	few clouds at 1700 feet AGL, scattered clouds at 14000 feet AGL, broken clouds at 28000 feet AGL

Figure 1: WMKM METAR Report at 1100 hours

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Actual weather report at the time of incident is similar to METAR and is well within the weather minima for student pilot solo flight as stated in Procedures Manual Part 4 Routes Para 4.4.

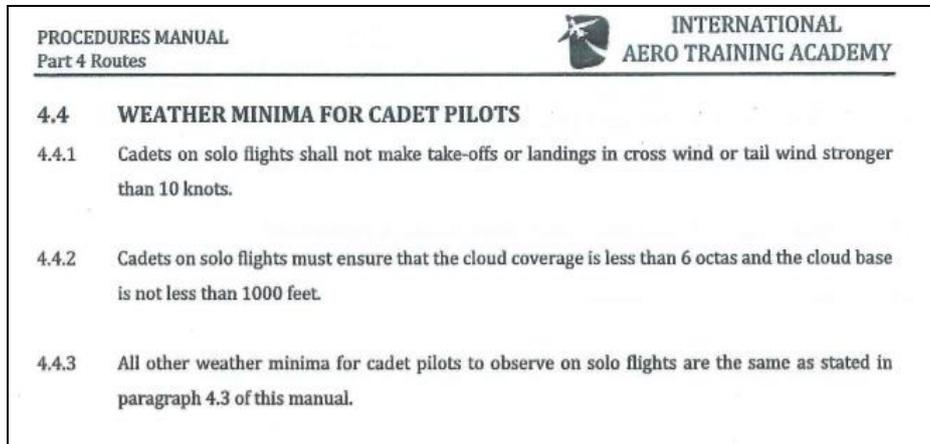


Figure 2: Procedures Manual Part 4 - Weather Minima Criteria for Student Pilots

### 1.8 Aids to Navigation

All navigation aids at WMKM were operational at the time of incident. As for the aircraft, it is equipped with a fully integrated Garmin G1000 Cockpit.

### 1.9 Communications

All communication facilities at WMKM were operational at the time of incident.

### 1.10 Aerodrome Information

#### 1.10.1 Malacca Airport (WMKM)

WMKM has a single asphalt runway, Runway 03/21 with a length of 2,135 metres x 45 metres. The elevation of the airport is 40 feet above mean sea level. There are two flying academies operating from this airport. They are Malaysia Flying Academy (MFA) and International Aero Training Academy (IATAC).

### 1.10.2 Runway Inspection

The airport authority, Malaysia Airports Holdings Berhad (MAHB) staff did an immediate inspection on the runway after being notified by the Air Traffic Control Tower of a suspected aircraft propeller blade strike on the runway surface. Three strike marks were observed on the runway consistent with an aircraft propeller strike measuring 79 cm between the first and second-strike mark and 89 cm between the second and third strike mark. Some debris made of wood and plastic like material were also found scattered on the runway.



Photo 2: Aircraft Propeller Strike Marks on Runway 03 Surface

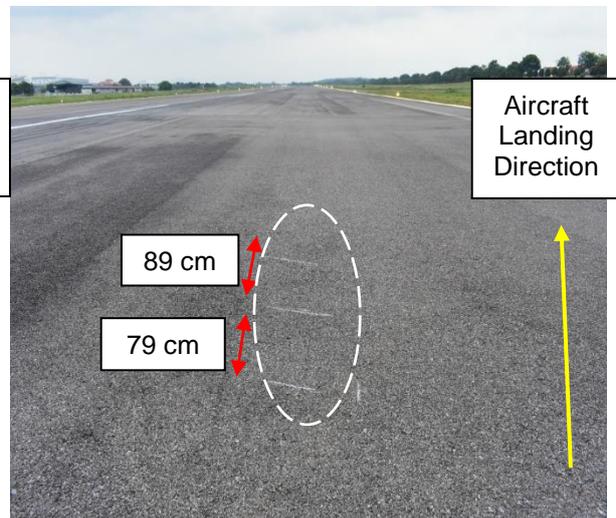


Photo 3: Distance Between Propeller Strike Marks (strike marks highlighted)



Photo 4: Debris made of wood and plastic found on runway

### 1.11 Flight Recorders

The aircraft is not installed with a Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR).

### 1.12 Wreckage and Impact Information

Aircraft was intact and able to taxi to IATAC dispersal after the propeller blades strike the runway surface. Below is the aerial view of the runway where the approximate aircraft position was when the aircraft propeller blades struck runway the surface:



Photo 5: Aerial View of Aircraft Position when Propeller Strike the Runway Surface at Malacca Aerodrome (Not according to scale)

### 1.13 Medical and Pathological Information

No injuries to the student pilot. No post incident medical examination was carried out on the student pilot.

**1.14 Fire**

There was no pre or post impact fire.

**1.15 Survival Aspects**

There were no fatality or injury to the pilot.

**1.16 Tests and Research**

Nil.

**1.17 Organisational and Management Information**

**1.17.1 Aircraft Operator**

International Aero Training Academy (IATAC) is an Approved Training Organization (ATO) operating at Malacca International Airport. IATAC has a fleet of 9 aircraft (6 Diamond DA40 and 3 Diamond DA42). It offers courses as stated in Procedures Manual Part 2 General Para 2.2.

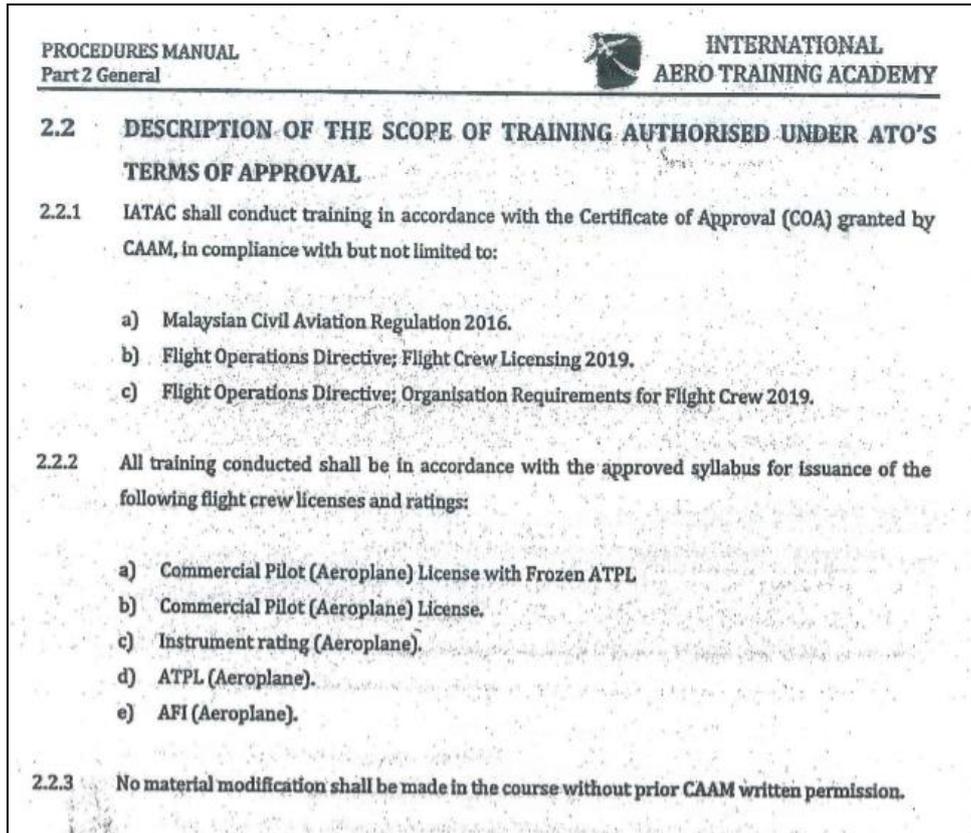


Figure 3: Procedures Manual Part 2 General - Malaysian Approved Training Organization (ATO) and Courses Offered

### 1.17.2 Pre-flight Board Brief and Post Flight Assessment in Student Pilot's Flight Logger Online Flight Training Record (FTR)

The Flight Instructor (FI) is directly responsible to the Chief FI (CFI) in all aspects of flight training activities of the student pilot that is allocated to him. The duties and responsibilities are stated in Procedures Manual Part 2 Para 2.4.8.3. Nevertheless, it was noted that pre-flight board brief was not carried out by the FI to the student pilot for most of the flight prior to the incident. Similarly, the FI did not complete the post flight assessment in the student pilot's flight logger online FTR system for all flights prior to the incident. Post flight assessment graded by the FI for all flying sorties in student pilot's flight logger online FTR was only emailed to the student pilot for approval from 10 to 12 July 2019, 4 days after the incident.



the incident was 4 days ago. Therefore, the student pilot is current in flying and flying fatigue was not a contributing factor in this incident.

#### 1.17.4 Location of Flight Instructor for Student Pilot Solo Flight

The Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying para 2.2.8 requires the FI to supervise the student pilot's first solo circuits at the Airport Fire and Rescue Services (AFRS) Tower.

