DEPARTMENT OF CIVIL AVIATION MALAYSIA

AIRCRAFT ACCIDENT

REPORT NO. 02 - 0182

CESSNA 206 9M - AVI

Kampong Janda Baik, Pahang

Malaysia, 10th January 1982

Operator	:	Royal Selangor Flying Club
Aircraft	:	Type : Cessna Single Engine
		Model : 206L
		Nationality : Malaysian
		Registration : 9M - AVI
Place of Accident:		Hill Slope, 58,000 meters North-west of Kampong Janda Baik.
Date of Accident :		10th January 1982

SYNOPSIS

An Inspector of Accident was notified at about 1215 hours (Official Malaysian Time) 10th January 1982 that a Royal Selangor Flying Club aircraft was missing.

Notification of no communication with the aircraft was made by the Kuala Lumpur Flight Information Region (KL FIR) Controller to the National Rescue Coordination Centre (RCC) in the KL International Airport Subang, at 1115 hours. RCC in turn notified the National Emergency Control Centre (NECC) at 1127 hours. Investigation into the accident was conducted by the office of the Chief Inspector of Aircraft Accident Malaysia.

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On the morning of 10th. January, 1982 the aircraft bearing the registration 9M-AVI, with three persons on board departed from Sempang Airfield (Old KL International) towards a small rural airstrip in Benta, in the state of Pahang.

The flight was supposed to be conducted in Visual Meteorological Condition (VMC). As planned the aircraft was to fly at 3500 feet crossing a range of hills that separated the Kuala Lumpur city valley and the state of Pahang. Though the flight was to be flown visually the aircraft entered clouds just as it approached the range of hills. At about 0923:42 seconds the aircraft impacted on the Eastern ridge slope of the 3954 feet Gunung Sempah (Sempah Mountain) at an altitude of 3050 feet. Though the pilot of the aircraft survived, the two passangers were killed.

1. FACTUAL INFORMATION

1.1 History of the flight

1.1.1 As his usual practice the pilot instructed his personal secretary to book for an aircract for the flight to Benta airstrip. That was done on Wednesday 6th January, 1982 by the personal secretary through a club instructor, who was also to follow the flight. Initially, another aircraft, a Piper Lance, bearing the registration 9M-AVA was booked for the task. However on the morning of Saturday 9th., the Club instructor instructed the club Operations Clerk to change the aircraft from 9M-AVA to 9M-AVI, a Cessna 206.

1.1.2 He then prepared a written flight plan with the following details:

(a) The Flight was to be from Sempang Airfield climbing to 3500 feet to a prominent landmark, a large limestone outcrop called Batu Caves. The flight time was estimated to be 05 minutes.

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(b) From Batu Caves he planned to fly direct to the township of Bentong in the state of Pahang. The flight time was estimated to be 08 minutes.

(c) From Bentong he planned to fly direct to the final destination - Benta, still maintaing 3500 feet, and with an estimated flight time of 16 minutes.

(d) The flight was filed in accordance to Visual Flight Rules (VFR), as the pilot was not holding an Instrument Rating.

1.1.3 Deviating from his normal practice, the club instructor did not book for the enroute or destination weather forecast in the flight plan. He also did not include the number of persons who were to be onboard the flight because at that juncture he was not certain on who would be going along. The time of departure from Sempang was to be at 0830 hours (GMT). Finally he inserted the pilot's name in the "pilot-in-command" column. Completing that he instructed the Club Operations Clerk to send the flight plan to Sempang Operations.

1.1.4 On the morning of Sunday 10th January, 1982 the pilot, the flying club Instructor (who was to be his passenger), his ADC (who was also to be his passenger), met in the Club House lounge. After some customary coffee they moved to the Club's aircraft parking area which was about 50 meters away from the main club house. The two passengers, (who shall be subsequently named as Passenger 1 for the Club Instructor and Passenger 2 for the pilot's ADC), went straight to the aircraft and were seated in the aircraft. The pilot (who shall be subsequently named as Pilot 1) however proceeded to the Club Operations Room which was situated just beside the aircraft parking apron. There he inspected all relevant flight documents. He was satisfied with the filled details of the flight. He then signed in the Captain's column in the club

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master authorisation form. In essence from thereon he accepted the responsibility of the sole commander of the flight. From the club operations room he then walked back to the parked Cessna 206. On arrival he noted that the two passengers had already seated themselves in their respective seats. He noted that Passenger 1 was seated and strapped in the front right seat, while Passenger 2 was seated and strapped in the rear right seat - immediately behind Passenger 1. There were minimal exchange of conversation. Pilot 1 was satisfied that the two passengers had done the pre-flight checks for him.

1.1.5 The pilot then seated himself in the left front seat and had himself strapped. He used both the lap and shoulder harness. As his usual practice in order to improve his forward vision, he had a raised padding on his seat.

1.1.6 Having completed his pre-start check and having satisfied himself with the serviceability of the aircraft, he started up the engine, He reported the start-up was good and was without any complication.

1.1.7 At time 0858 Official Malaysian Time (OMT) or 0058 GMT, he made his first radio call to "Sempang Tower" on 126.5 Mhz. He then requested to taxy for take-off as per his flight plan. (Up to this stage the pilot had carried out all normal operations himself). Sempang Tower cleared 9M-AVI to taxy for runway 22, which being the further end of the runway when viewed from the club parking apron. The 22 end of Sempang runway was serviced by a taxy-way up to its mid-length only. As such aircraft that wanted to use runway 22 for take-off had to hold at the holding point before entering to backtrack along the runway into a pan. At time 0905:35 (OMT) or 0105 GMT, 9M-AVI was given Air Traffic Clearance (ATC) to fly to Benta via Batu Caves and Bentong at 1500 feet. After that the aircraft was cleared to backtrack into the 22 pan to wait for its turn to take-off.

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1.1.8 However at 0908:35 (OMT) 0108:35 (GMT) (and whilst waiting in the pan), 9M-AVI was informed that the previous ATC clearance had been cancelled. Instead they could only take-off and hold over head Sempang Airfield. Finally, with pilot 1 at the controls, 9M-AVI took off at 0910:15 (OMT) - 10110:15 (GMT). The aircraft then climbed to 800 feet and executed a left hand orbit overhead Sempang.

1.1.9 As the aircraft was at the late "downwind" position, it was given Air Traffic Clearance to set course for Batu Caves at 1500 feet. The time then was 0915:00 (OMT) - 0115:00 (GMT). On receiving the clearance pilot 1 turned the aircraft towards Batu Caves and climbed the aircraft to 1500 feet.

By 0916:25 (OMT) - 0116:25 (GMT) 9M-AVI was overhead the Northern Boundary of the Royal Selangor Golf course along Jalan Pekeliling At the same time the aircraft reported reaching 1500 feet. Sempang Tower then instructed the aircraft to call Lumpur Tower (Controller situated in Subang) on the frequency 118.2 Mhz.

1.1.10 The aircraft established radio contact with Lumpur Tower at time 0916:41 (OMT) - 0116:41 (GMT). It then requested onward clearance to fly to Bentong and to climb to 3500 feet. However climb clearance was refused because of another traffic ahead. At 0917:27 (OMT) - 0117:27 (GMT) 9M-AVI was cleared to 2000 feet. At that instant the aircraft was passing abeam the Setapak Police Station.

It reached 2000 feet after about 34 seconds of climb, and on reaching that altitude, Pilot 1 requested to fly via Waterworks Gap.

1.1.11 Waterworks Gap is an aviators' jargon for a valley called Genting Bidai. This valley forms one of the two prominent valleys that cut through the range of mountains that separate the state of Pahang and the Kuala Lumpur City valley. The other valley, is

about 7500 meters North West of Genting Bidai, and is called Genting Sempah. To aviators Genting Sempah is called Genting or Bentong Gap. Waterworks Gap or Genting Bidai is on the Latitude 031738N and Longitude 1014942E. The valley is formed by the 3416 feet Bukit Bangkong in the North and the 4401 feet Bukit Repin in the South. The valley floor is fairly narrow with its lowest point at 2300 feet above mean sea-level. The valley and its surrounding high grounds are totally covered by thick secondary forest.

1.1.12 Lumpur Tower approved 9M-AVI to track towards Waterworks Gap and at the same time to leave 2000 feet for 3500 feet. On receiving the clearance 9M-AVI made a right turn towards the Gap, at the same time keeping slightly to the south of the Klang Gate water catchment area. By the time the aircraft reached 3500 feet it was exactly above the Klang Gate dam, and the time was 0920:20 (OMT) - 0120:20 (GMT).

1.1.13 It then maintained 3500 feet all the way. It circumnavigated to the South of the main catchment area and then turned Northward towards the Gap area (at time 0920:42 (OMT) - 0120:42 (GMT)). The aircraft did not make further radio call since its last call at 0918:55 (OMT) - 0118:55 (GMT). Finally 9M-AVI called Lumpur Tower at 0922:49 (OMT) - 0122:49 (GMT) informing that they were over Waterworks Gap at 3500 feet. Subsequent conversation between the tower and the aircraft lasted about 27 seconds. During which, Lumpur instructed the aircraft to change radio frequency,to 126.1 Mhz and adviced the area Altimeter setting QNH to be 1008 mb. The aircraft inturn responded by reading back the new QNH setting and informed Lumpur Tower that they would report at Bentong whilst maintaining 3500 feet. That was to be the last communication between 9M-AVI and other radio stations. The aircraft had crashed at about 0923:42 (OMT) - 0123:42 (GMT).

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1.2. Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	Nil	two	Nil
Serious	Nil	Nil	Nil
Minor/None	One	Nil	

1.3. Damage to aircraft

1.3.1. The damage suffered by the aircraft which was severe and extensive was identical to previous cases of similar nature. Examination on the wreckage revealed that most components were subjected to tear, tensile fracture and compression. Along with this, the aircraft also experienced a force of significant magnitude coming from various angles and directions. The severity of the damage was caused mainly by the rugged vegetation of the equatorial forest and aggravated by a high entry speed of 135 knots. Although the damage was substantial, the main wreckage was still in shape while the pieces which were completely detached from the aircraft were all found within the proximity of the main wreckage pattern. Prominent witness marks found along the final trajectory indicated that the aircraft had impacted on five major obstacles, namely 3 trees, a hill slope and ground/ tree stump.

1.3.2. The first contact was the least severe when compared to all other subsequent impacts. On hitting the first tree, the whole fuselage and part of the wing penetrated through the

limbs and foliage. During this process, the nose wheel, windscreen and other parts of the airframe experienced some damage. The nose wheel was completely detached from the bottom end of the oleo extension which was held by the four Bolts. The right windscreen was smashed affecting a total area.of 75cm x 60 cm, while minor dents and multiple cuts were found on some parts of the airframe. These facts were supported by the actual location of the pieces in relation to the trajectory of the aircraft. Being heavy, the pieces possessed significant kinetic energy and therefore were thrown approximately 6.09 metres from the first tree.

1.3.3. The subsequent or second major impact was made with a tree trunk of 20cm in diameter. Analysis made on the tree samples found on the airframe positively identified that contact was made with the right wing. A compression of significant size carrying tree samples was noted on the leading edge of the right wing about 55cm from the wing attachment point. Close examination also revealed that the damage formed an angle of 32 degrees with the normal axis of the aircraft. The compression which was identical to the shape and size of the tree trunk compressed the top and bottom surface inwards by 1.16m and 0.963m respectively. Aft of this compression, the airframe suffered from dents, multiple cuts and followed by severe ripping of the control surfaces (aileron and flap). Generally the wing experienced a force coming from the bottom thus causing a torsion in anti clockwise direction which caused the bottom spar to move by 5.08cm. The wing tip and strut also suffered from damages which were not significant enough to eloborate.

1.3.4. The third major impact was with a tree trunk of 20cm in diameter and was the most severe. Again tree samples found on the left wing confirmed that this particular wing was affected. The

The tree trunk which impacted against the left main plane and the wing strut formed a compression and tear damage of about 40cm in size. The damaged area which was about 2 metres from the attachment point was so severe that it almost caused the breaking up of the main plane. All along the leading edge the skin suffered from severe distortion, tearing and even separation. Generally the mainplane had lost its original shape and effectiveness in generating useful aerodynamic lift.

1.3.5. The fourth impact, on the hill slope which was confirmed by the soil samples and witness marks aggravated the condition of the left wing and substantially also damaged the left tail plane. The front left wing tip which was forced upwards by 50cm or 42 degrees at a point approximately 60cm from the tip was similar to the damage pattern experienced by the left tail plane. Study on the above damage airframe indicated that both these component had absorbed a force acting diagonally between 50 - 55 degrees and caused the left wing to be completely detached.

1.3.6. The final major impact experienced by the fuselage acted at an offset angle of 10 degrees. Owing to the dissipation of the aircraft residual energy the damage suffered by the fuselage was significant. The aircraft which was in an inverted position skidded on the ground and hit a tree stump thus causing the following damages:-

a. The propeller blades bent inward by about 50 - 80 degrees.
b. Downward compression of the cabin roof.
c. Backward buckling of the front bulkhead.
d. Bending of right control column.
e. Total fracture of the four engine mounting.
f. Damaging all the flight and engine instruments on right hand panel.
g. Rearward bending of the front right hand seat.

1.4. Other Damages

1.4.1. The other damages incurred due to the accident were minor. Only the natural vegetation of the secondary jungles consisting of trees and undergrowth were affected. As the aircraft plunged into the ground, a tree of 20cm in diameter was uprooted while other damages inflicted were insignificant. 7 trees were also cut down as a result of building a helicopter pad adjacent to the crash site. This was essential in order to meet the requirement of search and rescue operations.