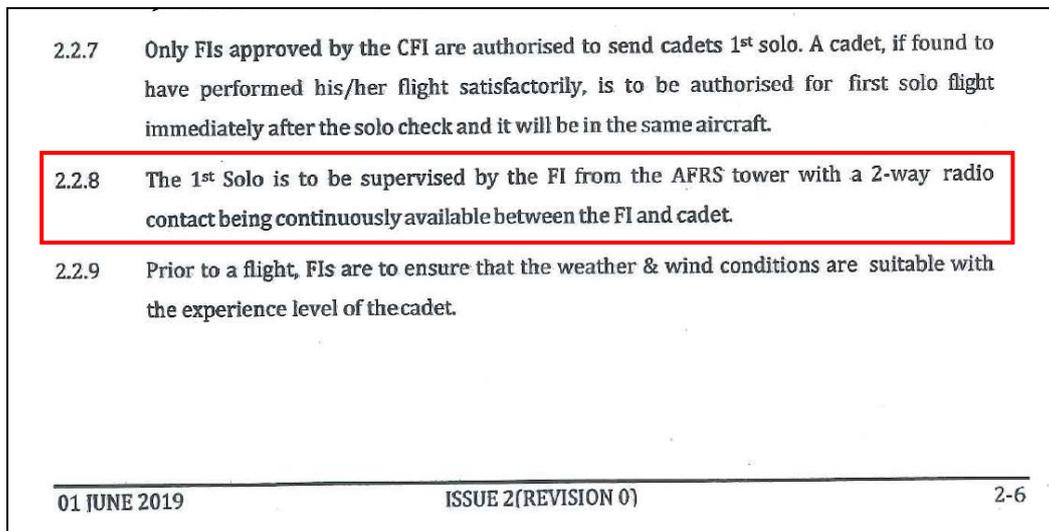


Figure 5: Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying – Flight Instructor Location for Student Pilot's First Solo

Para 2.2.15 requires the FI is to be stationed at the control tower for first solo training area. Nevertheless, during this incident the FI was monitoring the student pilot first solo training area flight while he was flying with another student pilot at Malacca airport.

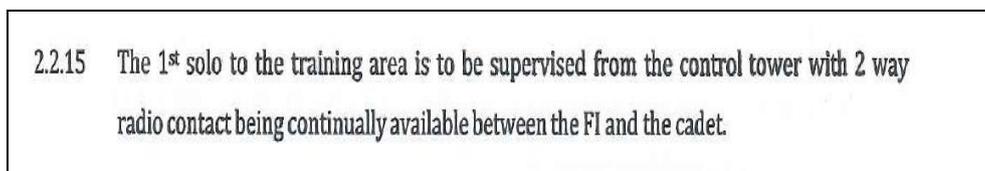


Figure 6: Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying – Flight Instructor Location for Student Pilot's First Solo Training Area

**1.17.5 Go-around and Mis-landing Procedure**

Go-around and Mis-landing procedures are stated as an exercise in Circuits 3 in the Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying page 2-13 as below:

13.	<b>CIRCUITS 3 (Normal, Flapless &amp; Glide)</b>  a. Crosswind take-off b. Revision of circuits 1 & 2 c. Glide circuit - demo d. Go-around procedure e. Mis-landing procedure f. Emergency - brakes failure.	1:00			
		12:30			12:30

Figure 7: Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying – Mis-landing Procedure -

Go-around procedures is clearly explained in Diamond DA40 SOP – Normal Procedures para 17 and in the Training Manual - Flight Instructor Guide Part 1 Exercise 12 Approach and Landing. There is no explanation what Mis-landing procedures are in either publication. It is noted that the student pilot does not have a clear understanding between these two procedures.

<b>GO AROUND PROCEDURE</b>	
17.	If at 200 feet AGL or above, and the approach is not to be continued for any reason then the go-around procedure is to be initiated.
a.	Throttle advance to full power and simultaneously select initial climb attitude. Select Flaps T/O
b.	Once the aircraft is stabilized in a climb at or above 300 feet AGL, with a <b>positive ROC</b> (rate of climb) as indicated on the VSI and altimeter and with more than 75 kts, - Flaps UP. Climb at 80 kts
c.	Continue Normal take-off procedure.
d.	Turn the aircraft towards the non- traffic side of the runway and fly parallel to the runway.
e.	Appropriate radio call.(Going round)
f.	If at 200 feet AGL and no landing clearance is received and/ or runway is not clear, a mandatory go around is to be carried out.

Figure 8: Diamond DA40 SOP - Normal Procedures - Go Around Procedure

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<p>e. <u>Go Around</u> Demo and practice at altitude. Before practicing in circuit</p>	<p>a. Open throttle fully, prevent yaw b. Select climbing attitude &amp; set flap T/O c. Trim d. LOOKOUT e. Flap raised in stages at 200' - Trim change f. Turn towards dead side of runway if necessary g. Climb 73 kts</p>
--	--

Figure 9: Training Manual - Flight Instructor Guide Part 1  
Exercise 12 Approach and Landing - Go Around Procedure

The Diamond DA40 SOP – Normal Procedures para 19 clearly states that a go-around is to be initiated even above 200 feet when it is not safe to make a landing. In this incident the student pilot did not initiate a go-around when her approach or landing is not safe.

19. However, a go around may be initiated even above 200 feet if at any time you find you will not be able to make a safe landing. The procedure is the same as the go around procedure from below 200 feet AGL except there is to be no turn toward the non-traffic side of the runway. Climb out is to be straight ahead on the runway centre line.

Figure 10: Diamond DA40 SOP – Normal Procedures – Initiating Go Around Procedure

### 1.17.6 Positioning and Spacing on Circuits

The Diamond DA40 SOP – Normal Procedures para 22 & 23 states that spacing in circuits are to be carried out at upwind and aircraft are to avoid extending downwind unless advised by Air Traffic Controller. Aircraft are to adjust to get to the correct glide path when cleared for approach by Air Traffic Controller after extending downwind. The student pilot was not at the normal position and height on final as taught during the circuits exercises after extending downwind.

POSITIONING/SPACING ON CIRCUIT	
22.	All spacing between aircraft will be carried out during the up wind portion of the circuit by turning on to crosswind only when the aircraft ahead has passed the abeam position of the aircraft or later. The turn on to base leg will be carried out in the normal position and if unable to continue with the approach due to the aircraft ahead, a go around will be initiated. Aircraft is to avoid extending downwind unless ATC so advises.
23.	If ATC instructs you to extend the downwind, maintain downwind heading until ATC gives clearance to commence approach then turn to base leg and adjust to get the correct approach path.

Figure 11: Diamond DA40 SOP – Normal Procedures - Positioning and Spacing on Circuits

### 1.17.7 Non-Standard Instructional Technique

The student pilot had a history in recognising the correct flare attitude to land the aircraft safely. During the interview, the FI stated that he had devised a technique to intentionally bounced the aircraft on 5 occasions to show the student pilot the correction technique to control the aircraft in an event of a bounce during landing. This device technique by the FI is not stated as a teaching technique in the Flight Instructor Guide Part 1 Exercise 12 – Approach and Landing.

Sequence:	Observations:
c. <u>Landing</u>	<ul style="list-style-type: none"> <li>a. Approaching threshold adjust speed to 65 kts</li> <li>b. Judging round out</li> <li>c. Start round out and then slowly close throttle</li> <li>d. Allow aircraft to touchdown on main wheels</li> <li>e. Maintain control column just aft of central, allowing nosewheel to lower on to the runway</li> </ul>

Figure 12: Flight Instructor Guide Part 1 Exercise 12 – Approach and Landing

### 1.17.8 Post-Accident Medical Examination

Post-accident medical examination on the student pilot was not carried out. ICAO Aircraft Accident and Incident Investigation Annex 13 Chapter 5 para 5.9.1 states that a medical examination of the crew is to be conducted expeditiously. Onsite Urine and Blood Test for substance abuse should be conducted on the student pilot immediately after the incident. Any further or more detailed examination shall be conducted when required by the investigation authority.

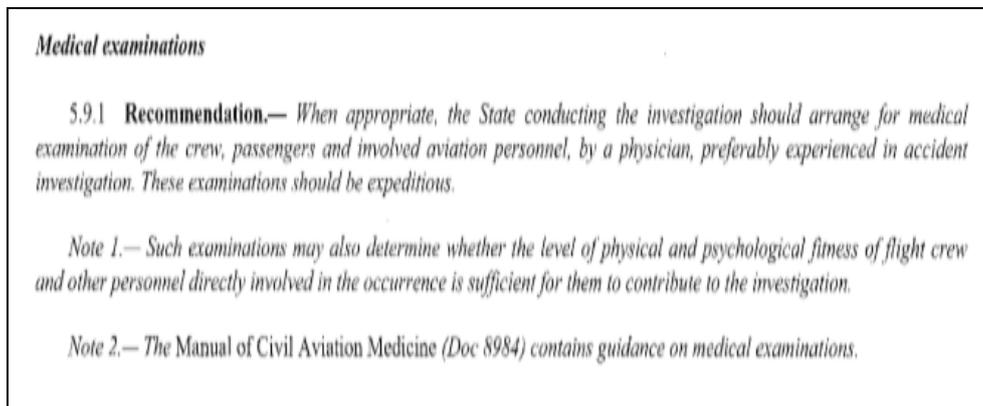


Figure 13: ICAO Aircraft Accident and Incident Investigation Annex 13 Chapter 5 – Medical Examinations

The IATAC Emergency Response Plan does not state the need to conduct a post-accident/incident medical examination on any crews that are involved in an accident or serious incident where applicable. It states only to secure records relating to the flight and personnel and or student that are involved in the accident or incident.