1.5. Personnel Information

The personnels' biodatas are as follows:-

1.5.1. Pilot Number 1

Age:	59 years old
Licence:	Private Pilot Licence No. 1874 valid until 31st March 1982.
Aircraft Rating:	Group 'A' Cessna 172, Cessna 206, Piper 28 - 180, Piper 28-236, Piper 32R-300.
Medical:	Valid until 31st March 1982.
Last flight as Pilot:	25 November 1981
Total flying hours:	976:00

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Total flying hours last 6 months:	11:00
Total P1 on C206:	9:10
Total P1 hours on all types:	661:00

1.5.1.1. Pilot 1 took up initial flying training on a single engined C172, a four seater high wing light plane, sometime in October 1970. At that time he was issued with a Student Pilot Licence by the Department of Civil Aviation Malaysia. His initial involvement with flying was intense. Inspite of his other commitments he was able to undertake the ground-lectures and flying lessons in its pace. He eventually made his first solo flight on the C172 aircraft on 8th December 1970, after about 2 months involvement in Aviation.

1.5.1.2. Training reports indicated that Pilot 1 was a good learner on subjects allied to aviation. His keeness in learning all aviation matters made it easy for him to grasp such technical topics normally associated to an aviation course. He sat and passed his Radio Telephony test conducted by DCA on April 1973, scoring 70%. Following that he was issued with a Radio Telephony Licence.

1.5.1.3. Pilot 1 was satisfied to fly on his Student Pilot Licence all the time until he eventually decided to attempt for his Private Pilot Licence (PPL) in 1976. By then he had accumulated about 289:00 hours, way above the normal minimum of 45:00 hours. The test which was conducted by a DCA Authorised Examiner was conducted on 10th February 1976. Pilot 1 passed it with an "above average" mark. It is worth noting here that the acceptionally long time span between his start of flying to the time he acquired his licence appeared to be due to his heavy Ministerial duties which left him with little free time. DCA records confirmed

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that if required, Pilot 1 could sit down and carry out all pre-requisite tests and pass them with good marks. In fact his PPL ground examinations were all passed with above the average marks.

1.5.1.4. His PPL carried the following restrictions:- "Holder to wear spectacles which correct for near/distant vision and shall have available a second pair whilst exercising the privileges of the licence."

1.5.1.5. From the day he obtained his PPL Pilot 1 had been keeping his flying current by flying more than the stipulated minimum until the day of the accident. During these periods he flew various types of aircraft, and were appropriately rated after the normal conversion were completed. He had flown intensively to many parts of the country, plus occasional fly away to neighbouring countries.

1.5.1.6. From the records it was noted that Pilot 1 ~~had almost always~~ on most occasion had some qualified pilot to sit in the front seat beside him. Sometimes the front seat passenger would be Club Instructor pilots or his own A.D.C.. Except on flights involving Examiners from DCA Malaysia or periodical Club check out by Club Instructors. Pilot 1 would sign his flights as the 'pilot in command'.

1.5.1.7. Being privileged with an ADC, Pilot 1 also took much pain to ensure all his ADC be given a proper flying course at Pilot 1's expense. Since his own involvement in aviation, two of his ADCs became qualified PPL holders. He then made it a point to get his ADC to assist him with such functions as flight plannings and pre-flight preparations of the aircraft.

1.5.1.8. His experience on the C206 aircraft started with a type conversion on 23rd January 1978. He undertook a 8:30 hours conversion

before he was rated P1 on this aircraft. Since then he had carried out some 6 different flights using the C206 aircraft from Sempang to Benta via the Waterworks Gap. (He had done some 35 similar trips using Piper aircraft). The previous flight on Cessna 206 through the Gap was done on 8th November 1981, (a period of about 2 months to that of the accident). He also had the same Club Instructor (deceased Passenger 1) to accompany that flight. And as in the crashed flight, he also signed off as "Pilot in Command".

1.5.1.9. Pilot 1's qualification as a pilot did not include any instrument rating. As such he was technically unqualified to undertake flights in conditions of poor visibility.

1.5.2. Accidents and Incidents

1.5.2.1. Previous to this accident, Pilot 1 had gone through two other incidents/accident. One happened on the 11 August 1979 and the other on 18 September, 1979. The first one was a minor incident which happened at Pulau Tioman involving a heavy landing on a Piper Dakota aircraft; The nearest established cause was due to strong wind gust on the approach at Pulau Tioman.

1.5.2.2. The second case, was an accident involving the same aircraft which crashed after take off at Polo ground Johor Bahru. He was accompanied by the deceased Passenger 1 who sat in the front seat beside him and the deceased Passenger 2 who sat behind. The finding of that accident revealed there was no technical failure on the part of the aircraft but there was an over control by the accompanying pilot (the deceased - Club Instructor) who interfered with the controls at the critical moment which caused the aircraft to stall and hit an earth mound and crashed on the long wide grass field. The details of the conclusion is attached for reference. (Annex. B)

1.5.2.3. As could be seen from these informations and together with the interviews conducted by the investigators it was determined that Pilot 1 would always want to fly as 'Pilot-in-Command' whenever he was able and qualified to do so. His natural tendency was not to give up his controls when the situation of the flight could badly warrant so. More often than not, the accompanying pilot (whom he always flew with) would have to take the controls or firmly tell him that the flight warrants his (accompanying pilot's) assistance.

1.5.2.4. As a result of that accident and while the investigation was carried out, Pilot 1 was suspended by DCA. After the lifting off of the suspension, he carried out the appropriate retraining under the tutorship of the RSFC Captain. A post accident flight test was conducted by a DCA Examiner and who found him fit to re-exercise the privileges of his PPL.

1.5.2.5. With the experience Pilot 1 had, it could be deduced that he was an able pilot and there was no reason to show anything otherwise. The presence of another qualified pilot beside him was a personal arrangement by him so as to render appropriate assistance when required.

1.5.3. Passenger Number 1

Age:	31 years
Licence:	P.P.L. with an Assistant Flying Instructor Rating
Medical:	Valid till 23rd January, 1982
Last Competency check flight:	18th July, 1981.
Last Flight Prior to accident:	9th January, 1981.

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1.5.3.1. Passenger Number 1 started flying in October 1971 as a Student Pilot with the Royal Selangor Flying Club. He passed his Radio Telephony test after a second attempt on 1st December 1971. He had to make 3 attempts to pass the written PPL papers like General Paper, Air Legislation and Navigation in 1973. The remaining mandatory written exams. were passed by 8th September 1976. However as a concession he was allowed to sit for the PPL flight test on 28th April 1976, even before completing all written exams.. His PPL was then dated on 28th April 1976.

1.5.3.2. He went through an Assistant Flying Instructor Course in 1978 and attempted the test on 16th December 1978, but unfortunately did not make the grade. He made a marginal pass during his second attempt in January 1979. A confirmation flight test was carried out 6 months later, again barely making the grade. It appeared that most of his problems as an instructor was his general weakness in allied aviation subjects. From there on Passenger Number 1 worked hard in getting himself established as an instructor pilot. His flying hours increased to about 827:00 hours by early 1980.

1.5.3.3. His A.F.I. rating was renewed in July 1980 and his competency to instruct on the Cessna 206 was first checked out in February 1981. His performance were recorded as average. Although Passenger 1 had been flying with most of the available club aeroplanes, his flying hours on the Cessna 206 were barely 20 hours with the last 10 hours being flown with Pilot 1 since September 1981 to the day of accident, flying as passenger in the advisory capacity. Therefore it is safe to conclude that Passenger 1 was qualified to fly this aircraft (but in this flight he was merely an advisor to Pilot 1 and he was not to interfere in the controls of this aircraft). However, he was in the position to assist Pilot 1 if need be. From interviews carried out it was noted that when flying as Passenger with Pilot 1, he would always oblige in every way and would not involve himself in any arguement. Therefore his conduct was acceptable to Pilot 1 and also made him respected by most of the club members.

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1.5.4. Accidents and Incidents

1.5.4.1. Passenger 1 was involved in a take-off accident on a Piper 32R - 300 aircraft on 18 September 1979. At that time he was the the accompanying pilot who was to assist the Captain (same Pilot 1) when required. Unfortunately it was determined that he had disturbed with the flight controls at a critical point of take-off and therefore induced the aircraft to stall and crashed. As an outcome of the accident he was suspended together with Pilot 1 from exercising his PPL for a period of time. His privileges were reinstated after the normal post accident flight test was carried out.

1.5.4.2. The privileges to exercise his PPL were again suspended temporarily in April 1980 when he was involved with yet another take-off accident. This time his aircraft wing tip struck two spectators as he was on the take-off roll on a make-shift strip. His PPL was reinstated on 1st July 1980 after yet another post accident flight test.

1.5.5. Passenger Number 2

Age:	38 years old
Licence:	PPL
Aircraft Rating:	Cessna 172
Medical:	Valid till March 1983
Total flying hours:	87:00 hours

1.5.5.1. Passenger 2 had been an ADC to Pilot 1 since 1978. He took up flying by arrangements made by Pilot 1. As an ADC Passenger 2 used to accompany Pilot 1 in most of his travels and flights. Passenger 2's involvement in this accident was minimal and therefore was not cause related.

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1.6. Aircraft Information

1.6.1.	Manufacturer:	Cessna Aircraft Company Witchita, Kansas, U.S.A.
	Year of Manufacture:	1976
	Certificate of Airworthiness:	Valid till 24th April, 1982.
	Last Maintenance:	23rd November, 1981.
	Hours Flown Since Maintenance:	9 hours
	Hours flown since new:	2507 hours
	Maximum take off weight:	1636.3 kg.
	Estimate weight at the time of accident:	1431 kg.

1.6.2. The aircraft was a single engine, six seater, high wing aeroplane with short take off and landing capabilities. The authorised maximum take off weight was 1636.3 kgs. With a basic weight of 1431 kgs the aircraft was capable of uplifting more than 681 kgs of payload including fuel. At the time of accident the fuel weight was calculated to be 45.45 kg less than its normal full tank capacity, together with three passengers the estimated gross weight of the aircraft was 1431 kgs.

1.6.3. The aircraft weight was found to be well within the limits specified for flight. The weight distribution and centre of gravity was found to be within the limitsof the aircraft.

1.6.4. The aircraft (9M-AVI) was manufactured by the Cessna Aircraft Company in Witchita, Kansas, U.S.A. in 1976. It was first registered into the Malaysian Register from (N.8605Q) to 9M-AVI on the 20 December, 1976. Since then the aircraft had clocked 2807 hours with no records of any accident till the 10th January 1982.

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1.6.5. The aircraft went through a series of checks prior to the accident. A major check was carried out on 5th October 1981.

1.6.6. (Check three) was done from 20 December, 1981 to the 23 December which was 25 days prior to the accident. This check consisted of all the systems and functional test including a flight test (23 December 1981) indicated that the aircraft was airworthy. After Check three 9M-AVI flew another 9 hours 50 minutes without any unserviceability.

1.6.7. Detail study of the aircraft background and necessary inspections and routine scheduled maintenance did not reveal any significant factor that could affect the performance of this aircraft up to the point of the accident.

1.7. Meteorological Information

1.7.1. Weather in Kuala Lumpur Airport was recorded by Subang Meteorological centre as fair all round with a cloud base of 2000 feet above sea level. At the 'Waterwork Gap' the base of the cloud was reported to be around 3000 feet with the cloud holding on the surrounding hills.

1.7.2. Turbulent in the area would be considered light and sometime moderate especially around the hill tops. Cloud base in the area during this time of the year (December to February) were normally around 3000 feet until mid afternoon when it would start to rise to about 4500 feet by 1400 hours.

1.7.3. Other reports of weather at the location were mainly obtained from ground witnesses and aircraft flying in the area at the time of the accident. The visibility within the area was 5 nautical miles and improved to 10 miles below the 3000 feet level.

1.7.5. The weather was suitable for VMC flights through the intended track for flights below 2800 feet above sea level.

1.8. Aids to Navigation

1.8.1. As the flight was planned to be conducted in Visual Meteorological Condition (VMC) the status of Navigation Aids at and around the airfield of departure were deemed to be irrelevant to this accident.

1.9. Communication

1.9.1. Following is the complete tape transcript as obtained from Sempang Tower:-

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0858.30	0858.00	Parking area Royal Selangor Flying Club.	Ground	Nil	9M - AVI	Sempang Nine Mike Alpha Victor India Selamat Pagi.
0858.35	0858.05	"	"	"	Sempang	Nine Mike Alpha Victor India Selamat Pagi Tan Sri Go Ahead.
0858.38	0858.08	"	"	"	Pilot 1	Victor India request clearance for Bentong for Benta, Benta with three Soul on board endurance zero five zero zero.
0858.50	0858.20	"	"	"	Sempang	Nine Mike Alpha Victor India runway two two, QNH one zero one zero time check reaching five seven and the half.
0858.57	0858.27	"	"	"	Pilot 1	Five seven and the half, runway two two, one zero one zero Thank you.

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0900.03	0859.33	Parking area Royal Selangor Flying Club.	Ground	Nil	18T	Sempang one eight Tango request start up.
0900.05	0859.35	"	"	"	Sempang	One eight tango clear to start QNH one zero one zero, two nine eight three time check approaching on the hour.
0903.00	0902.30	"	"	"	9M - AUI	Uniform India request back track and line up.
0903.10	0902.40	"	"	"	Sempang	Uniform India clear for back track and line up.
0903.23	0902.53	"	"	"	9M - AUI	Uniform India clear for back track and line up.
0903.30	0903.00	Taxiway	"	Taxy Speed	Pilot 1	Victor India ATC clearance please.
0903.34	0903.04	"	"	"	Sempang	Roger on request
0903.36	0903.06	"	"	"	Pilot 1	On request

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0903.38	0903.08				Sempang	Victor India QNH one zero one zero or two nine eight six.
0903.33	0903.13	Taxiway	Ground		Pilot 1	One zero one one
0903.45	0903.15		"		9M - AUI	One zero one one uniform India.
0905.05	0904.35		"		Sierra 18T	One eight tango request taxi.
0905.07	0904.37		"		Sempang	Mega one eight tango taxi to holding point runway two two.
0905.10	0904.40		"			Holding point runway two two one eight tango.
0905.20	0904.50		"		Sempang	Tango request person on board.
0905.25	0904.55		"			Sempang one eight tango eight soul on board.
0905.31	0905.01		"		9M - AUI	Uniform India ready for take off.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0905.35	0905.05		Ground		Sempang	Uniform India clear for take off, wind light and variable.
0905.40	0905.10		"		9M - AUI	Uniform India clear for take off, wind copied.
0905.58	0905.28		"		Sempang	Alpha Victor India ATC.
0906.01	0905.31		"		Pilot 1	Victor India go.
0906.05	0905.35				Sempang	Nine Mile Alpha Victor India cleared to TMA east via Batu Caves, Bentong initially one five zero zero.
0906.10	0905.40	Holding point Runway 22.	Ground		Pilot 1	Victor India cleared Batu Caves, Bentong initially one five zero zero back track lining up.
0906.24	0905.57	Holding point	Ground		Sempang	Victor India back track and line up.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0906.37	0906.07				Sempang	Sierra one eight tango are you able to track for papa kilo.
0906.40	0906.10				Sierra 18	One eight tango affirmative.
0907.04	0906.34		Ground		9M - AXO	Sempang tower Nine Mike Alfa Xray Oscar one two six decimal five.
0907.10	0906.40				Sempang	Nine Mike Alfa Xray Oscar Sempang loud and clear.
0907.15	0906.45				9M - AXO	Xray Oscar request taxi clearance, Romeo two one eight two POB, fuel endurance three hours.
0907.20	0906.50				Sempang	Xray Oscar taxi for runway two two QNH one zero one one.
0907.30	0907.00				9M - AXO	Runway two two QNH one zero one one Xray Oscar.
0907.32	0907.02				Sempang	Xray Oscar advise weather in Romeo two one eight is cloudy.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0907.35	0907.05				9M - AXO	Xray Oscar
0907.40	0907.10	On the runway	Ground	Taxing	Sempang	Victor India continue straight to the pan, report in the pan.
0907.45	0907.15	On the runway	Ground	Taxing	Pilot 1	Will do ..... ?
0908.03	0907.33				Sempang	One eight tango enter back track in turn report in the pan.
0908.05	0907.35				Sierra 18T	Roger one eight tango.
0908.21	0907.51				9M - AUI	Uniform India downwind to roll.
0909.05	0908.35	Taxy pan	Ground	0 knot	Pilot 1	Victor India holding in the pan.
0909.10	0908.40				Sempang	Victor India
0909.20	0908.50				9M - AUI	Uniform India extending downwind.
0909.22	0908.52				Sempang	Uniform India.
0909.29	0908.59				Sempang	Victor India disregard last clearance would you like to take

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
						off remain in circuit initially while waiting clearance.
0909.33	0909.03	Taxy pan	Ground		Pilot 1	We would like to do that thank you.
0909.35	0909.05				Sempang	Victor India line up and hold.
0909.38	0909.08	Pan	Ground		Pilot 1	Victor India.
0910.33	0910.03	Take off point runway 22	Ground	0 knot	Pilot 1	Victor India lining up holding.
0910.37	0910.07				Sierra 18T	One eight tango holding in the pan.
0910.38	0910.08				Sempang	Tango
0910.40	0910.10				Sempang	Victor India when ready clear for take off, surface wind light and variable, circuit initially .
0910.45	0910.15	Take off point	Ground	0 knot	Pilot 1	Victor India Thank you.

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0912.00	0911.30				Sempang	One eight tango delay in your clearance due to traffic.
0912.05	0911.35					Roger
0912.08	0911.38				9M - GBS	Sempang tower this is nine Mike Golf Brave Sierra one two six decimal five how do you read.
0912.15	0911.45				Sempang	Nine Mike Golf Bravo Sierra Sempang reading you loud and clear go ahead.
0912.25	0911.55				9M - GBS	Bravo Sierra request taxi clearance destination flight plan two three POB endurance seven hours.
0912.30	0912.00				Sempang	Golf Bravo Sierra standby.
0912.32	0912.02				9M -GBS	Standby

Actual Tape-Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0912.40	0912.10				9M - AUI	Sempang Uniform India short final.
0912.43	0912.13				Sempang	Uniform India cleared to roll.
0912.46	0912.16				9M - AUI	Clear rolling Uniform India.
0913.12	0912.42	Final runway 22	800 ft.	110 kts.	Pilot 1	Victor India final going a round.
0913.15	0912.45				Sempang	Victor India go round.
0913.18	0912.48				Sierra 18 Tango	One eight tango line up.
0913.25					Sierra 18 Tango	One eight tango line up.
0913.30	0913.00				Sempang	One eight tango ATC on request expect delay due to traffic. Would you like to take off and remain in circuit.
0913.35	0913.05				Sierra 18 Tango	One eight tango hold in the pan.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0913.40	0913.10				Sempang	One eight tango.
0913.42	0913.12				Sierra 18 Tango	One eight tango.
0913.53	0913.23				9M - AXO	Xray Oscar request back track and line up.
0914.00	0913.30				Sempang	Xray Oscar hold I got traffic in front tracking through Romeo two one eight to Lumpur.
0914.10	0913.40				9M - AXO	Xray Oscar roger we are ready for immediate we will take off and remain in circuit.
0914.15	0913.45				Sempang	Xray Oscar line up.
0914.40	0914.10				9M - AXO	Xray Oscar ready.
0914.45	0914.15					Xray Oscar when ready clear for take off for circuit initially wind light and variable.

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0915.51	0915.21				Sempang	India
0916.18	0915.42				Sempang	Xray Oscar cleared to Romeo two one eight initially one five zero zero.
0916.25	0915.55				9M - AXO	Xray Oscar clear Romeo two one eight two five zero zero and below.
0916.32	0916.02				Sempang	Xray Oscar I say again one five zero zero feet Romeo two one eight four.
0916.38	0916.08				9M - AXO	Xray Oscar correction Romeo two one eight, one five zero zero and below.
0916.45	0916.15				Sempang	Victor India your altitude passing.
0916.50	0916.20	Short of northern edge of Royal Selangor Golf Course.	1500 ft.	100 kts.	Pilot 1	Victor India this time one five zero zero.
0916.55	0916.25				Sempang	Victor India call Lumpur one one eight decimal two.
0916.58	0916.28		1500 ft.	100 kts.	Pilot 1	Victor India. Thank you.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
0914.50	0914.20					Xray Oscar
0914.55	0914.25	Downwind 22	800 ft.	100 kts.	Pilot 1	Victor India downwind in circuit.
0915.10	0914.40				9M - GBS	Tower Golf bravo Sierra requesting taxy three POB for Senai please.
0915.15	0914.45				Sempang	Bravo Sierra standby ATC will be delayed.
0915.20	0914.50				9M - GBS	Roger can we taxy to the holding point for run up.
0915.25	0914.55				Sempang	Golf Bravo Sierra taxy for holding point runway two two.
0915.28	0914.58				9M - GBS	Roger Bravo Sierra.
0915.30	0915.00				Sempang	Victor India clear to set course for Batu Caves one five zero zero.
0915.36	0915.06	Late Downwind	800 ft.	100 kts.	Pilot 1	Victor India clear to Batu Caves one five zero zero. Thank you.
0915.47	0915.17				9M - AUI	Uniform India downwind to roll.

1.9.2. Following is the complete tape transcript as obtained from Lumpur Tower:-

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0916.38	Abeam race course just passed Jalan Ampang.	1500 ft.	120 kts.	Pilot 1	Lumpur tower nine Mike Alpha Victor India Selamat Pagi.
	0916.41				Lumpur Tower	Nine Victor India Selamat Pagi go ahead.
	0916.44		1500 ft.	120 kts.	Pilot 1	Victor India one five zero zero this time Batu Caves heading for Bentong via Sempang requesting er ..... for three five zero zero over.
	0917.00	Abeam Southern end and of General Hospital.			Lumpur	Nine Victor India maintain one five zero zero initially report passing Batu Caves.
	0917.06		1500 ft.	120 kts.	Pilot 1	Roger will do.
	0917.10				Lumpur	QNH one zero one one.
	0917.13	Abeam Jalan Pahang round about.	1500 ft.	120 kts.	Pilot 1	Victor India one zero one one.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0917.17				Lumpur	Mike Oscar report altitude.
	0917.20				9 MO	We have three thousand feet this time.
	0917.23				Lumpur	Niner Victor India climb to two thousand initially.
	0917.27	Abeam Setapak Police Station	1500 ft. climbing to 2000 ft.	105 kts.	Pilot 1	Victor India will climb to two thousand.
	0917.30				9M - UWW	Whisky Whiskey landing Genting five thousand.
	0917.35				Lumpur	Niner Whiskey Whiskey.
	0917.52				Lumpur	Niner Mike Oscar, have you passed Batu Caves.
	0917.55				9 MO	Roger crossed Batu Caves in three minutes.
	0918.00					Roger

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0918.05				Lumpur	Niner Mike Oscar report Bentong.
	0918.11	Abeam Lee Rubber Factory Setapak.	Passing 1950 ft.	105 kts.	Pilot 1	Victor India two thousand will use the water work gap er ..... requesting water work gap.
	0918.18				Lumpur	Niner Victor India clear to track via water work gap.
	0918.23		Passing 2050 ft.	105 kts.	Pilot 1	Can we climb to three five zero zero
	0918.32				Lumpur	Niner Victor India climb to three five traffic ahead of you is a helicopter maintaining three thousand. Passed Batu Caves at one five.
	0918.45	Abeam Lee Rubber Factory Setapak.	Passing 2375 ft.	105 kts.	Pilot 1	Victor India your message copied climbing to three five zero zero will report reaching. Thank you.
	0918.52				Lumpur	The heli tracking via Bentong for Kuala Trengganu.
	0918.55				Pilot 1	Message copied.

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Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0918.58				Gading Tango echo.	Tango echo request climb to four thousand.
	0919.03				Lumpur	Gading tango echo clear to the east of Lumpur airfield maintain four thousand.
	0919.17				Lumpur	Singapore one zero two report level.
	0919.20				Singapore 102	Just passed five thousand.
	0919.24				Lumpur	Singapore one zero two report KL inbound.
	0919.28				Singapore	Kilo Lima inbound one zero two.
	0919.52				M 651	Malaysian err ..... six five one ready.
	0919.55					Malaysian six five one hold at the holding point.
	0920.00				M651	Roger holding.
	0920.06				Lumpur	One zero two report DME.

Actual Time Tape	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0920.08				Singapore 102	Five DME Victor Bravo Alpha. Singapore one zero two.
	0920.10				Lumpur	Singapore one zero two.
	0920.15				9M - UWW	Tower Whiskey Whiskey Genting to Lumpur one one on bound.
	0920.20				Lumpur	Niner Whiskey Whiskey clear to Lumpur initially five thousand.
	0920.29				9M - UWW	Maintain five thousand Whiskey Whiskey.
					Lumpur	Whiskey Whiskey.
	0920.40				Lumpur	Singapore one zero two give a check on the localizer and commend on landing.
	0920.45				Singapore 102	Roger one zero two.
	0920.49				9M - ATE	Niner tango echo reaching four thousand request further descend.

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Actual Time Tape	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0920.56				Lumpur	Niner tango echo descend to three thousand.
	0921.00				9M - ATE	Three thousand niner tango echo.
	0921.04				Malaysian 651	Malaysian six five one after take off requesting direct south bound for Jay Bee.
	0921.08				Lumpur	Malaysian six five one will advise.
	0921.10				Malaysian 651	Malaysian six five one.
	0921.12				Singapore 102	Singapore one zero two Kilo Lima inbound.
	0921.18				Lumpur	Singapore one zero two continue approach.
	0921.20				Singapore 102	Singapore one zero two.
	0921.23				Malaysian 162	Malaysian one six two TMA North maintaining six thousand estimating Ipoh zero one three five.

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Actual Time Tape	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0921.32				Lumpur	Malaysian one six two contact Lumpur on one two six decimal one area QNH one zero zero eight.
	0921.38				Malaysian 162	Roger one six two over to one two six decimal one. One zero zero eight.
	0921.41				Lumpur	Niner tango echo confirm you have Lumpur airfield in sight.
	0921.45				9M - ATE	Affirmative air.
	0921.50				Lumpur	Niner tango to position left hand downwind for runway one five, report downwind.
	0921.57				9M - ATE	Tango echo.
	0922.01				Lumpur	Singapore one zero two clear to land surface wind calm.
	0922.05				Singapore 102	Singapore one zero two cleared to land.

Actual Time Tape	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0922.25				Lumpur	Niner Whiskey Whiskey traffic err... two, one is a heli passed Batu Caves at one five maintaining three thousand and another one is a Cessna two zero six er ... climbing to three five zero tracking via Batu Caves err.... abeam er.... water work gap for Bentong.
	0922.49	1800 metres to the West of Bukit Bangkong.	3500 ft.	120 kts.	Pilot 1	Victor India this time over water work gap three five zero zero over.
	0922.55				Lumpur	Victor India confirm you have passed water work gap.
	0922.58	900m to the south of Bukit Gumpang.	3500 ft.	120 kts.	Pilot 1	This time over water work gap.
	0922.59				Lumpur	Roger niner victor India report. Contact Lumpur now one two six decimal one area QNH one zero zero eight.