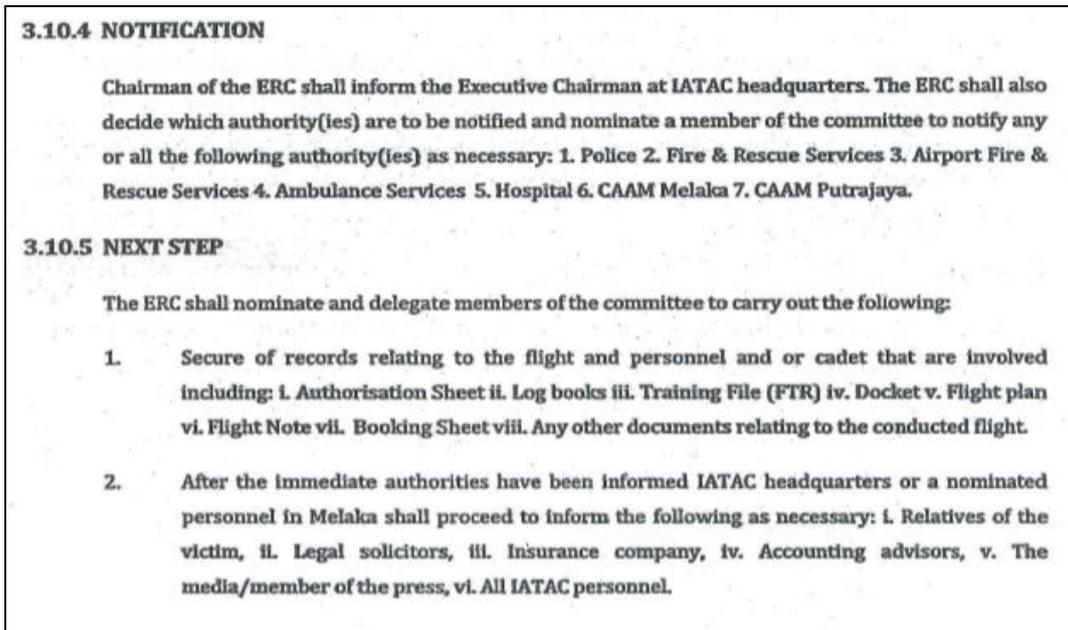


Figure 14: IATAC Emergency Response Plan – Securing of Records

### 1.17.9 Post Flight Inspection

Post flight inspection was not carried out by the student pilot as stated in the Diamond Airplane Flight Manual DA 40 NG as the student pilot was not aware of the damage on the aircraft propeller blades after the completion of the flight. The student pilot did not notice the damage to the propeller blades until she was told by ground staff later.



Figure 15: Diamond Airplane Flight Manual - Normal Operating Procedures – Post Flight Inspection

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The Diamond DA40 NG Checklist also does not state the requirement to conduct post-flight check as required by the Diamond DA40 NG Flight Manual.

<b>PARKING CHECK</b>		
1	Parking brake .....	SET 1
2	Power lever .....	max 10% for 1 min. 2
3	ELT .....	CHECK not activated 3
4	Engine / System page .....	CHECKED 4
5	Engine / Fuel page .....	TTL TIME IN SVC NOTED 5
6	Avionic master .....	OFF 6
7	Electrical consumers except ACL (strobe) .....	OFF 7
8	Engine Master .....	OFF 8
9	ACL (strobe) .....	OFF 9
<i>When engine indications x-out red:</i>		
10	Electric Master .....	OFF 10
11	Start key .....	REMOVED 11
End of Checklist		
<b>SECURING THE AIRCRAFT</b>		
<i>Release parking brake, use chocks. Cover the pitot probe. Attach tie down ropes to mooring points</i>		
15.04.2017 Edition # 17.3	Diamond Flight Training <i>Does not replace the Airplane Flight Manual</i>	Page 7

Figure 16: Diamond DA40 NG Checklist

### 1.17.10 Flight Instructor Competency

The FI is a 52 years old expatriate pilot from the Philippines. He obtains his Commercial Pilot Licence (CPL) in 1993 and an Assistance Flight Instructor (AFI) licence in 1994. Before joining IATAC Malacca in 2018, he was a FI in Gulf Golden International Flying Academy (GGIFA) in Bintulu, Asia Pacific Flight Training (APFT) in Kota Bharu and Ground Instructor in IATAC Sandakan where IATAC was previously based for 6 years before relocating to Malacca. He has a total of about 3,000 hours on all types and about 2,000 hours instructional.

### 1.18 Additional Information

#### Interview and Statements

The investigation team conducted separate interview sessions with the Student Pilot, Student Pilot's Flight Instructor, MAHB Staff, Duty

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Air Traffic Controller and IATAC Safety Manager. The interview sessions were all recorded under the express knowledge of all the parties. All of the personnel had also submitted a written statement to be included in this report as follows:

### 1.18.1 Interview with Student Pilot

Interview was recorded and a written statement submitted. The main findings found during the interview session are as follows:

- a. No pre-flight board briefings were conducted by the FI prior to her GH 4 sortie with her instructor. Verbal brief was given only for the exercises cleared by the Instructor prior to her first solo training area sortie.
- b. The student pilot was also distracted by the busy radio chatter in circuits and led her to miss the downwind checks. She was further distracted when she was requested by ATC to extend downwind and to locate another aircraft ahead of her in circuits.
- c. Too focus on aiming point at runway threshold with aircraft approach and speed high on final.
- d. The student pilot flared late and forgot to reduce power to idle approaching the threshold. The aircraft touch down hard and bounce multiple times and the student pilot did not realize the propeller blades had struck the runway surface. She could not recall if she had inadvertently pushed the nose attitude down during the bounce landing.
- e. Instructor did mostly verbal pre-flight briefs prior to flying for most of her flying sorties. The Instructor also did not complete the after-flight report assessment in the FTR for all the concluded

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flying sorties. All the assessment was only completed later after the incident.

f. The student pilot did not have a clear understanding of mis-landing and go-around procedures as they seem to be the same.

### 1.18.2 Interview with Student Pilot's Flight Instructor

Interview was recorded and a written statement submitted. The main findings found during the interview session are as follows:

a. Instructed student pilot on flare correction technique when aircraft bounce on landing by intentionally approach with high speed to bounce aircraft with nose high attitude on 5 occasions during student pilot first solo training area check flight. There was a tendency for the student pilot to correct the flare attitude by pushing control column forward. Instructor acknowledged this is a non-standard teaching technique.

b. He acknowledged that he would sometimes improvise teaching a flying technique which is not stipulated in the Instructor Guide for student pilot's easy understanding.

c. Flight Instructor's explanation on mis-landing procedures were ambiguous.

d. Flight Instructor was not very familiar with the operations of the Student Pilot's Flight Logger Online Flight Training Record (FTR) system.

e. Flight Instructor stated that for first solo circuits, instructor will monitor and supervise student pilot at Airport Fire Rescue Services Tower. As for first solo training area, instructor will either

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be airborne or stationed at IATAC Operations Room to monitor and supervise the student pilot.

f. Flight Instructor was flying as airborne instructor when the student pilot was doing her first solo training area sortie.

g. Flight Instructor stated he has conducted pre-flight board briefs but could not provide evidence to show proof.

### **1.18.3 Interview with Malaysia Airports Holdings Berhad (MAHB) Staff**

Interview was recorded and a written statement submitted. The main findings found during the interview session are as follows:

a. During the runway inspection, he found strike marks and a few pieces of wooden and plastic like material scattered on the runway near the strike marks. All these debris were later handed over to AAIB investigation team.

### **1.18.4 Interview with Duty Air Traffic Controller**

Interview was recorded and a written statement submitted. The main findings found during the interview session are as follows:

a. The weather was good and she saw the aircraft bounced on landing Runway 03.

b. The aircraft was observed to be in good condition and taxi back to IATAC dispersal.

c. The instructor was not at the control tower when the student pilot was flying her solo flight.

## 1.19 Investigation Techniques

### 1.19.1 Reason's "Swiss Cheese" Model

As this incident is Human Factor related, the Reason's "Swiss Cheese" Model (Figure 17) is used to describe the layers of defences at which active failures/conditions and latent failures/conditions may occur in this incident.