Actual Tape Time	Lumpur Time	Position of Aircraft	Height of Aircraft	Speed of Aircraft	Transmission	Contents
	0923.11	Bukit Gumpang	3500 ft.	120 kts.	Pilot 1	One zero zero eight I will report Bentong maintaining three five zero zero.
	0923.15				Lumpur	Miner Victor India.

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1.10 Aerodrome Information

1.10.1 On the day of the accident the aircraft initially operated at Sempang Airfield (a military airfield 6 nautical miles to the East of Subang International Airport) on radio frequency 126.5 Mhz. There was no navigational aid malfunctions that could be traced to effect the flight. Sempang Airfield normally control all air traffic within its vicinity up to a height of 1500 feet above the aerodrome. Above this height the responsibilities of controlling an aircraft was with Subang International Airport, operating on frequency 118.2 Mhz.

1.10.2 As could be heard from the tape transcript, the actual radio call was made from the time the aircraft started up until the radio contact was finally passed over to area control on 126.1 Mhz. As far as the communication radio equipments were concerned there were nothing amiss. Both airport tape monitoring system were functioning and investigators were able to play back the tape transcript from both these airfields.

1.10.3 Other facilities: i.e. runway and airfield emergency services were available. Though Meteorological informations were also available from Subang International Airport to the crew of 9M-AVI, they did not request for this information on the day of the accident.

1.10.4 The coordination of Search and Rescue activities were conducted by RCC officials at Subang Airport. Weaknesses like overloading of telephone lines, no radio communications equipment for direct link with search aircraft and no direct communication with "Police Mobile Tact" made efficient search and rescue coordination almost impossible.

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1.10.5 Otherwise the aerodrome facilities at the time were found to be in satisfactory condition and did not affect or contribute to the cause of the accident.

1.11 Flight Recorders

1.11.1 This aircraft was not equipped with a Flight Date Recorder (FDR) as the National and International legislation do not require this category of aircraft to be so equipped.

1.12 Wreckage and Impact Information

1.12.1 As mentioned earlier, the ill fated aircraft had impacted on 5 major obstacles. Examination and deduction made on the wreckage and other damages concluded a very informative detail.

1.12.2 The first contact was the least severe. Although the aircraft had achieved the highest entry speed of 135 knots, the impact force was greatly reduced by the nature and structure of the obstacle which consisted mainly of branches and foliage. The limbs and foliage were of 1.21 metres in thickness and calculation made showed that the aircraft had an initial penetration and exit speed of 135 knots and 120 knots respectively. Study on the witness marks also indicated that the aircraft had a slight right bank. By using the mathematical equation of

($G = \frac{Vo^2 - Vf^2}{32.2s}$ and $T = \frac{2Vo - Vf}{32.2G}$) it was found that the aircraft had experienced a force of 24.233G over a period of 0.0649 seconds.

1.12.3 Tree samples found on the aircraft confirmed that the second contact was made on the right wing. Analysis on the nature

of the damages showed that the aircraft was banking to the right with an approximate angle of 32 degrees. Using the above formula, the aircraft had experienced a force of 130.09G over a period of 0.00806913 sec. This calculation was based on the speed of 115 - 105 knots after experiencing a dissipation in kinetic energy due to the previous impact.

1.12.4 The third impact on the left wing was the most severe. Using the same formula, it was determined that the aircraft (having a speed of 95 knots - 75 knots) had undergone a 'G' force of 201.0517G over a time of 0.010442 sec. This resulted in a condition where the wing [illegible] was at the brink of breaking up, thus failed to generate useful aerodynamic lift.

1.12.5 The forth impact was made on a hill slope. The damages inflicted on the aircraft confirmed that contact was made when the aircraft was in a left rolling motion passing an approximate angle of 50 degrees. It was calculated that the aircraft had an entry and exit speed of 60 knots and 45 knots respectively. Basing on the same formula the result showed a 'G' force of 34.95G over a period of a 0.0450867 sec.

1.12.6 The last impact was the fatal impact. It hit the ground and subsequently the tree stump in an inverted position at a speed of approximately 40 knots. As the 'G' force was absorbed by the nose section of the aircraft, it was unavoidable for the occupants not to be subjected to this force. Calculations revealed that the aircraft had experienced a force of 37.845G over a period of 0.111 sec. Although the 'G'force was comparatively small, it was a sustained over a longer period which therefore resultedin a serious consequent.

1.13. Medical and Pathological Information

1.13.1 On the 11th. January, 1982 at about (1508 Official Malaysian Time)

helicopters departed the crash site area for General Hospital Kuala Lumpur. They were assigned to transport a Survivor (Pilot one) and two bodies (passenger one and two) to the hospital for further medical treatment and examination. On arrival, pilot one was hospitalised while the two bodies were brought to the mortuary. Current procedures and regulations dictate that all crew and victims of an air accident have to undergo internal post mortem. This is of paramount importance as vital information regarding the physical and physiological condition of a person can be determined. However this particular aspect was not performed satisfactorily as the exercise was intervened by the Malaysian Police. Instead of an internal post mortem, the National University of Malaysia only carried out external post mortem.

1.13.2 Pilot 1.

Pilot 1 had no adverse medical report eversince he took private flying in 1970. He had done 12 medical check ups and met the medical standard stipulated in our regulation. Evidence also indicated that his activities were controlled and within an acceptable level to have any detrimental effect on his health. However an extract from his post accident medical report indicated the following injuries. (as in annexture A).

1.13.3 Passenger 1.

Passenger 1 had done 6 aviation medical check up eversince he took flying. His medical record was good and showed no indication of any medical problem. Evidence gathered also supported the above statement. Though he did pick up social habbits like smoking, drinking and occasional late nights, they were never excessive. On the night before the accident, Passenger 1 attended a party in Petaling Jaya. He consumed 3 glasses of diluted whiskey and was reported to be in a normal condition.

Evidence also indicated that he slept late on that particular night and woke up early the next morning (0630 GMT). This provided him with only 5 hours of rest period which was a factor to be considered. Just before his departure to Benta, he was seen having some light food. However within 10 hours before the flight, there was no evidence to support that he had a proper meal.

The body of passenger one was inspected by the investigators only after 27 hours. There were multiple injuries seen on the chest and body plus fracture on his right lower arm. Although the body was a state of rigor mortis, both hands showed a posture to indicate that he was on the controls. He was hanging in an inverted position, strapped to the right front seat and leaning to the right.

1.13.f As the internal post mortem was not performed, it was not possible to establish his physiological condition. Without this vital detail, his physical condition could not be determined accurately, thus creating many complications and problems. Relying solely from the pathologist's report, the cause of death was due to fracture of the neck combined with internal bleeding. The report also indicated the following informations.

(a) Multiple injuries on the head, neck, chest and both extremities.

(b) Multiple small abrasion and contusion of the face.

(c) Multiple fracture of the chest ribs with massive bleeding in the chest cavity.

(d) Fracture of the right lower arm, right shoulder and multiple contusion and abrasion of both extremities.

1.13.5 Passenger 2

Passenger 2 did not play a major role in the flight as he was just an innocent passenger occupying the rear seat. From the report he died due to shock, fracture of the base of the skull and neck. Other injuries sustained by Passenger 2 were as follow :-

(a) Multiple injuries to the head, neck and both extremities.

(b) Contusion of the right shoulder.

(c) Laceration and contusion of the chin plus fracture of the base of the skull and neck.

(d) Fracture of the right lower arm and left femur, plus multiple small abrasion and contusion on both extremities.

1.14 Fire

1.14.1 The evidence of the wreakage and the surrounding vegetation showed that there was no sign of fire. This fact was confirmed by the sole survivor who witnessed most of the events.

1.15 Survival Aspects

1.15.1 The sole survivor (Pilot 1) was unable to clarify the condition of the other occupants. The death of Passenger 1 and Passenger 2 were only confirmed after the recuers were winched down just before night fall. To ascertain the cause and time of death, the inquiry team had to rely totally on the pathologist's report submitted by the National University of Malaysia. As no internal post mortem was carried out the details given by the said Department was unsatisfactory.

1.15.2 Pilot 1 escaped death due to the fact that he was ejected out from the aircraft. With a forward speed of around 50 knots and at a height of approximately 8 feet, he was thrown sideway through the left side door. This was made possible as the straps were loose and the door which was completely detached by the impact forces did not hinder his trajectory. Just clear of the rotating propeller, he landed on the rattan plants which acted as a cushion in the impact. The impact was further reduced by his rolling motion and was estimated to be less than 13G per second. This force was well within the human 'G' tolerance which could result in moderate injury.

1.15.3 The presence of dried saliva showed sign that he was unconcious after the ejection. On regaining some of his senses he entered into a semi concious state. His ability to identify and recognise the position of the sun (Eastern side) confirmed that he was semi unconcious for about 1½ hours. As he was unable to determine the fate of the other crew, he decided to walk to the main wreckage. On arrival he was greeted by the horrifying spectre thus forcing him to leave inorder to look for possible assistance. Before departing, he attended his injured left hand using the bandages found in the aircraft's first aid kit.

1.15.4 He tracked in a northerly direction following his natural instinct for the nearest route to the settlement area. Although it was a slight uphill, it proved to be the shortest route. He followed the contour and crossed over onto the other side of the hill and moved downslope. Being exhausted and helpless, his physical and mental functions were ineffective. He accidently fall and slipped into a ravine which was about 60.97 meters deep. The will to survive was the determination he was holding on, as his body momentarily rode the rough surface of the ravine. Finally he landed into a water hole and was miraculously

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uninjured and concious, therefore escaped possible drowning. Instead, the cool mountain water freshened him up. Desperately holding on he struggled for life. Pilot 1 admitted that he experienced a condition of extreme destress and fear. He mustered every ounce of his strength he could and swung his hands against the side of the hole and inched slowly upward until he had a positive grip onto something. Finally after a long struggle he managed to free himself from the waterhole and also the possibility of death. It was a traumatic experience and the agony he encountered was the worst that had happened to him. Again it was a miracle that saved his life. Just before night fall he found a comfortable resting spot and made use of it as a shelter for the night. As the jungle became quieter and darker he was again faced with fear. The fear of the unknown aggravated by the sound of wild animals. Anyhow he managed to live with it till the next morning.

1.15.5 The next day was uneventfull. He was weak and could not find the required strength to take any course of action. He stayed put at this spot hoping for the rescuer to arrive. Fortunately the stream nearby, provided him with some water although he had no proper food for the last 24 hours. Finally he was rescued at about 1300 GMT and was immediately taken to the General Hospital Kuala Lumpur for treatment.

1.16. <u>Test and Research</u>

1.16.1. Reconstruction of wreckage scatter pattern: As the aircraft wreckage was not destroyed by any fire, it was possible to salvage most of the pieces to be reconstructed to an almost complete aircraft. The initial rebuilding was based on crash site scetches and drawings. And was thus in reality the wreckage scatter pattern. From the scatter pattern it was possible to determine which obstacle caused damage to the aircraft. The rebuilding of the scatter pattern also confirmed on the trajectories of various aircraft components as they were scattered along the crash path.

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From there it was deduced that the wreckage distribution at crash site were of direct result of the aircraft having impacted with the various obstacles before it finally came to a rest.

1.16.2. Reconstruction of wreckage

1.16.2.1. Following that, the wreckage pieces were then fitted to their original positions as would have been from an undamaged aircraft. That was done in order to analyse the extent of damage incurred on the aircraft and the direction through which the forces acted on the aircraft. From the reconstruction, it was determined that the second major impact occurred when the aircraft was in a 32^{o} bank to the right. From the reconstruction it was possible to inventorise all aircraft pieces and rule-out the possibility of any ante-crash damage. It was during the wreckage reconstruction that the injury inflicted to the occupants could be accurately itemised. The reconstruction also assisted in analysing the crash worthiness of the aircraft as a whole and to make such recommendations that may enhance this aspect.

1.17. Reconstruction of Flight Path

1.17.1. A complete reconstruction of flight path was conducted on three different occasions. The initial step taken was a detail analysis of the various cues given by eye witnesses and Pilot 1 that were finally reconstructed in a form of a flight plan. Step two was the reconstruction of a flight plan based on the tape transcripts obtained from Sempang and Lumpur Towers. Step three was the interfacing of Step One and Step Two with minor adjustments to areas that would not be solved mathematically. The final flight plan was then put on actual trial using one Cessna 206 adjusted to simulate the crashed aircraft weight and balance.

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1.17.2. The reconstruction of the flight path involved initially the pure flying and checking of aircraft to ground positions at various time cues. This was done after taking the prevailing wind and temperature conditions into consideration. All manoeuvres were based on time cues. Actual aircraft positions were thus plotted on a map and this was later compared to the solution as determined by earlier Step 3. It was found that the flight path matched very closely with the Step 3 solution.

1.17.3. The next flight trial involved a reconstruction of the crashed flight with both pure flying and radio text incorporated. The idea was to confirm the possible cockpit activities as experienced by the crashed flight. Again the result agreed closely to the Step 3 solution, and strongly suggested the possibility of Pilot 1 flying the aircraft and making the radio calls.