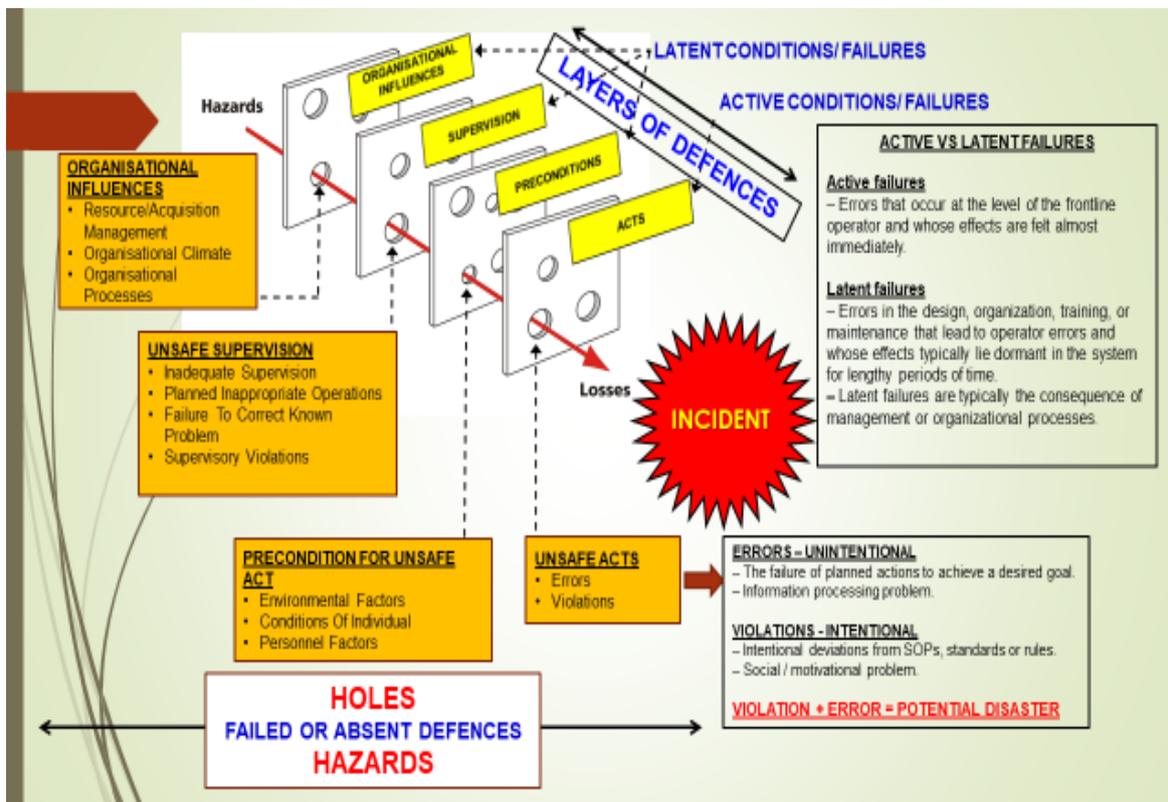


Figure 17: Reason's 'Swiss Cheese' Model

### 1.19.2 Human Factors Analysis and Classification System (HFACS)

From the describe layers of defences in the Swiss Cheese model at which active failures/conditions and latent failures/conditions may had occur in this incident, Human Factors Analysis and Classification System (HFACS) will be used to evaluate and rule in or eliminate the various preconditions that resulted in the unsafe act. It will then evaluate the supervisory and subsequent organizational issues that had contributed

to the precondition. Finally, this will provide a detailed human factors picture of all the event that led up to the incident as in Figure 18.

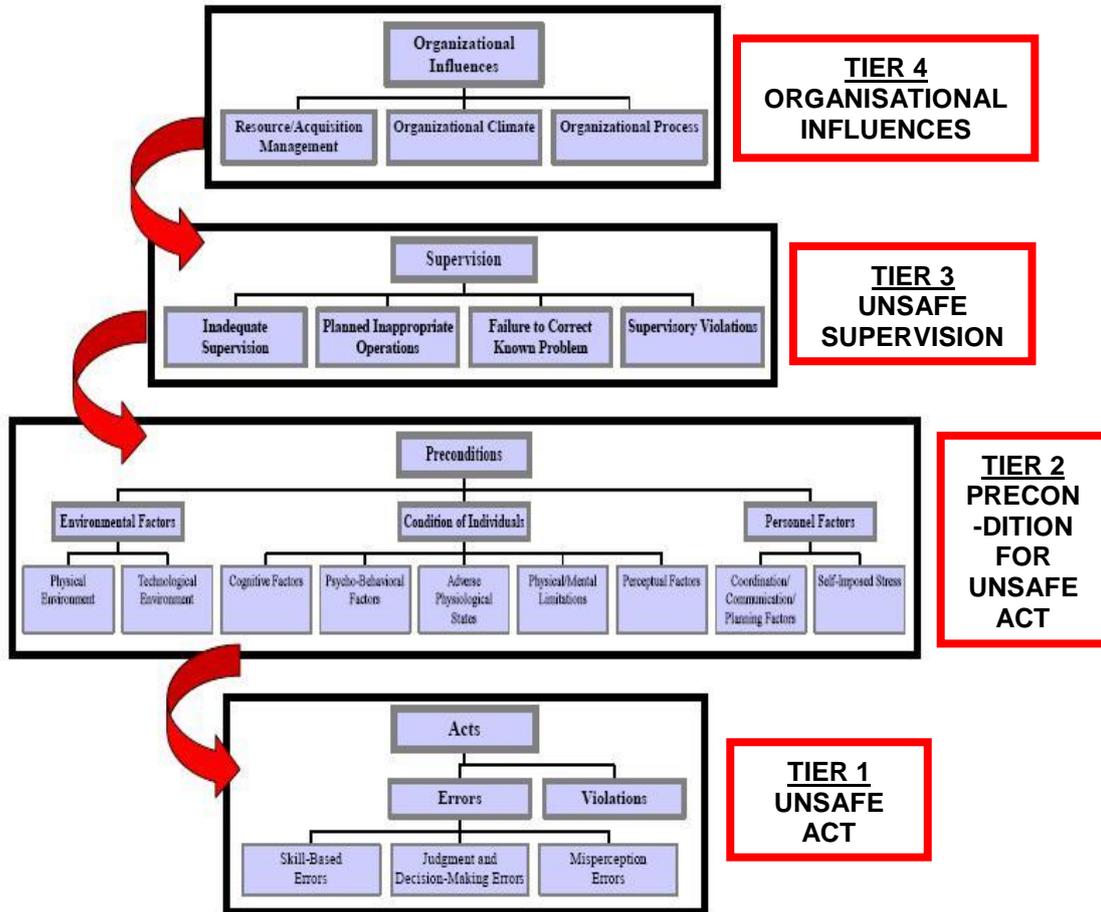


Figure 18: Human Factors Analysis and Classification System (HFACS)

## 2.0 ANALYSIS

The HFACS Worksheet is used to rate each statement in Tier 1 to 4 (**Appendix A**). Wherever the rating is 2, 3 or 4 an evidence analysis is provided for the reasons responsible at the end of the rating sheet as in paragraph 2.1 to 2.4. Subsequently an Investigation Analysis Summary is tabulated as in paragraph 2.9.

2.1 Tier 1 - Unsafe Acts

AE	ERRORS	EVIDENCE
AE 1	<b>Skill-Based Errors</b>	
AE1.3	<b>Procedural Error.</b> Procedural Error is a factor when a procedure is accomplished in the wrong sequence or using the wrong technique or when the wrong control or switch is used. This also captures errors in navigation, calculation or operation of automated systems.	<ul style="list-style-type: none"> <li>- Slow final correction technique. Slow to correct high final speed and did not correct for high rate of descend (ROD) on short final.</li> <li>- Wrong flaring technique. Late flare to arrest ROD and landing with power.</li> </ul>
AE 1.4	<b>Over-Control/Under-Control.</b> Over-control/Under-control is a factor when an individual respond inappropriately to conditions by either over-controlling or under-controlling the aircraft/vehicle/system. The error may be a result of preconditions or a temporary failure of coordination.	<ul style="list-style-type: none"> <li>- Unable to control aircraft pitch attitude when aircraft bounce to prevent multiple bounce on landing.</li> </ul>
AE 2	<b>Judgement and Decision-Making Errors</b>	
AE2.1	<b>Risk Assessment-During Operation.</b> Risk Assessment – During Operation is a factor when the individual fails to adequately evaluate the risks associated with a particular course of action and this faulty evaluation leads to inappropriate decision and subsequent unsafe situation. This failure occurs in real-time when formal risk-assessment procedures are not possible.	<ul style="list-style-type: none"> <li>- Continued approach despite high speed and high ROD on final.</li> <li>- Continued landing aircraft despite aircraft bouncing on landing.</li> </ul>
AE2.2	<b>Task Mis-prioritization.</b> Task mis-prioritization is a factor when the individual does not organize, based on accepted prioritization techniques, the tasks needed to manage the immediate situation.	<ul style="list-style-type: none"> <li>- Did not carry out Go-Around procedures when approach and final speed high or when aircraft bounce on landing.</li> </ul>
AE2.6	<b>Decision-Making During Operation.</b> Decision-Making During Operation is a factor when the individual through faulty logic selects the wrong course of action in a time-constrained environment.	<ul style="list-style-type: none"> <li>- Decided to land despite final approach not stable and bounced on landing.</li> </ul>