1.17.4. The final flight trial was to solve the possible flight path taken by the crashed aircraft from the position where Pilot 1 made the last call to the position where the aircraft impacted with the ground. It was of interest to note that during all the trials, there was the bunch of cloud that clinged to the hill tops. And when the trial aircraft have made its last call it was just at the periphery of the cloud. When effort was made to stay out of it, the trial aircraft had to deviate slightly left of track. Followed very quickly with an entry into the cloud. The timing of the run from the last call position coincided very closely to the timing as noted from Passenger 1's watch (adjusted for elaspe time). Further re-running of that particular phase of flight reenforced the Step 3 solution further. In its final analysis the final position of Step 3 involved a number of manoeuvres. Firstly there was a deviation to the left of track in order to maintain VMC. There was an unavoidable penetration of the cloud at 3500 feet . There was a highly worrying phase when the aircraft entered cloud knowing fully well there were high ground around. During this

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phase it appeared that the crashed aircraft made a heading correction to the right to the appoximate original heading. It then appeared that height was lost at an approximate rate of 1350 feet per minute, and with a slight right Bank when it finally impacted with the hill slope.

1.18. Additional Information

1.18.1. Search and Rescue

1.18.2. The Search and Rescue operations conducted by the Rescue Coordinating Centre (RCC) was activated at about 1125 OMT on 10th Jan. 1982. This was in response to the information received from the Flight Information Region Controller regarding the missing of 9M-AVI. Following the normal procedures, all personnels and organisations concerned were alerted followed by a request to the Royal Malaysian Police for assistance in confirming whether the aircraft had diverted to any nearby airstrips like Bentong, Triang, Jerantut etc. On receiving an unfavourable and negative reply from the Police, "Destresfa" was declared at 1221 OMT.

1.18.3. At 1255 OMT, two aircraft (a Genting Helicopter and a Royal Selangor Flying Club aeroplane) were dispatched to the general area with the aim of searching, combing and reporting any possible sign. The search was immediately joined by a RMAF Nuri Helicopter and later followed by a Fokker aircraft from the "Malaysian Airline System". The Search produced its first success when an emergency signal from an emergency locater transmitter was received by the Genting Highland helicopter at 1345 OMT. On checking its source, it was determined to be orginating from a point on radial 064/38 DME from Victor Bravo Alpha. This was later confirmed by the Fokker aircraft. At this juncture, RCC was in a position

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to reduce the size on the search area thus creating a better possibility in locating the distress aircraft physically. At 1521 GMT another Nuri Helicopter and a PC 130 from the Royal Malaysian Airforce joined the search. Due to traffic congestion, all Civil aircraft participating in the Search were instructed by the RCC to clear the area immediately. The PC 130 was capable to perform SAR function. The sophistication of its equipments enabled the aircraft to accurately pin point the source of the distress signal. Finally at 1841 GMT the PC 130 announced the coordinate 03210N 101508E as the probable site and the subsequent checking carried out by two helicopters proved it to be correct. The wreckage was spotted at 1758 GMT by the Nuri Helicopter (Gading 311J2) and all relevant information regarding the exact position, survivor and state of aircraft were passed immediately. As a result "Destresfa" was cancelled at time 1906 GMT.

1.18.4. At 1930 GMT, 12 commandos from the HANDAU Unit (RMAF) boarded a helicopter for the crash site area. They were specially tasked to rescue any survivor and at the same time to secure the area against any eventuality. As a result of the overtaking nightfall and cloudy weather only 4 commandos were able to be winched down. Unfortunately the main radio equipments were also unable to be delivered. This resulted in no communication for the rest of the night. Although there was no communication with the advanced party, two groups comprising of members of the RSPC and Police were sent in by foot to provide assistance. Their search in the dark turned out to be unsuccessful.

1.18.5. The continuation of the effort to inject more commandos and establish radio contact continued on the second day which was on 11th January 1982. The major operations which was supposed to start at sunrise was hampered by the presence of low cloud which was typical of the area. The low cloud which was sitting just on top of the crash site persisted until 1025 GMT and this created many difficulties and complications. As soon as there

was a clearing, rescuers comprising of Department of Civil Aviation, Air Force, Army and Police personnels were inserted at 1030 GMT. Simultaniously a helicopter pad was built by the army Engineers to facilitate the rescue. At 1255 GMT, it was confirmed that two bodies identified as Passenger 1 and 2 were found in the wreckage. As there was no trace of Pilot 1, the ground search continued. Finally at 1422 GMT, Pilot 1 was located by a party of Police UKK.

1.18.6. Problems and Complications

1.18.7. Although the final aim of the search and Rescue operation and the investigation into the cause of the accident were achieved many complications were encountered. These had affected the smooth running of the exercise and leaving it unchecked would create a burden for future operations. Rescue Coordinating Centre was formed with a sole function of coordinating and controlling the rescue operation. The centre must be given a complete control and cooperation from other government agencies in implementing its decision. On the day of the accident there was a break down in command. RCC was ineffective as a result of the intervention of the Malaysian Police. By carrying out a separate rescue operation, the Malaysian Police created many unco-ordinated moves which resulted in the loss of valuable time and efforts. This had severe repercussion more so when RCC was unable to utilize the resources of the Malaysian Police. To eradicate this problem the Police must still provide the assistance and co-operation while the controlling aspect must be carried out by RCC.

1.18.8. It was also noted that the National University of Malaysia failed to carry out the internal post mortem. This contravened the present ICAO regulations which clearly stated that all victims of aircraft accident must undergo internal post mortem. Infact prior instruction by RCC was given to the Director of the General

Hospital Kuala Lumpur to stress the importance of this request. Unfortunately they did not respond to the RCC's request. Thus leaving numerous questions unanswered. The excuse that it was the Police who stopped the post mortem was an interesting statement to note but till now it is still a mystery.

2. Analysis

2.1. Aircraft

2.1.1. The airframe had from new accumulated a total of 2506:59 hours flying time. However since the last major servicing on 23.11.81 it had only done 9:00 hours. There were no recorded complaints of unserviceability of any part of the airframe. Comparatively, the airframe was free of dents, skin or structural faults. There were no evidence to state anything otherwise. There were also no mention or complaint of abnormality of aileron, elevator and rudder controls. Likewise the flaps, rudder trim and elevator trim were serviceable. And so were the associated controls like the fixed tabs, cabin air intakes and the engine cowl flaps. However the airframe suffered severe crash damage. From the examination of the wreckage all airframe parts could be accounted for. All airframe wreckage pieces were within the main wreckage scatter pattern. Indicative that the aircraft impacted with the first obstacle when it was in one complete piece. As such mid air break-up were ruled out.

2.1.2. When the aircraft impacted with the first tree, the whole fuselage and part of the wings penetrated through the limbs and foliage. The damage expected due to this impact was actually sustained by such airframe components like the ripping off the nose wheel, breaking up of a 750cm x 600 cm piece of windscreen and multiple cuts and dents on the airframe.

These damages were incurred when the aircraft cut through 4 feet of tree limbs and leaves at an entry speed of 135 KTAS; and exited at 120 KTAS. By using the methamatical equation where the final velocity was not equal to zero and the pulse pattern was triangular No.2 "(in which G = $\frac{Vo^2 - Vf^2}{32.2.S}$)" it was found that the airframe experienced a deceleration level of 24.233G over a period of 0.0649 seconds. The swathe through this tree indicated a slight right bank. Indicating a good degree of aircraft control.

2.1.3. The subsequent airframe damage when the aircraft impacted with the second major obstacle, a tree trunk of about 20 cm diameter, was sustained by the right mainplane and right wingstrut. Analysis of the nature of dents and cuts, established that the aircraft left wing impacted with the tree trunk when the aircraft had about 32 degrees of right bank. Calculation of the forces acting on the right wing came out with the following result; impact shock was 130.09 G over a rapid period of 0.00806913 seconds.

2.1.5. The fourth crash impact damage was suffered by the left mainplane tip and the left tailplane outer leading edge. Examination of witness marks on the ground and the above damaged airframe components indicated that shock force acted diagonally from the outboard mainplane and tailplane from its bottom surface upwards. The angle of the forces were also accurately determined and found to be the consequential result of the yawing and rolling moment created by the previous 3rd impact. The snapping of the left mainplane about its fuselage attachment point left behind evidences of the existance of the above discussed forces. Mathematical analysis indicated that the left mainplane and left tailplane experienced a loading in the order of 34.95 G through a period of 0.04550 seconds. Therefore nett damage of that mainplane could be accounted accurately and was not as antecrash damage as such.

2.1.6. The final (5th) major impact was experienced by the fuselage which acted through at about 10° offset angle. The force was due to the dissipation of the aircraft residual kinetic energy due to collision with the ground. This final impact was in the order of 37.845 G over a period of 0.111 seconds. The damage suffered by the airframe was relatively light. They included the downward compression of the cabin roof, backward buckling of the front bulkhead, the rearward movement and bending of the right control column, the total fracture of the four engine mountings etc. The damage suffered by the fuselage, especially the front portion, were those expected of impact of such nature and magnitude. Again ruling out antercrash damage.

2.1.7. The engine was a Continental IO - 520 - F 3 manufactured by the Teledyne Continental Motors USA on 15th November, 1979. It was given the Federal Aviation Authority USA 9FAA) Export Certificate of Airworthiness No.E 173575 on 15 November, 1979. Since it was installed on 9M-AVI it had accumulated 909 hours. 14 minutes of runningtime. The engine was subjected to a major check three inspection on 23rd November 1981. Since then it had only done 9 hours up to the day of the accident. There had been no recorded observation or complaints on the engine since the last inspection. Neither were there any adverse comments by pilots and engineers alike against the engine. On the day of the accident, no one noticed anything abnormal about the starting-up and the subsequent engine report as 9M-AVI taxied out from the parking apron.

2.1.8. Post crash examination of the engine and its accessories did not reveal antercrash failure of either the engine or its accessories. There were no evidence to indicate that the engine high tension electrical system, fuel system or engine mechanical components failure before the crash. All damages on engine andiits accessories strongly suggested crash damages rather than antercrash. Such damages suffered by the magneto shaft suggested that there were normal engine rotation before the engine was forced to a stop by an external force. The spark plugs and its associated electrical lines were still in proper working order. The severence of fuel lines between the fuel tanks and the engine

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were the result of the ripping off of the fuel tanks compartments in the wings. Therefore the engine could be said to be functioning normally before the crash.

2.1.9. The propeller fitted on the engine of 9M-AVI was constructed by Mc Calley Industrial Corporation U.S.A. on 13th September 1976. It had done a complete overhaul and was given zero life on 4th March 1981. Since than the propeller had given satisfactory service until it was subjected to check 3 on 23rd December, 1981. By then it had only accumulated 315 hours and 32 minutes. The propeller had done further 9 hours since check 3. There had been no recorded unserviceability or complaints on the propeller. In essence the propeller was able to deliver its rated thrust (within allowance) right up to the day of the accident.

2.1.10 Post crash examination of propeller indicated that the whole propeller system was still in one piece. None of its associated parts were missing. Examination of the blades and flanges revealed the solid integrity of the system. The blades themselves were badly mishapened due to crash forces. Examination of witness marks on tree limbs and the blades themselves indicated that the propellers were turning when the aircraft plowed through the first tree. Examination of the blades indicated there were engine power available when the blades were forced to stop by the ground where the aircraft finally rested. All damages on the propeller were of crash induce ones. Therefore the propeller can be deemed to have been functioning satisfactorily before the crashed.

2.1.11 Examination of the fuel and its system indicated nothing was amiss in that area. Fuel analysis in the lab confirmed the acceptable quality as stipulated by the aviation industry. Further, the fact that the engine was delivering power on impact confirmed the satisfactory state of the fuel and the fuel system.

2.1.12 Aircraft engine instrument were badly damaged by the crash forces, making detail analysis extremely difficult. However the final static positions of the various pointers indicated normal function of the instruments, except for those that were mechanically mangled. There were therefore no evidence from the engine instrument to indicate instrument or engine malfunctions.

2.1.13. The aircraft flight instrument were also examined in detail. However two instruments, namely the top altimeter and the Automatic Direction Finder (ADF) gauge were missing from the wreckage by the time the aircraft was salvaged. Of the many flight instrument, the ones that had bearing on the investigation were the No. 1 altimeter sub-scale reading, the No.2 altimeter altitude reading, the artificial horizon and the aircraft clock.

2.1.14. The No. 1 altimeter sub-scale was at 1011 mb when the instrument was first examined on-site. Though the pointers were indicating some unrealistic altitude, the subscale was correct for the Lumpur TMA QNH prior to the accident. It was expected that the subscale QNH to be 1008 mb as was announced by Lumpur Tower. This had an important bearing on the accident interm of determining the lapse time from when the change of QNH was announced to the time the aircraft crashed. In other words precrash event overtook the pilot and he did not have enough time to adjust the altimeter subscale to indicate the new QNH of 1008 mb. In retrospect, it was a great pity that altimeter was the one that was taken away, therefore leaving the investigation team short of one important evidence.

2.1.15. The aircraft artificial horizon was bench tested to determine its serviceability state. On being subjected to its normal working suction, the rotor ran-up to the correct operating speed and was satisfactory in all modes of functions. Here, the aspect of the pilot being misguided by a disapparent artificial horizon malfunction was ruled out.

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2.1.16. The aircraft clock jammed on impact and indicated the time of about 0917:00. It appeared that the clock was functioning until subjected to heavy impact forces when the inner gears jammed solid. Here the clock timing assisted to narrow down the impact hour. Granted that the clock was not synchronised to any known datum, and perhaps had been so for the past many days. It still was useful in supporting other more accurate sources to determine the impact time.

2.1.17. The No.2 altimeter indicated 3050 feet with its subsclae at 1011 mb. It more or less confirmed of its antecrash serviceability and the crash point altitude above mean sea level.

2.1.18. All the aircraft radio system were examined and their serviceability state determined. The point of importance in the crash investigation was the frequency of the communication radio, the VHF. The frequency as displayed on the counter was on 118.25 MHz. Like the No. 1 altimeter subscale, it was expected that the frequency to be changed to 126.1 MHz as directed by Lumpur Tower before the crash. However the only change from the tower frequency of 118.2 Mhz was the second digit after the decimal point which was 5 instead of zero. Here it again indicated the rapid time lapse between the last radio instruction and the events prior to the crash and the crash itself.

2.2. <u>Weather</u>

2.2.1. The weather report as provided by the Meteorological Department of Malaysia indicated that on the morning of the accident the general weather around the Kuala Lumpur City valley was fine but with random presence of low cloud around Subang airfield area. However detail analysis indicated the presence of a number of interesting posibilities for weather around the higher ground

inland. This was also confirmed by weather satellite photographs which indicated presence of low clouds covering the "Main Range" and the Kampung Janda Baik area.

2.2.2. Eyewitness and evidence from pilots who were familiar with the area also confirmed the presence of low cloud around the high ground that separated the KL city valley and the state of Pahang. From the detail analysis of the temperatures and dew points as obtained from the Meteorological Stations in Subang and
9 Temerloh, and further confirmed by witness, it could be deduced that there was a layer of Stratus cloud that hanged and clinged to the hills and mountains at about the time of the accident. It could be deduced that the cloud base was about 2800 feet and was in the process of raising. The tops were generally quite undefined but on the average were 4000 feet. It was then obvious, that when one flew between 3500 ft and 3050 ft around the high ground that morning, one would be in the status cloud. It was found from flight trials carried out on 4th February and 8th. February, 1982 at about the same time as the accident the presence of the low cloud of such structure. It was interesting to note that if one fly the same pattern as the crashed aircraft, and in order to maintain visual for as long as possible, one would be led to deviate to the left of track, finally into the approximate crash site. It was also interesting to note that out of the 4 flights trials, in all instances the trial aircraft entered cloud at about the time and position where 9M-AVI made its last radio call.

2.2.3. It was therefore beyond reasonable doubt that there was low cloud amongst the hills. It was beyond reasonable doubt that the cloud would engulf anything within the height band of 3500 ft and 3050 feet. And it was beyond reasonable doubt that when in such cloud, the fowward visibility would be reduced to less than 20 meters.

2.2.4. Analysis of wind aloft as obtained at Kuala Lumpur and Kuantan showed the presence of North to North Easterly wind up to the height of 3000 ft. The wind was stronger (approximately 15 knots) at Kuantan while was only approximately 5 knots overhead Kuala Lumpur. The possible vortices and eddies downstream of the Janda Baik range of hills was the most likely cause of the moderate turbulance that were normally experienced at the lower levels around the Water Works Gap. The presence of such turbulence was confirmed by Pilot 1.

2.2.5. In its totality, the weather held the crucial key in opening the door that led to the accident. The impact area was in weather, the aircraft was in weather and the crew of 9M-AVI were not equipped to be in weather.

2.3. Communication

2.3.1. There were altogether 31 calls made by 9M-AVI. Of which 19 calls were made to Sempang Tower and 12 calls were made to Lumpur Tower. All the calls appeared to be made by Pilot 1 alone.

2.3.2. The first was made to Sempang Tower on 126.5 Mhz at 0858:00 (GMT) - after Pilot 1 carried out the pre start checks, started the engine and completed the after start checks. The exercise involved a combination of coordinated hands, speech, hearing and eye scannings, with minimal feet movement. The degree of coordination would be higher as the starter-switch was energised with the left hand and the throttle lever was adjusted to catch the engine rotation as the engine

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became self sustaining with the right hand. Normally the after start checks would be in a period of slight phase of reduction in workload demand. The speech rate of Pilot 1 after the above work was approximately 3.1 words per second and the voice pitch was comparatively low.

2.3.3. By 0910:00 (GMT) 0110:00 (GMT) the aircraft was ready for take-off. The pre-take off checks did not demand such a degree of physical coordination as a start up. However the mental stress due to the anxiety of the impending take-off would normally be quite high. The speech rate of Pilot 1 before he was ready for take-off was 4.49 words per second and the voice pitch was slightly higher.

2.3.4. 9M-AVI finally took-off at about 0910:30 (GMT) - 0110:30 (GMT). The aircraft then held overhead Sempang until 0915:06 (GMT) 0115:06 (GMT) when it was cleared to set course for Batu Caves. The Pilot stated that he flew the aircraft without any assistance from anyone within the aircraft. The workload then would only have been to fly the aircraft around with reasonable accuracy while waiting for an ATC clearance from Sempang. The speech rate of only about 3.7 words per second and a reasonably high voice pitch reflected the amount of workload.

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2.3.5 It should be noted that up to this stage, there was no doubt on who was at the controls of the aircraft. As was conclusively stated by Pilot No. 1, the tone and context of the radio calls, the speech respond rate to ATC calls and flying reaction rates to ATC's clearances supported it; - i.e. Pilot No. 1 was at the controls.

2.3.6 It was of interest to note that when the clearance was finally given to 9M-AVI to set course for Batu Caves, it was Pilot 1 who replied, "Victor India clear to Batu Caves one five zero zero, thank you,". After much listening to the quality of the speech and its text, it was obvious that he was pleased for being finally given that clearance.

2.3.7 The quality of Pilot 1's transmission after he had set course for Batu Caves indicated a degree of confidence and self control. It portrayed an image of one who was quite settled in doing something he knew quite well. The rate of speech was well regulated and was with purpose. It appeared he was in control of the situation within the cockpit.

2.3.8 It was significant that there were altogether 8 radio transmission made by Pilot 1 at this stage. Inspite of the numerous other radio calls Pilot 1 was not rushed when he transmitted his messages. He took a total of 26.03 seconds for the 8 calls and said a total of 75 words. Thus his speech rate at that time averaged to 2.88 words per second. The voice pitch was more controlled then earlier calls, and were therefore quite low.

2.3.9 All radio calls during the phase when the aircraft approached Batu Caves were made by Pilot 1. Such request as 'Victor India two thousand will use the Water Work Gap or ..... requesting Water

Work Gap' was made possibly coinciding with the action of levelling off from a climb. The speech rate appeared to be more or less matched the possible action of lowering the aircraft nose towards the level attitude. Further, the action of levelling off the aircraft would have been quite involved. One would have to glance at the altimeter, ease forward on the control column, glance at the airspeed, pull back the throttle lever, twirl back the RPM lever, trim off the elevator loads, glance at the skid ball and trim off the rudder loads. Therefore it was possible that Pilot 1 was doing all these and his speech was dragged by the actions he had to carry out at the same time.

2.3.10 After the aircraft cleared to track via Water Work Gap Pilot 1 made the following transmission, "Can we climb to three five zero zero?". The transmission was well regulated and appeared to be intended to be clear. reason was obvious; he had requested for that level earlier but was refused by Lumpur. Now that he was cleared to track via Water Works Gap he was anxious to climb to 3500 feet as requested earlier.

2.3.11 Subsequently when he was cleared to climb to 3500 feet, Pilot 1 acknowledged the call after about 5.27 seconds of pause by saying "Victor India your message copied climbing to three five zero zero will report reaching, thank you," Analysis of the time lapse to respond and speech rate presented with a good possibility of Pilot 1 was also involved in setting the aircraft for the climb to 3500 feet.

2.3.12 There was no further call from 9M-AVI until at time 0922:49 (GMT) 0122:49 (GMT) when Pilot 1 transmitted with the following message, "Victor India this time over Water Work Gap three five zero zero over." The significant point about this transmission was that before it, Lumpur was calling 9M-UNW, a Genting Highland Helicopter,

advising it that there were two traffic in its vicinity. The message was rather long and contained 4 phases and was obviously intended for 9M-UWW. On immediate completion of the message, and before 9M-UWW could respond, 9M-AVI cut in to transmit his position and altitude.

Analysis of the limited possibilities for this action resulted with the following:- Since 0919:03 (GMT) - 0119:03 (GMT), to 0922:49 (GMT) 0122:49 (GMT) when Pilot 1 made his transmission, there was a spate of heavy radio transmission. There were infact some 36 different messages being transmitted within that time. It was then likely that 9M-AVI was unable to advise Lumpur when he reached 3500 feet at about 0920:55 (GMT) - 0129:55 (GMT). And possibly at that time that, Pilot 1 did not want to break into other transmission just to inform he had levelled off at 3500 ft. Whereas when he was over a prominent land mark like Water Works Gap he perhaps felt a greater need to inform others of his position. Moreover the Lumpur transmission to 9M-UWW that he cut in was to inform 9M-UWW of his (9M-AVI) position being in the vicinity of 9M-UWW's. And possibly due to the presence of cloud nearby and therefore restricted visibility, he was anxious to inform Lumpur and 9M-UWW of his position and height.

The sound of the voice and the text of the message appeared to be intended to be clear. At that stage there seemed to be no trace of over anxiety or concern in his voice.

2.3.13 At 0922:59 (GMT) - 0122:59 (GMT), Lumpur Tower called 9M-AVI with the following message, "Roger Niner Victor India (hesitated) contact Lumpur now one two six decimal one, area QNH one zero zero eight." There was a fairly long pause of about 03.22 seconds before Pilot 1 acknowledged that call. stating, "One zero zero eight I will report Bentong maintaining three five zero zero". This last transmission was critical. It contained many informations that were to provide clues to the possible cause of the accident.

Firstly, it was difficult to tell from the tone of the voice and speech rate on what Pilot 1 was doing then. But there seemed to be an air of "control over situation" portrayed by Pilot 1. The 3.22 second pause before he replied to Lumpur's call indicated the possibility of Pilot 1 being busy doing something else and had to take time to locate the microphone, pressed the transmit button and talked. Had he not been doing anything but made radio calls he would most probably had the microphone in a position where he could make fast respond.

The 3.22 second pause would have been about right for a person who was flying the aircraft having to stretch down with his right hand to secure the microphone, pressed the transmitting button and talked.

The probability of Pilot 1 flying the aircraft at that time was further endorsed by his message, "..... I will report .....". The message as heard from the recorded transmission somehow portrayed the element of control by the speaker over the destiny of the flight.

Secondly Pilot 1 acknowledged the QNH to be 1008. However as was determined later, the altimeter QNH was still indicating 1011 mb when the aircraft crashed. Therefore after having completed his last message at 0923:14.55 (GMT), Pilot 1 was engrossed with some over-riding situation or action that prevented him from stretching forward with either hands to the panel infront of him and twirl the altimeter subscale knob to change the QNH. Thirdly the sound of the voice portrayed his sureness of maintaining 3500 feet when he made that transmission. However the aircraft crashed on a 3050 feet ridge about 32 seconds later. It therefore appeared that up till 0923:14.55 (GMT) the aircraft was able to maintain 3500 feet and was still not in cloud. Yet Pilot 1 did not have

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sufficient time to change the altimeter QNH to 1008 mb. Therefore after considering Pilot 1's extended reaction time of not more than 4 seconds, it could be deduced that the aircraft entered cloud with Pilot 1 being engrossed in some major workload at not later than 0923:55 (GMT)

Finally, though he did not repeat the change of radio frequency to 126.1 Mhz, it was unlikely that Pilot 1 missed out that message. It was more likely that he did not have time to change the frequency. For the aircraft crashed with 118.25 still selected on his VHF communication radio.

2.3.14 In its entirety, from the text of the radio transmissions, the tone of Pilot 1's voice and the rate of speech it confirmed his statement that he was at the controls of the aircraft from the start. Though there was no definite confirmation of his being at the control during the phase from Batu Caves to the "last-call" position, events and radio calls pointed to the possibility of Pilot 1 being at the controls.

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2.4.1. **Medical and Pathological Information**

2.4.1. Pilot 1 - Pilot 1 have had a clean bill of health since he took up Private flying in October, 1970. From evidence gathered he was a man who was particular of his health and well being. Evidence also indicated that he does not over indulge himself in extreme of activities that may jeopardise his physical and mental health. Evidence also indicated that he does not over indulge in such socially acceptable activities like late nights, smoking and drinking. There was no evidence of any illness or injury sufferred by Pilot 1 three days preceeding the flight. As such it could safely be stated that he was in good health when he conducted the flight.

2.4.2. However after the accident he was reported to have sufferred injuries as in Annexture A.

2.4.3. Passenger 1 Passenger 1 who was only 31 years of age was deemed physically and medically fit to hold a private Pilot's Bicence. His last medical checkup to renew his licence was on 25th January 1980. Since then there were no evidence to indicate he sufferred any serious illness or injury, until the accident. In fact there were evidence to suggest that he was in a very good state of health. Though there were evidence that he participated in a number of social habits like smoking, drinking and occasional late nights, he was far from being over indulgent. There were no evidence of any illness or injury suffered by Passenger 1 in the last 3 days preceeding the flight. As such he was in good health when he took the flight.

2.4.4. There were however evidence that he slept quite late the night before. It was determined that he attended a friend's birthday party and was involved in the normal social activities like dancing, smoking and some light drinking. Psychologically he was not acceptionally keen to undertake the flight to Benta. It

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was not that he did not like to accompany Pilot 1, but more due to the flight being programmed on a weekend. Moreover there were evidence that his fiancee was not happy to see him fly on a Sunday when by right he should be resting. This state of mind was finally reversed the night before the flight when he decided he wanted to go.