2.2 Tier 2 - Preconditions for Unsafe Acts

PC	CONDITION OF INDIVIDUALS	
PC1	<b>Cognitive Factors</b>	
PC1.2	<b>Channelized Attention.</b> Channelized Attention is a factor when the individual is focusing all conscious attention on a limited number of environmental cues to the exclusion of others of a subjectively equal or higher or more immediate priority, leading to an unsafe situation. It may be described as a tight focus of attention that leads to the exclusion of comprehensive situational information.	<ul style="list-style-type: none"> <li>- Too focus on busy aircraft radio transmission in circuits which led to forgetting downwind checks and unable to locate number one aircraft in circuits.</li> <li>- Too focus on aim point at runway threshold resulting in high approach and speed on final.</li> </ul>
PC1.8	<b>Checklist Interference.</b> Checklist Interference is a factor when an individual is performing a highly automated/learned task and is distracted by another cue/event that results in the interruption and subsequent failure to complete the original task or results in skipping steps in the original task.	<ul style="list-style-type: none"> <li>- Did not perform downwind checks due to distraction from busy radio transmission.</li> </ul>
PC4	<b>Physical / Mental Limitation</b>	
PC4.4	<b>Motor Skill/Coordination or Timing Deficiency.</b> Motor Skill/Coordination or Timing Deficiency is a factor when the individual lacks the required psychomotor skills, coordination or timing skills necessary to accomplish the task attempted.	<ul style="list-style-type: none"> <li>- Slow to flare during landing.</li> <li>- Forgot to reduce power to idle on flaring.</li> <li>- Failed to recognise multiple aircraft bounce.</li> </ul>
PC5	<b>Perceptual Factors</b>	
PC5.4	<b>Misperception of Operational Conditions.</b> Misperception of Operational Conditions is a factor when an individual misperceives or misjudges altitude, separation, speed, closure rate, road/sea conditions, aircraft/vehicle location within the performance envelope or other operational conditions and this leads to an unsafe situation.	<ul style="list-style-type: none"> <li>- Misjudge landing flare height.</li> <li>- Misjudge closure rate to runway during landing.</li> </ul>
PP	<b>PERSONAL FACTORS</b>	
PP1	<b>Coordination/Communication/Planning Factors</b>	
PP1.10	<b>Mission Briefing.</b> Mission briefing is a factor when information and instructions provided to individuals, crews, or teams were insufficient, or participants failed to	<ul style="list-style-type: none"> <li>- Instructor did not conduct proper pre-flight board brief during solo check flight prior to first solo training area flight</li> </ul>

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	discuss contingencies and strategies to cope with contingencies.	and most other sorties before the incident.
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**2.3 Tier 3 - Unsafe Supervision**

<b>SI</b>	<b>INADEQUATE SUPERVISION</b>	
SI1	<b>Leadership/Supervision/Oversight Inadequate.</b> Leadership/Supervision/Oversight Inadequate is a factor when the availability, competency, quality or timeliness of leadership, supervision or oversight does not meet task demands and creates an unsafe situation. Inappropriate supervisory pressures are also captured under this code.	- Instructor was not at ATC Tower to supervise student's first solo training area flight.
SI2	<b>SI 2 - Supervision – Modelling.</b> Supervision – Modelling is a factor when the individual's learning is influenced by the behaviour of peers and supervisors and when that learning manifests itself in actions that are either inappropriate to the individual's skill level or violate standard procedures and lead to an unsafe situation.	- Non-standard instructional technique. Instructor purposely bounce aircraft on landing and teach student the correction technique for bounce which is not stipulated in the training syllabus.  - Ambiguous explanation between mis-landing procedure and go-around procedure that leads to student confusion during flying.
SI4	<b>Supervision – Policy.</b> Supervision – Policy is a factor when policy or guidance or lack of a policy or guidance leads to an unsafe situation.	- No written Mis-Landing procedure in Standard Operating Procedure (SOP) and Flight Instructor Guide.  - No written requirement for instructor to conduct pre-flight board brief, after flight debrief and post flight assessment in SOP.
<b>SP</b>	<b>PLANNED INAPPROPRIATE OPERATIONS</b>	
SP5	<b>Proficiency.</b> Proficiency is a factor when and individual is not proficient in a task, mission or event.	- Student was assessed to have lack of landing skill proficiency before first solo and was extended extra 2 hours for retraining before

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		being cleared for first solo circuits.
<b>SF</b>	<b>FAILURE TO CORRECT KNOWN PROBLEM</b>	
SF2	<b>Operations Management.</b> Operations management is a factor when a supervisor fails to correct known hazardous practices, conditions or guidance that allows for hazardous practices within the scope of his/her command.	- Instructor teach the student the incorrect correction technique for bounced landing.

**2.4 Tier 4 - Organisation Influence**

<b>OP</b>	<b>ORGANISATIONAL PROCESSES</b>	
OP 3	<b>Procedural Guidance/Publications.</b> Procedural Guidance/ Publications is a factor when written direction, checklists, graphic depictions, tables, charts or other published guidance is inadequate, misleading or inappropriate and this creates an unsafe situation.	<ul style="list-style-type: none"> <li>- Diamond 40 SOP and Flight Instructor Guide does not explain mis-landing procedure.</li> <li>- Diamond 40 SOP does not state the requirement for FI to conduct pre-flight board brief, after flight debrief and complete post flight assessment in student's FTR.</li> </ul>

**2.5 Propeller Strike Runway Surface**

From the Safety Manager's witness statement, he heard two "squeezing" sound from the runway as the aircraft touchdown and the aircraft continued to float about 5 to 8 feet above the runway surface before it finally landed. The Air Traffic Controller also saw the aircraft bounced on landing while the student pilot stated that she noticed two bounces followed by a few more bounces on landing.

Immediate runway inspection carried out by MASB staff after the incident found three significant strike marks, some debris made of wood and plastic like material on the runway which matched the material of the aircraft propeller thus confirming that the aircraft propeller had struck the runway surface.

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Evidence from the three strike marks indicated most probably the control column was pushed forward during the multiple bounce sequence which resulted the nose attitude moving down significantly. This nose down attitude movement inadvertently caused the propeller blade tips to strike the runway surface.

As there is no closed-circuit television (CCTV) recording, flight data recorder and eyewitness which can describe the incident in detail, it cannot be determine when exactly the aircraft propeller blades struck the runway surface during the multiple bounce sequences.

### **2.6 Location of Flight Instructor for Student Pilot Solo Flight**

It must be noted that the Duty Air Traffic Controller has total authority over all air traffic flying in the specify airspace under her control. For aircraft controlling and safety coordination between Duty Air Traffic Controller and Flight Instructor in an event of an aircraft emergency to a student pilot on their first solo circuits or training area, the most appropriate location for the Flight Instructor will be at the Air Traffic Control Tower to supervise and provide assistance when needed. A common location with the Air Traffic Controller and a common 2-way radio communication with the student pilot will provide good situation awareness for both Duty Air Traffic Controller and Flight Instructor on the student pilot's flight condition and other traffic flying in the vicinity of the aerodrome.

The importance of the Flight Instructor to be at the Air Traffic Control Tower to supervise his student first solo training area cannot be overemphasised. As the Air Traffic Controller extended the student pilot's aircraft at downwind due to the student pilot not complying to air traffic instruction be at east of airfield instead of left hand downwind at 1,500 feet, the Flight Instructor could have coordinated with the Air Traffic Controller to instruct the student pilot to go-around and make another approach or to direct the aircraft ahead to go-around and give priority for the student pilot to make a normal approach to land. This would had avoided putting the student pilot on

an unfamiliar approach path (high and further from threshold) as compared to what was taught in circuits exercises especially with the limited flying experience at this stage of flying training.