2.4.5. There were evidence that Passenger 1 was not in normal party spirit when he attended the friend's birthday party. This being a direct effect of a said unsatisfactory food arrangement by the host. However he participated in such activities like dancing, drinking and eating. The food he took was shared by a number of close friends and did not leave any ill effect on them. Passenger 1 also did not complain of any uncomfortableness or illness due to the food. He had a total of 3 glasses of diluted Scotch which by his standard was a normal party consumption. His drinking rate was reported to be slow. However before he attended the party it was reported that he had a glass of beer at the Flying Club. Therefore within the last 19 hours before the accident he had a total of 1 glass of beer and 3 glasses of diluted Scotch. It was reported that he finally slept at 01:30 (OMT) on 10th January and woke up at 06:30 (OMT) on the same day. He therefore had only about 5 hours of sleep. He had coffee and toast for breakfast.

2.4.6. As a conclusion Passenger 1 could be said to be slightly short of sleep and had some alcohol the night before. However the investigatass were not able to determine the effect, if any, of these as the Pathologist did not do any internal postmortem and analysis of blood and body tissue. This had a major bearing on the quality of the investigation because the theorotical possibilities could not be medically and chemically supported. More so when it was affirmed by the pathologist that he was prevented from carrying out his normal examination by a police officer. Up to the time this report is compiled, the investigators could not get a satisfactory answer on why the police were not keen to have the body closely examined by the pathologist.

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Such informations like blood sugar level, alcohol and toxic chemical level could never be determined. Further, detailed listing of injuries as were normally required to be inventorised for all aircraft accident victims could not be made.

2.4.7. External postmortem carried out by the Phathologist indicated that amongst others, Passenger 1 suffered fractures of the right lower arm (at the wrist) and the right shoulder. He also suffered multiple fracture of the rib cage. It was of great interest that the finger positions when examined at the crash site was in classic "at the control" posture. The right fingers were semi-clenched as one would when one held the control column. The fracture of the right wrist which at the site appeared to have snapped inward indicated the breaking force was from the front acting chestward. Again supporting the finger position; i.e. the right hand finger were tightly clenched around the control column, the right hand and shoulder braced hard against incoming impact forces, thus fracturing both the right wrist and right shoulder.

2.4.8. The left hand finger position also projected the classic 'at control' posture . In this case they appeared to commensurate with a finger position when one held the throttle control. The lack of fracture injuries on the left hand further indicated this possibility.

2.4.9. Short of strong medical evidence which might prove the contrary, it was of opinion that Passenger 1 was mainpulating the control when the aircraft impacted with obstructions. And short of strong medical evidence of a contrary, it was of opinion that Passenger 1 was not in the best of state to salvage the flight from an abnormal situation.

3. CONCLUSIONS

3.1. Pilot 1 was properly licenced, qualified and current on the Cessna 206 aircraft to conduct the flight.

3.1.2. The aircraft was certified, equipped and maintained in accordance with requirements of Department of Civil Aviation Malaysia.

3.1.3. The aircraft was airworthy and operating normally up to the time of the accident.

3.1.4. The aircraft all-up weight and Centre of Gravity position were within allowable limits.

3.1.5. Both Pilot 1 and Passenger 1 were not qualified and rated to fly in Instrument Meteorological Condition (IMC).

3.1.6. The flight was planned to be in Visual Meteorological Condition (VMC)

3.1.7. The final phase (after last radio call by Pilot 1) of the flight was in IMC, contrary to the flight plan.

3.1.8. As the sole commander of the flight Pilot 1 should have taken appropriate actions to ensure the flight was maintained VMC throughout.

3.1.9. The aircraft lost 450 feet of altitude in cloud during the final phase of heading correction manoeuvre.

3.1.10. Passenger 1 was at the control during the crash phase.

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3.2. **Findings**

3.2.1. The probable cause of the accident was; "In trying to assist Pilot 1 to fly out of the cloud, Passenger 1 took over control and flew the aircraft on instrument, which unfortunately resulted in altitude loss and the aircraft being inadvertantly flown into high ground."

4. **Safety Recommendations**

4.1. The supervisory members of the Royal Selangor Flying Club must ensure that members need to maintain VMC for all flights that are conducted by those without instrument flying qualification. If in wanting to maintain VMC require such steps as climbing/ descending, doglegging or even returning back to Base, it has to be done. There shall be no acception here.

4.2. In view of the possibility of RSFC pilots being technically in IMC at certain phases of flights, it is strongly recommended that RSFC take such steps to ensure that members be further trained in instrument flying to achieve standard equivalent to "IMC Rating". The idea here is not to encourage pilots to fly in bad weather, but to allow them to safely fly out of it when required.

4.3. Not later than 31st June 1982, all Royal Selangor Flying Club pilots who plan to fly Navigation across the Main Range to the East be recommended to passes an IMC Rating before doing so.

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4.4. All RSFC pilots be trained to use such available aircraft Navigation aids like VOR, DME and ADF in ensuring more precise navigation when in poor weather condition.

4.5. That all aircraft analogue clock must be serviceable and be tuned to the last departure airfield time check to the nearest 20 seconds. And Navigation exercise shall not be conducted when the clock is not serviceable.

4.6. Aircraft clocks must have the second-sweep hand.

4.7. Full shoulder and lap harness must be firmly worn by all front seat occupants when flying in IMC or doing circuit and landings. All other occupants must at least firmly wear their lap harness in such exercises above.

4.8. All aircraft flown in IMC must comply with the required terrain clearance. Therefore request for change of flight levels must be made after giving such due time allowance.

4.9. All aircraft on navigation be provided with an appropriate survival kit together with some pyrotechnics.

4.10. Authorising of Navigation flights must only be done after Club instructors have satisfied themselves that all safety aspects of the flight are met, this must include advance request for route weather forecast.

4.11. RCC must be equipped with at least 2 more direct telephone lines, one HF, one VHF and one UHF FM (police frequency). RCC must also have a complete set of 1 inch to one mile maps of the whole nation.

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4.12 A complete debrief of the Search and Rescue phase of the accident be carried out by DCA, inviting all participating agencies.

4.13. A periodical 'SAREX' be carried out by all Responsible Agencies, under the coordination of RCC. It is recommended there should at least be one 'SAREX' every 12 months.

4.14. RCC to incorporate detail individual position check list for all RCC staff, which among others must include organising of ground parties to make ground inquiries from general public of aircraft sightings etc.

4.15. Malaysian Medical Services be appropriately notified on the need to assist Accident Investigation in carrying out such medical services, compilation of accurate medical datas and release of such datas and reports to the Investigators.

Inspectors of Aircraft Accident
Malaysia:

1) .....
(ABDUL JAMIL BIN MOHD. SHARIFF)

2) .....
(HUSSIN BIN MOHD. NOOR)

3) .....
(SYED ZAINAL BIN SYED MOHAMAD)

Chief Inspector of Aircraft Accident
Malaysia:

.....
(OMAR BIN SAMAN)

2.2. Conclusions. ANNEX B

EXTRACT OF PILOT 1's AND PASSENGER 1's TAKE-OFF ACCIDENT IN JB POLO GROUND

a. Findings.

1. The aircraft held a valid certificate of Airworthiness and was properly maintained to an approved maintenance schedule.

2. There was no technical failure of the aircraft.

3. Engine power was normal at and before the accident.

4. Flight controls appeared to be properly rigged.

5. The pilot was properly licenced.

6. The pilot had a proper conversion on type and was rated as competent to operate the aircraft.

7. Though the pilot did not use the performance graph to calculate take-off run and take-off distance, the strip length was edequate for that configuration, weight and prevailing conditions.

8. The pilot was fully justified in not using the South Western strip inspite of the recommendation by the front seat passenger (Safety pilot).

9. The strip inspection carried out by the pilot (though not directly attributeable to the cause of the accident) could have gone right to the end to where the earth mound was.

10. The front seat passanger should not have interfered with the controls at that critical stage of take-off.

b. Cause.

The probable cause of this accident was due to the interferance by the front seat passenger with the elevator control- in that he made the aircraft to pitch excessively and thus induced it to mush resulting a decrease in lift and altitude correspondingly. The whole situation was so tight and critical that a slight drop from maximum performance was good enough to bring about aircraft to obstacle contact.

ANNEX C

SPEECH & RATE & VOICE PITCH OF PILOT 1

1. **After start call**

No.1 call	02.37 sec	8 words
2	09.69 sec	18 words
3	04.17 sec	14 words
Average	13.23 sec	41 words

rate of speech 3.1 words per second
pitch quite low(index ref 0 - 10) - 4

2. **Taxy and holding**

No. 1 call	0.74 sec	3 words
2	8.90 sec	15 words
3	1.50 sec	6 words
4	1.39 sec	8 words
Average	12.53 sec	32 words

rate of speech 2.55 words per sec
pitch + 5.5

3. **Line-up for t/o**

No. 1 call	0.21 sec	2 words
2	1.43 sec	5 words
3	0.81 sec	4 words
Average	2.45 sec	11 words

Speech rate 4.49 words per sec
pitch rate 5.5

4. **Airborne in circuits**

No. 1 call	01.15 sec	5 words
2	01.69 sec	5 words
3	03.10 sec	12 words
	05.94	22 words

Speech rate - 3.9 words per sec

pitch rate - 5.8

5. **Set course for Batu Caves**

No. 1 call	02.25 sec	8 words
2	0.98 sec	4 words
3	02.77 sec	9 words
4	11.02 sec	23 words
5	00.93 sec	3 words
6	01.10 sec	6 words
7	01.34 sec	7 words
8	05.71 sec	15 words
Avdrage	26.03 sec	75 words

Speech rate - 2.88 words per sec

pitch rate - 5.3

6. **Set course for Water WORKS GAP**

No. 1 call	00.89 sec	8 words
2	04.30 sec	16 words
3	02.03 sec	13 words
4	01.09 sec	6 words
Last call	03.55 sec	13 words
Average	11.95 sec	56 words

Speech rate - 4.69 words per second

pitch rate - 5.0

NOTE: 5 of the calls were not timed because they were quick acknowledgements like "Roger etc"

ANNEX D1 → 1120 TS C206 EXPERIENCE

Date	Time	P1	His Capacity	A/C TYPE	ROUTE
.2.80	8.55			PA 320 Piper	
2.4.80				PA 28.	
.5.77	1.20	Y.S.F.	P 1	206 AVI	KL–Smp.
3.1.78	1.20	Chin	P 3	206 AVI	KL–JB
	1.20	"	P 3	"	JB–KL
26.1.78	1.30	Lim	P 3	206 AVI	Local
27.1.78	1.30	Lim	P 3		Semp
28.1.78	2.50	Lim	P 3		Semp–J.B.–Semp.
30.1.78	2.30	Chin	P/U/S		Johore–Semp.
31.1.78	N/S	Chin	P/U/S		Semp.
1.5.	1.35	M Ong	P 1	206 AVI	Semp–Senai.
.5.78	.25	Y.S.F.	P 3	206 AVI	
7.5.78	1.35	Y.S.F.	P 1		Simp–Bidor–Bidor–Simp.
8.5.78	1.05	Y.S.F.	P 1		KN – Semp.
.6.78	1.40	Y.S.F.	P 1		K.T. – Semp.
.6.78	1.20	Y.S.F.	P 1		Semp – Senai.
.6.78	1.30	Y.S.F.	P 1		V I
.6.78	5.30	Lim	P 1 U/S		Semp–Hadyai–Hua Hin
.6.78	3.45	Lim	P 1 U/S		Hua Hin–Penang
.6.78	1.20	Lim	P 1 U/S		Png – Semp.
2.6.78	1.20	Y.S.F.	P 1		Semp–Benta–Semp
.6.78	:45	Y.S.F.	P 1		Benta– Semp.
.6.78	:40	Y.S.F.	P 1		Benta–Semp.
7.78	:35	Y.S.F.	P 1		Benta–Bidor.
7.78	:25	Y.S.F.	P 1		Bidor–Banta
.7.78	2:15	Lim	P 1 U/S		Senai–Palembang
.7.78	2.15	Lim	P 1 U/S		Palembang–Senai
.7.78	:30	Lim	P 1 U/S		Jakarta–Bandong
.7.78	:30	Lim	P 1 U/S		Bandong–Jakarta
7.7.78	1.30	Y.S.F.	P 1		Semp–Trg.

Date	Time	P 1	His Capacity	A/C Type	Route
3.8.78	:40	Y.S.F.	P 1		Semp - Benta
4.8.78	:35	Y.S.F.	P 1		Benta - Sempang
3.8.78	:45	Y.S.F.	P 1		Bemp-Benta
5.10.78	1:35	Y.S.F.	P 1	9M-AVI	Polo Grd-Sempang
20.10.78	1.20	Y.S.F.	P 1	9M-AVI	Semp-Penang
21.10.78	1.35		P 1	9M-AVI	Png-Semp
23.10.78	1.05	Henry Cheng	P 3	9M-AWT	Semp-KN -35min - Instrument N/S.
24.10.78	1.10	Henry Cheng	P 3	9M-AWT	Kn-Semp
22.1.79	2.05	Y.S.F.	P 1	9m-AVI	Semp-K.N.-Semp
23.2.79	2.15	Viswa	P 1	9M-AVI	Semp-Png-Hadyai
25.2.79	2.25	Viswa	P 1	9M-AVI	Hdy-Peng-Semp
15.6.79	:50	Cheng	P 1 U/S	9M-AWT	Semp - KN.
16.6.79	1.55	Cheng	P 1 U/S	WT	KN-Benta Semp
14.7.79	2.00	Viswa	P1	VI	Semp-KN-Semp
13.8.79	:40	Viswa	P 1	VI	Semp-Benta
23.8.79	3.10	Viswa	P 1	VI	Semp-PoloGrd-Semp
20.12.79	5:35	Henry Cheng	P 1	WT	Semp-Palembang-Jakar
21.12.79	4:30	Henry Cheng	P 1	WT	Jakarta-Surabaya-Bali.
22.1.79	4.40	H.Cheng	P 1	WT	Bali-Surabaya-Mar.
13.4.80			P 1	WT	Semp-Benta-Semp
3.3.81	:05	Ong H.C.	P 1	WT	Semp-Benta
14.3.81	1.4	Vergis	P 1	WT	Semp-Tioman
15.3.81	1.3	Vergis	P 1	WT	Rompin-Semp
1.4.81	.5	Md Noor	P1 U/S	PSA	Semp-Benta-Subang
1.5.81	18	Md Nor	P 1	PSC/PSD	WMKF-WMKM-WMKF
1.5.81	1.4	Md Nor	P 1	PSC/PSD	WMKF-WMKM-WMKF
12.5.81	1.4	Vergis	P 1	WT	WMKJ-WMKM-WMKF
1.8.81	2.3	Vergis	P1	VI	WMKF-BENTA-MACCA-SPG.