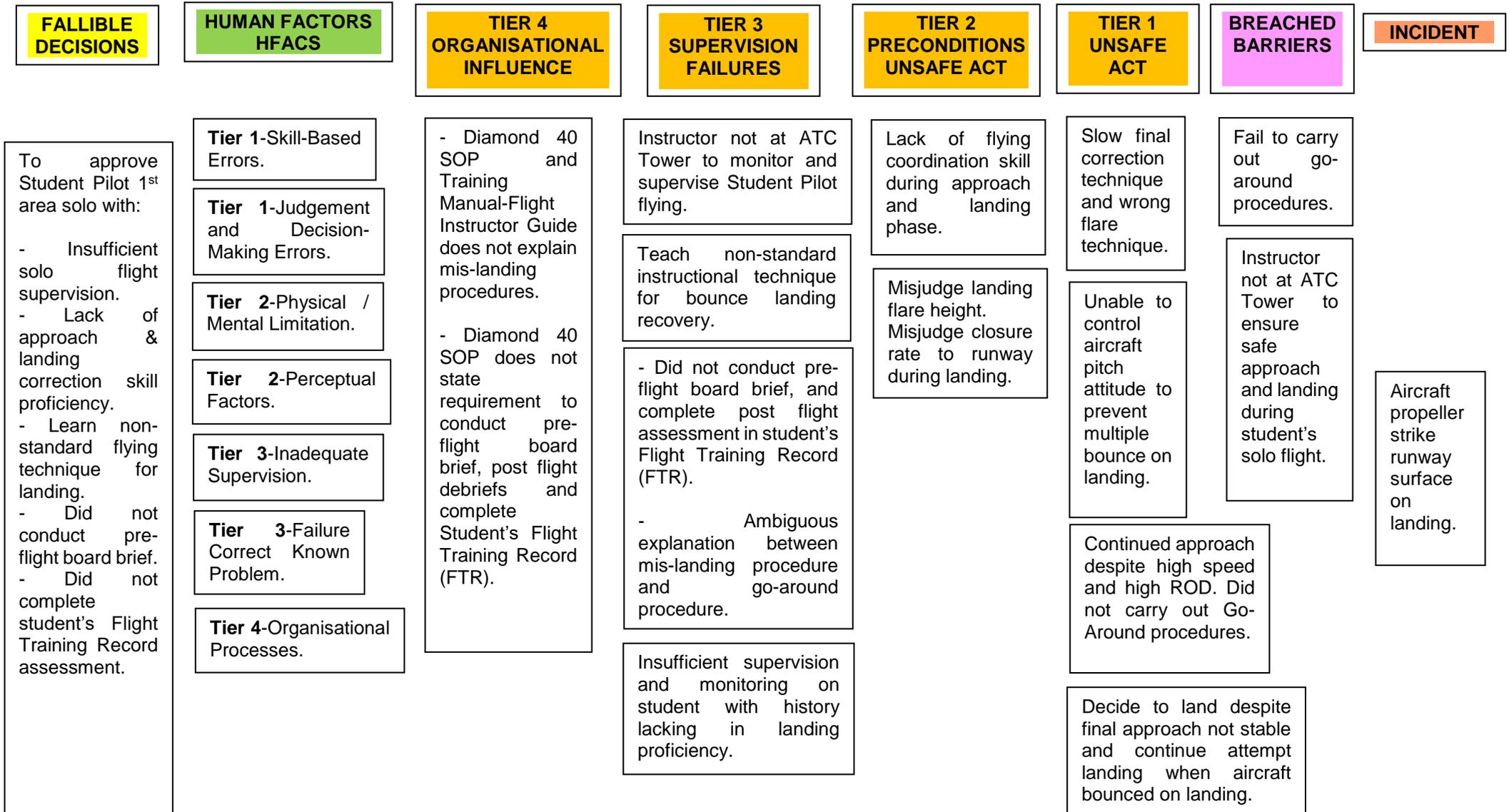
## **2.7 Non-Standard Instructional Technique**

The Flight Instructor stated that he has demonstrated to the student pilot on how to recover from a bounce on landing on 5 occasions as the student pilot had a tendency to bounce on landing and to push the control column to pitch aircraft attitude down to make correction. This 'Supervision – Modelling' non-standard instruction technique (**see para 2.3 Tier 3 – Unsafe Supervision SI 2**) had led the student pilot to try and control the multiple bounce landing instead of executing a go-around procedure thus causing the aircraft propeller blades to strike the runway surface.

## **2.8 Flight Instructor Competency**

The Flight Instructor is a very experience pilot and instructor. He has instructed in a few Approved Flying Training Organisation in Malaysia. He is current and competent to instruct as a flying instructor in IATAC. Nevertheless, he has a tendency to improvise teaching a flying technique which is not stipulated in the Instructor Guide and a tendency of non-adherence to Flight Training and Flight Simulator Syllabus.

2.9 INVESTIGATION ANALYSIS SUMMARY



## 3.0 CONCLUSION

### 3.1 Findings

3.1.1 The aircraft was properly maintained and airworthy for the flight.

3.1.2 The Student Pilot was properly licensed and authorised to carry out the first solo training area in accordance to Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying. The Student Pilot was also current in flying and fatigue was not a contributing factor.

3.1.3 Weather was good and suitable for solo flight at the time of incident in accordance with weather minima criteria in Procedures Manual Part 4.

3.1.4 The Flight Instructor did not conduct pre-flight board brief for most of the flights. He also did not complete the post flight assessment in the student pilot's Flight Logger Online Flight Training Record (FTR) system for all flights before the incident. This contravene with the duties and responsibility of a flight instructor as stated in Procedures Manual Part 2.

3.1.5 The Flight Instructor was not at the Air Traffic Control Tower to monitor and supervise the student pilot during the first solo training area flight. The instructor was carrying out flying duties and at the same time acting as an airborne instructor. This contravene the Flight Training and Flight Syllabus Part 2 requirement where the Flight Instructor must be in the control tower.

3.1.6 No explanation for mis-landing procedures in Diamond DA40 SOP and Training Manual – Flight Instructor Guide. The student pilot and the flight instructor did not have a clear understanding between mis-landing and go-around procedures.

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3.1.7 Flight Instructor taught the student pilot non-standard instructional technique for bounce landing recovery. This was not in accordance to Flight Instructor Guide Part 1 Exercise 12 – Approach and Landing.

3.1.8 No post-accident medical examination was conduct on the student pilot. This not in accordance to the ICAO Aircraft Accident and Incident Investigation Annex 13 Chapter 5 - Medical Examinations.

3.1.9 No post flight inspection on the aircraft was conducted by the student pilot. This practice is not in accordance to Diamond Airplane Flight Manual – Normal Operating Procedures – Post Flight Inspection.

3.2 Causes

<b>TIER 1 - UNSAFE ACTS - ERRORS</b>		<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
AE 1	Skill-Based Errors	2			4
AE 2	Judgement and Decision-Making Errors	1	1	1	3
AE 3	Misperception Error				1
<b>TIER 1 - UNSAFE ACTS – VIOLATIONS</b>					
AV 1	Violations - Based on Risk Assessment				1
AV 2	Violations - Routine / Widespread				1
AV 3	Violations – Lack of Discipline				1
<b><u>TIER 1 - UNSAFE ACTS SUB TOTAL</u></b>		<b><u>3</u></b>	<b><u>1</u></b>	<b><u>1</u></b>	<b><u>11</u></b>
<b>TIER 2 - PRECONDITIONS FOR UNSAFE ACTS - ENVIRONMENTAL FACTORS</b>					
PE 1	Physical Environment				11
PE 2	Technology Environment				8
<b>TIER 2 - PRECONDITIONS FOR UNSAFE ACTS - CONDITIONS OF INDIVIDUAL</b>					
PC 1	Cognitive Factors			2	6
PC 2	Psycho-Behavioural Factors				15
PC 3	Adverse Physiological State				16
PC 4	Physical / Mental Limitation	1			4
PC 5	Perceptual Factors	1			10
<b>TIER 2 - PRECONDITIONS FOR UNSAFE ACTS - PERSONNEL FACTORS</b>					
PP 1	Coordination/Communication/Planning Factors			1	11
PP 2	Self-Imposed Stress				6
<b><u>TIER 2 - PRECONDITIONS FOR UNSAFE ACTS SUB TOTAL</u></b>		<b><u>2</u></b>	<b><u>0</u></b>	<b><u>3</u></b>	<b><u>87</u></b>
<b>TIER 3 - UNSAFE SUPERVISION</b>					
SI	Inadequate Supervision	1	1	1	3
SP	Planned Inappropriate Operations		1		6
SF	Failure Correct Known Problem	1			1
SV	Supervisory Violations				4
<b><u>TIER 3 - UNSAFE SUPERVISION SUB TOTAL</u></b>		<b><u>2</u></b>	<b><u>2</u></b>	<b><u>1</u></b>	<b><u>14</u></b>
<b>TIER 4 - ORGANIZATIONAL INFLUENCES</b>					
OR	Resource/Acquisition Management				9
OC	Organisational Climate				5
OP	Organisational Processes		1		5
<b><u>TIER 4 - ORGANIZATIONAL INFLUENCES SUB TOTAL</u></b>		<b><u>0</u></b>	<b><u>1</u></b>	<b><u>0</u></b>	<b><u>19</u></b>
<b><u>TOTAL UNSAFE ACTS</u></b>		<b><u>7</u></b>	<b><u>4</u></b>	<b><u>5</u></b>	<b><u>131</u></b>

Table 4: Summary of HFACS Worksheet

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3.2.1 From the human factor analysis as shown in the summary of the HFACS worksheet in paragraph 3.2, it has been determined that the above incident **primary causes** were attributed to:

- a. 3 Unsafe Acts (Tier 1) as follows:
  - i. 2 Skilled-Based Errors.
  - ii. Judgement and Decision-Making Errors.
  
- b. 2 Preconditions of Unsafe Acts (Tier 2) as follows:
  - i. Physical / Mental Limitation.
  - ii. Perceptual Factors.
  
- c. 2 Unsafe Supervision (Tier 3) as follows:
  - i. Inadequate Supervision
  - ii. Failure Correct Known Problem.

3.2.2 The **secondary causes** were attributed to:

- a. 1 Unsafe Act (Tier 1) as follows:
  - i. Judgement and Decision-Making Errors.
  
- b. 2 Unsafe Supervision (Tier 3) as follows:
  - i. Inadequate Supervision.
  - ii. Planned Inappropriate Operations.
  
- c. 1 Organisation Influence (Tier 4) as follows:
  - i. Inadequate Organisational Processes.

3.2.3 A chain of events started when the student pilot was instructed by Air Traffic Controller to extend downwind thus inadvertently putting the student pilot in an unfamiliar approach path on final. The student pilot continued approach to land the aircraft despite high speed and high approach on final. Misjudgement of closure rate to the runway and wrong flaring technique led to a multiple bounce landing.

3.2.4 The primary cause of this incident is 'Supervision Modelling'. A non-standard instructional technique was taught by the instructor which led the student pilot to try and control the multiple bounce landing by inadvertently pushing the aircraft nose attitude down thus causing the aircraft propeller blades to strike the runway surface.

3.2.5 The secondary cause is due to Inadequate Supervision by the flight instructor by not being at the Air Traffic Control Tower to instruct the student pilot to execute a go-around procedure when the approach or landing is not safe.

### **3.3 Breached Barriers**

3.3.1 The student pilot had completed a total of 23 sorties as stipulated in the Flight Training and Flight Simulator Syllabus with an addition of 2 hours extra sorties due to flying handling problems prior to first solo circuits. The total accumulated flying hours was 23 hours. Therefore, approving a student pilot to fly solo with the limited experience and flight training hours is obviously a calculated training risk in training a person to become a pilot.

3.3.2 To mitigate these calculated training risks, the approved Flight Training and Flight Simulator Syllabus is designed to train a student pilot in a progressive learning environment, a standard flying technique with continuous repetitive practices and build in barriers to ensure accident or incident does not happen. These barriers are compliance to Standard Operating Procedures (SOP) and Teaching Guide, flights authorisation by Flight Instructors, proper monitoring of student pilot during solo flights as stated in SOP to state a few.

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3.3.3 Therefore, the breached barriers for this incident are as follows:

- a. The failure of the student pilot to execute the go-around procedures by when landing is not safe contrary to the Diamond DA40 SOP.
- b. The absent of the flight instructor at the Air Traffic Control Tower to ensure the student pilot carries out a safe approach and landing during her solo flight contrary to the Flight Training and Flight Simulator Syllabus Part 2 CPL SE Flying.

### 4.0 SAFETY RECOMMENDATIONS

4.1 The Operator is to carry out the following safety recommendations:

4.1.1 To include mis-landing procedure explanation and technique in the Diamond 40 SOP and Training Manual-Flight Instructor Guide or to delete in total mis-landing procedure if this procedure is the same as go-around procedure.

4.1.2. To include the requirement to conduct the following flight tasks in the Diamond 40 SOP as follows:

- a. Pre-flight board brief.
- b. Post flight debrief.
- c. Post flight assessment in the student pilot's Flight Logger Online Flight Training Record (FTR) system.
- d. Post flight aircraft inspection.

4.1.3 To include the requirement to conduct post-flight inspection in the Diamond DA40 Checklist.

4.1.4 To amend the Flight Training and Flight Simulator Syllabus to co-locate the Flight Instructor with the Air Traffic Controller at the Air

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Traffic Control Tower when monitoring and supervising student pilot's first solo and first solo training area.

4.1.5 To ensure all Flight Instructor comply with the instruction stated in the Flight Training and Flight Simulator Syllabus (after amendment in para 4.1.4) to be at the Air Traffic Control Tower to supervise and monitor when their student is on first solo circuits or first solo training area flight.

4.1.6 To ensure Flight Instructor teaches the standard flying technique as detail in the Training Manual-Flight Instructor Guide to all student pilots in relation to Approach and Landing exercises.

4.1.7 To include post-accident/incident medical examination on crews that are involved in an accident or serious incident where applicable in the IATAC Emergency Response Plan.

4.2 CAAM is to carry out the following safety recommendations:

4.2.1 To standardise the location of Flight Instructor of all Approved Training Organisation to be at the Air Traffic Control Tower to monitor and supervise their student during first solo circuits and first solo area flight.

**5.0 COMMENTS TO THE FINAL REPORT AS REQUIRED BY ICAO ANNEX 13  
PARAGRAPH 6.3**

5.1 As required by ICAO Annex 13, paragraph 6.3, the draft Final Report was sent to State of Manufacturer (CASIA), State of Registry (CAAM) and the Operator (IATAC) inviting their significant and substantiated comments on the Report. The following is the status of the comments received: -

<b>Organisations</b>	<b>Status of Significant and Substantiated Comments</b>
Civil Aviation Accident Investigation Authority Austria	No comments received
Civil Aviation Authority of Malaysia	Accepted with no comments
International Aero Training Academy Sdn. Bhd.	Accepted with no comments

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**APPENDICES**

<b>A</b>	Human Factors Analysis and Classification System (HFACS) Worksheet – SI 05/19	A-1 TO A-8
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**APPENDIX A**

**HUMAN FACTORS ANALYSIS AND CLASSIFICATION SYSTEM (HFACS)**  
**WORKSHEET - SI 05/19**

1. This worksheet is on HFACS. It is divided into four (4) sections having question pertaining to that area. There are total 147 statements and each statement is to be rated on a 4-point scale, where:

- a. **4 - Primary cause.** Main factors that directly contributed to / responsible for accident/incident.
- b. **3 - Secondary cause.** Factor was present but not the most important / critical factor responsible for accident / incident and contributed indirectly.
- c. **2 -** Factor was present but didn't affect the outcome at all, was not contributory.
- d. **1 -** Factor was not present.

2. It is mandatory to rate each statement. Wherever the rating is 2, 3 or 4 the explanation has to be provided for the reasons responsible in a narrative form at the end of the rating sheet.

**TIER 1 - UNSAFE ACTS**

**AE - Errors**

		4	3	2	1
<b>AE 1</b>	<b>Skill-Based Errors</b>				
AE 1.1	Inadvertent Operation				√
AE 1.2	Checklist Error				√
AE 1.3	Procedural Error	√			
AE 1.4	Over-control / Under-control	√			
AE 1.5	Breakdown in Visual Scan				√
AE 1.6	Inadequate Anti-'G' Straining Manoeuvre				√

		4	3	2	1
<b>AE 2</b>	<b>Judgement and Decision-Making Errors</b>				
AE 2.1	Risk Assessment – During Operation	√			
AE 2.2	Task Misprioritization			√	
AE 2.3	Necessary Action – Rushed				√
AE 2.4	Necessary Action – Delayed				√
AE 2.5	Caution / Warning – Ignored				√
AE 2.6	Decision-making During Operation		√		

		4	3	2	1
<b>AE 3</b>	<b>Misperception Error</b>				
AE 3.1	Errors due to Misperception				√

**AV – Violations**

		4	3	2	1
AV 1	Violations - Based on Risk Assessment				√
AV 2	Violations - Routine / Widespread				√
AV 3	Violations – Lack of Discipline				√

**TIER 2 - PRECONDITIONS FOR UNSAFE ACTS**

**PE - Environmental Factors**

		4	3	2	1
<b>PE 1</b>	<b>Physical Environment</b>				
PE 1.1	Vision Restricted by Icing/Windows Fogging/etc.				√
PE 1.2	Vision Restricted by Meteorology Conditions				√
PE 1.3	Vibration				√
PE 1.4	Vision Restricted in Workspace by Dust/Smoke/etc.				√
PE 1.5	Windblast				√
PE 1.6	Thermal Stress-Cold				√
PE 1.7	Thermal Stress-Heat				√
PE 1.8	Manoeuvring Forces-In-Flight				√
PE 1.9	Lighting of Other Aircraft / Vehicle				√
PE1.10	Noise Interference				√
PE 1.11	Brownout / Whiteout				√

		4	3	2	1
<b>PE 2</b>	<b>Technology Environment</b>				
PE 2.1	Seating and Restraints				√
PE 2.2	Instrumentation and Sensory Feedback Systems				√
PE 2.3	Visibility Restriction				√
PE 2.4	Controls and Switches				√
PE 2.5	Automation				√
PE 2.6	Workspace Incompatible with Human				√
PE 2.7	Personal Equipment Interference				√
PE 2.8	Communications - Equipment				√

**PC - Conditions of Individual**

		4	3	2	1
<b>PC 1</b>	<b>Cognitive Factors</b>				
PC 1.1	Inattention				√
PC 1.2	Channelized attention			√	
PC 1.3	Cognitive Task Oversaturation				√
PC 1.4	Confusion				√
PC 1.5	Negative Transfer				√
PC 1.6	Distraction				√
PC 1.7	Geographic Misorientation (Lost)				√
PC 1.8	Checklist Interference			√	

		4	3	2	1
<b>PC 2</b>	<b>Psycho-Behavioural Factors</b>				
PC 2.1	Pre-Existing Personality Disorder				√

PC 2.2	Pre-Existing Psychological Disorder				√
PC 2.3	Pre-Existing Psychosocial Disorder				√
PC 2.4	Emotional State				√

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PC 2.5	Personality Style				√
PC 2.6	Overconfidence				√
PC 2.7	Pressing Beyond Limits				√
PC 2.8	Complacency				√
PC 2.9	Inadequate Motivation				√
PC 2.10	Misplaced Motivation				√
PC 2.11	Overaggressive				√
PC 2.12	Excessive Motivation to Succeed				√
PC 2.13	Get-Home-It is / Get-There-Itis				√
PC 2.14	Response Set				√
PC 2.15	Motivational Exhaustion (Burn out)				√

		4	3	2	1
<b>PC 3</b>	<b>Adverse Physiological State</b>				
PC 3.1	Effects of G-Forces (G-LOC, etc.)				√
PC 3.2	Prescribed Drugs				√
PC 3.3	Operational Injury/Illness				√
PC 3.4	Sudden Incapacitation / Unconsciousness				√
PC 3.5	Pre-Existing Physical Illness/Deficit				√
PC 3.6	Physical Fatigue (Overexertion)				√
PC 3.7	Fatigue – Physiological / Mental				√
PC 3.8	Circadian Rhythm Desynchrony				√
PC 3.9	Motion Sickness				√
PC 3.10	Trapped Gas Disorders				√
PC 3.11	Evolved Gas Disorders				√
PC 3.12	Hypoxia				√
PC 3.13	Hyperventilation				√
PC 3.14	Visual Adaption				√
PC 3.15	Dehydration				√
PC 3.16	Physical Task Oversaturation				√

		4	3	2	1
<b>PC 4</b>	<b>Physical / Mental Limitation</b>				
PC 4.1	Learning Ability / Rate				√
PC 4.2	Memory Ability / Lapses				√
PC 4.3	Anthropometric / Biomechanical Limitations				√
PC 4.4	Motor skill / Coordination or Timing deficiency	√			
PC 4.5	Technical / Procedural Knowledge				√

		4	3	2	1
<b>PC 5</b>	<b>Perceptual Factors</b>				
PC 5.1	Illusion – Kinesthetics				√
PC 5.2	Illusion – Vestibular				√
PC 5.3	Illusion – Visual				√

PC 5.4	Misperception of Operational Conditions	√			
PC 5.5	Misinterpreted / Misread Instrument				√
PC 5.6	Expectancy				√

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PC 5.7	Auditory Cues				√
PC 5.8	Spatial Disorientation (Type 1) Unrecognized				√
PC 5.9	Spatial Disorientation (Type 2) Recognized				√
PC 5.10	Spatial Disorientation (Type 3) Incapacitating				√
PC 5.11	Temporal Distortion				√

### PP – Personnel Factors

		4	3	2	1
<b>PP 1</b>	<b>Coordination/Communication/Planning Factors</b>				
PP 1.1	Crew/Team Leadership				√
PP 1.2	Cross-Monitoring Performance				√
PP 1.3	Task Delegation				√
PP 1.4	Rank / Position Authority Gradient				√
PP 1.5	Assertiveness				√
PP 1.6	Communicating Critical Information				√
PP 1.7	Standard / Proper Terminology				√
PP 1.8	Challenge and Reply				√
PP 1.9	Mission Planning				√
PP 1.10	Mission Briefing			√	
PP 1.11	Task/Mission-In-Progress Re-Planning				√
PP 1.12	Miscommunication				√

		4	3	2	1
<b>PP 2</b>	<b>Self-Imposed Stress</b>				
PP 2.1	Physical Fitness				√
PP 2.2	Alcohol				√
PP 2.3	Drugs/Supplements/Self-Medication				√
PP 2.4	Nutrition				√
PP 2.5	Inadequate Rest				√
PP 2.6	Unreported Disqualifying Medical Condition				√

### TIER 3 – SUPERVISION

#### SI – Inadequate Supervision

		4	3	2	1
SI 1	Leadership / Supervision / Oversight Inadequate		√		
SI 2	Supervision-Modelling	√			
SI 3	Local Training Issues / Programs				√
SI 4	Supervision – Policy			√	
SI 5	Supervision – Personality Conflict				√
SI 6	Supervision-Lack of Feedback				√

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### SP – Planned Inappropriate Operations

		4	3	2	1
SP 1	Ordered / Led on Mission Beyond Capability				√
SP 2	Crew / Team / Flight Makeup / Composition				√
SP 3	Limited Recent Experience				√
SP 4	Limited Total Experience				√
SP 5	Proficiency		√		
SP 6	Risk Assessment – Formal				√
SP 7	Authorized Unnecessary Hazard				√

### SF - Failure Correct Known Problem

		4	3	2	1
SF 1	Personnel Management				√
SF 2	Operations Management	√			

### SV - Supervisory Violations

		4	3	2	1
SV 1	Supervision – Discipline Enforcement (Supervision act of Omission)				√
SV 2	Supervision – Defacto Policy				√
SV 3	Directed Violation				√
SV 4	Currency				√

## TIER 4 - ORGANIZATIONAL INFLUENCES

### OR - Resource/Acquisition Management

		4	3	2	1
OR 1	Air Traffic Control Resources				√
OR 2	Air Field Resources				√
OR 3	Operator Support				√
OR 4	Acquisition Policies / Design Processes				√
OR 5	Attrition Policies				√
OR 6	Accession/Selection Policies				√
OR 7	Personnel Resources				√
OR 8	Informational Resources / Support				√
OR 9	Financial Resources / Support				√

### OC - Organisational Climate

		4	3	2	1
OC 1	Unit / Organisational Values / Culture				√
OC 2	Evaluation / Promotion / Upgrade				√
OC 3	Perceptions of Equipment				√
OC 4	Unit Mission / Aircraft / Vehicle / Equipment Change or Unit Deactivation				√
OC 5	Organisational Structure				√

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### OP - Organisational Processes

		4	3	2	1
OP 1	Ops Tempo / Workload				√
OP 2	Program and Policy Risk Assessment				√
OP 3	Procedural Guidance / Publications		√		√
OP 4	Organisational Training Issues / Programs				
OP 5	Doctrine				√
OP 6	Program Oversight / Program Management				√

**SUMMARY OF HFACS WORKSHEET**

<b>UNSAFE ACTS – ERRORS</b>		<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
AE 1	Skill-Based Errors	2			4
AE 2	Judgement and Decision-Making Errors	1	1	1	3
AE 3	Misperception Error				1
<b>UNSAFE ACTS – VIOLATIONS</b>					
AV 1	Violations - Based on Risk Assessment				1
AV 2	Violations - Routine / Widespread				1
AV 3	Violations – Lack of Discipline				1
<b>UNSAFE ACTS SUB TOTAL</b>		<b>3</b>	<b>1</b>	<b>1</b>	<b>11</b>
<b>PRECONDITIONS FOR UNSAFE ACTS - ENVIRONMENTAL FACTORS</b>					
PE 1	Physical Environment				11
PE 2	Technology Environment				8
<b>PRECONDITIONS FOR UNSAFE ACTS - CONDITIONS OF INDIVIDUAL</b>					
PC 1	Cognitive Factors			2	6
PC 2	Psycho-Behavioural Factors				15
PC 3	Adverse Physiological State				16
PC 4	Physical / Mental Limitation	1			4
PC 5	Perceptual Factors	1			10
<b>PRECONDITIONS FOR UNSAFE ACTS - PERSONNEL FACTORS</b>					
PP 1	Coordination/Communication/Planning Factors			1	11
PP 2	Self-Imposed Stress				6
<b>PRECONDITIONS FOR UNSAFE ACTS SUB TOTAL</b>		<b>2</b>	<b>0</b>	<b>3</b>	<b>87</b>
<b>UNSAFE SUPERVISION</b>					
SI	Inadequate Supervision	1	1	1	3
SP	Planned Inappropriate Operations		1		6
SF	Failure Correct Known Problem	1			1
SV	Supervisory Violations				4
<b>UNSAFE SUPERVISION SUB TOTAL</b>		<b>2</b>	<b>2</b>	<b>1</b>	<b>14</b>
<b>ORGANIZATIONAL INFLUENCES</b>					
OR	Resource/Acquisition Management				9
OC	Organisational Climate				5
OP	Organisational Processes		1		5
<b>ORGANIZATIONAL INFLUENCES SUB TOTAL</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>19</b>
<b>TOTAL UNSAFE ACTS</b>		<b>7</b>	<b>4</b>	<b>5</b>	<b>131</b>

**FINDINGS**

1. From the analysis using the HFACS tool worksheet, it has been determined that the above incident where the aircraft propeller strike the runway surface primary causes were attributed to:

- a. 3 Unsafe Acts.
- b. 2 Preconditions of Unsafe Acts.
- c. 2 Unsafe Supervision.

2. The secondary causes were attributed to:

- a. 1 Unsafe Act.
- b. 2 Unsafe Supervision.
- c. 1 Organisation Influence.