3/.....

ANNEX D3 PILOT I'S C206 EXPERIENCE

Date	Time	Pi	His Capacity	A/C Type	Route
3.81	1.2	Ong H.C.	P 1	WT	WMKF-BENTA-SPG
9.81	1.5	Vergis	P 1	WT	WMKF-TENERLOH-WMKF
9.81	1.8	Vergis	P 1	WT	WMKF-WMKI-WMKF
10.81	1.0	Vergis	P 1	VI	WMKF-WMKI
10.81	1.1	Vergis	P 1	VI	WMKI- WMKF
1.81	2.6	Vergis	P 1	VI	WMKF-SENAI-WMKF
1.81	2.1	Vergis	P 1	VI	WMKF-BENTA-WMKF

ANNEX E,

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM F.1.

Aircraft Reg No: 9M AVI Body No: 2

Date of Examination: 11/1/1982 Pathologist: DR. JOKO SH Sex: Male ~~FEMALE~~

Identified as: Vergis chooko

Means of identification: Primary: — Confirmatory: Yes

EXTERNAL EXAMINATION

Estimated age: Visual 30 Dental	Height: (if measured) 6'2"	Weight: (if measured) —	Body build: Heavy Built
Colour of skin: Dark Ears: Pierced / Not pierced	Hair: Length Colour dark	Lipstick: — Nail varnish: —	Degree of obesity: Large

External scars, skin marks/tumours, etc. Nill

Any obvious visual characteristics	Extent of burning
Nill	Nill

Breasts —

Scalp Vault of Skull: No fracture of the skull

Face: multiple abrasion & contusion

Chest: multiple fracture of the chest ribs left and right and R shoulder.

Abdomen: Nill

Back: Nill

L. Arm: multiple contusion and abrasion

R. Arm: Fracture of right lower Arm

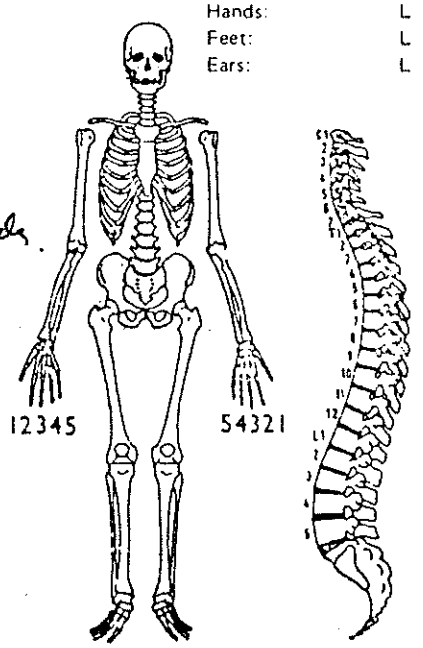
L. Leg: multiple contusion and abrasion

R. Leg: multiple contusion and abrasion.

FOR USE IN CASES OF MUTILATION

Summary:

	L	R
Humeral Heads:		
Femoral Heads:		
Hands:		
Feet:		
Ears:		



24/2/72
No. 2

ANNEX E_2

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM F.2.

Date of Examination: 11/1/1982 Body No: 2

Examiner: DR. JOKO SH Sex: Male ~~FEMALE~~

CLOTHING

Outer Garments:

grey T-shirt
Dark brown long pants

Under Garments:

white underpant

JEWELLERY

—

OTHER EFFECTS (Handbag, documents, etc.)

ANNEX E 3

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM

Accident to Aircraft Reg. No: Surname: Mr/Mrs/Miss/Inf Body No:

REGISTRATION PARTICULARS

1. Forenames
2. Date of Birth
3. Place of Birth
4. Usual Residence
5. Religion
6. Profession
7. Nationality
8. Married/Single

9. Father's Name Profession Nationality
10. Mother's Name Nationality
11. Husband's Name Profession Nationality
Place of Birth

12. AVAILABLE NEXT OF KIN

Name in full: Relationship:

Address: Telephone:

13. OTHER CONTACTS

a) Solicitors
b) Dentist
c) Doctor
d) Others

Dental chart requested / obtained / sent to Field Team

IDENTIFICATION PARTICULARS

14. Build: Height: Weight: Obesity:

15. Race: 16. Colour of eyes:

17. Colour and peculiarities of hair:

18. Moustache - Yes/No
Beard Yes/No

19. Nails peculiarities varnished or bitten:

20. Ears pierced – Yes/No

21. Scars or missing parts:

22. Tattoos:

23. Circumcision Yes/No

24. Moles or other identifying marks:

25. Medical history (e.g. operations, non-surgical illnesses, broken bones, etc.)

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM F.1.

Aircraft Reg. No: 9M AVI Body No: 1

Date of Examination: 11/1/1982 Pathologist: DR. JOKO SH. Sex: Male ~~FEMALE~~

Identified as: ASP Charon Daam

Means of identification: Primary: — Confirmatory: Yes

EXTERNAL EXAMINATION

Estimated age: Visual 38 Dental — if measured Height: 5'6" Weight: — Body build: well built

Colour of skin: Fair Ears: Pierced / Not pierced Hair: Length Colour grey & dark Lipstick: — Nail varnish: — Degree of obesity: Nill

External scars, skin marks/tumours, etc. Nill

Any obvious visual characteristics Nill Extent of burning Nill

Breasts —

Scalp / Vault of Skull ~~Normal~~ Fracture of the base of the skull as well as the neck.

Face Lacerations & contusion of the chi

Chest contusion of the right shoulder 4 x 6 cm

Abdomen Nill

Back Nill

L. Arm multiple contusi and abrasi

R. Arm Fracture of right humerus multiple contusi & abrasions

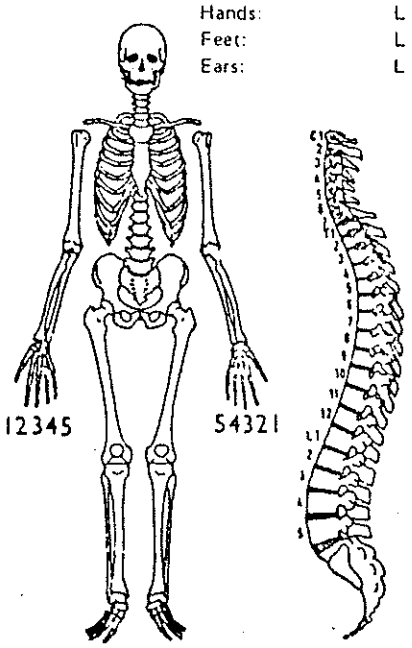
L. Leg ~~Fract~~ Fracture of left femur. multiple contusi & Abrasi

R. Leg multiple contusi & abrasi.

FOR USE IN CASES OF MUTILATION

Summary:

Humeral Heads: L R
Femoral Heads: L R
Hands: L R
Feet: L R
Ears: L R



24/2/72
No. 2

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM F.2.

Date of Examination: 11/1/1982 Body No: 1

Examiner: DR JCKO 54 Sex: Male ~~FEMALE~~

CLOTHING

Outer Garments: Brown short sleeve
~~white singlet~~
Brown long pants
~~white cardigan~~

Under Garments: white singlet
white underpants

JEWELLERY

Nill

OTHER EFFECTS (Handbag, documents, etc.)

Nill

ANNEX F 3

FATAL AIRCRAFT ACCIDENT VICTIM IDENTIFICATION AND AUTOPSY FORM

Accident to Aircraft Reg. No: 9M AVI Surname: ASP Charon Daam Body No: 1
Mr/Mrs/Miss/Inf

REGISTRATION PARTICULARS

1. Forenames
2. Date of Birth
3. Place of Birth
4. Usual Residence

5. Religion Budist
6. Profession Police.
7. Nationality Malaysian
8. Married/Single Married.

9. Father's Name Profession Nationality
10. Mother's Name Nationality
11. Husband's Name Profession Nationality
Place of Birth

12. AVAILABLE NEXT OF KIN

Name in full: Relationship:
Address: Telephone:

13. OTHER CONTACTS

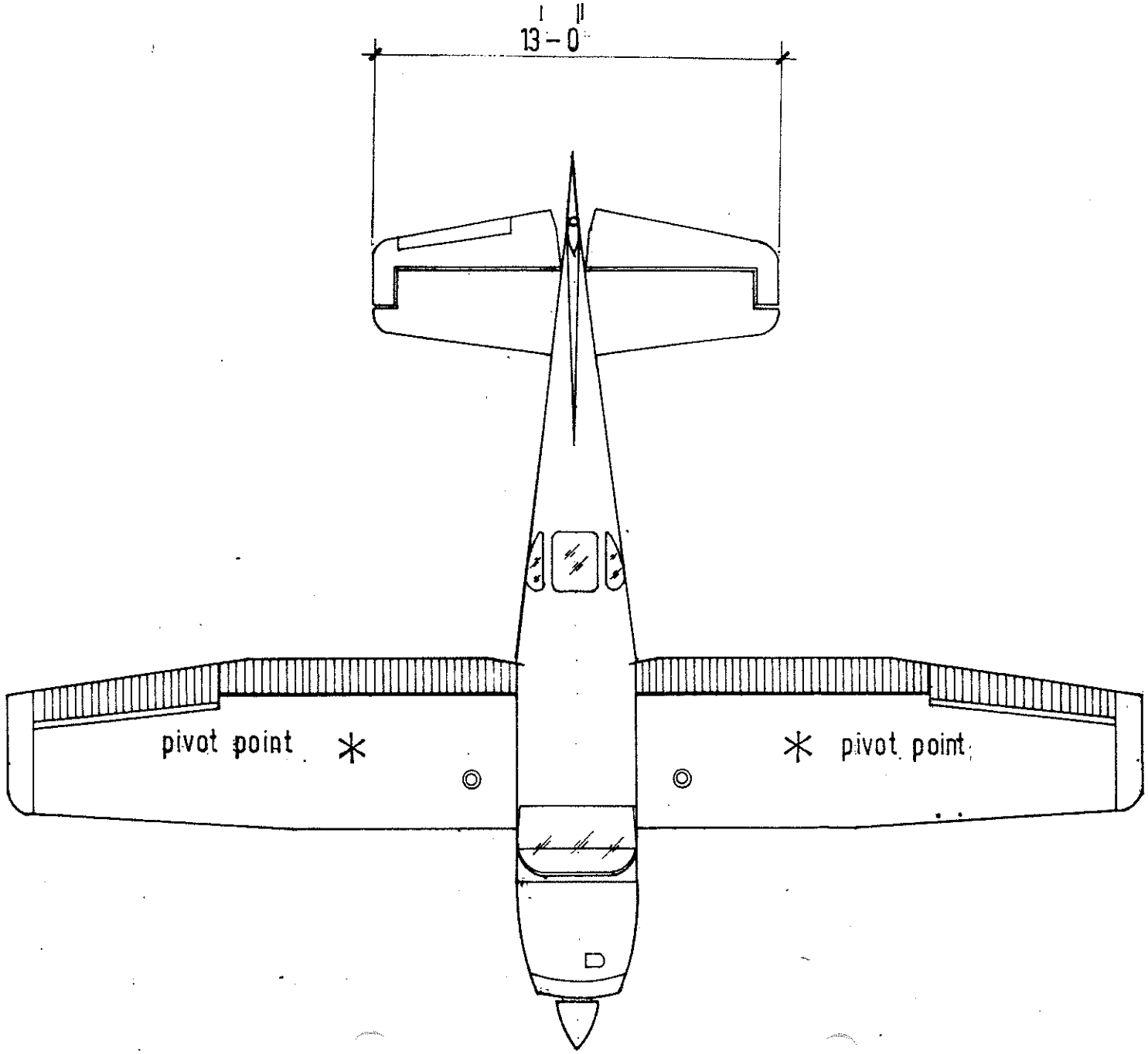
a) Solicitors
b) Dentist
c) Doctor
d) Others

Dental chart requested / obtained / sent to Field Team

IDENTIFICATION PARTICULARS

14. Build: Height: Weight: Obesity:
15. Race: 16. Colour of eyes:
17. Colour and peculiarities of hair: 18. Moustache – Yes/No
Beard Yes/No
19. Nails peculiarities varnished or bitten: 20. Ears pierced - Yes/No
21. Scars or missing parts:
22. Tattoos: 23. Circumcision - Yes/No
24. Moles or other identifying marks:
25. Medical history (e.g. operations, non-surgical illnesses, broken bones, etc.)

JPA

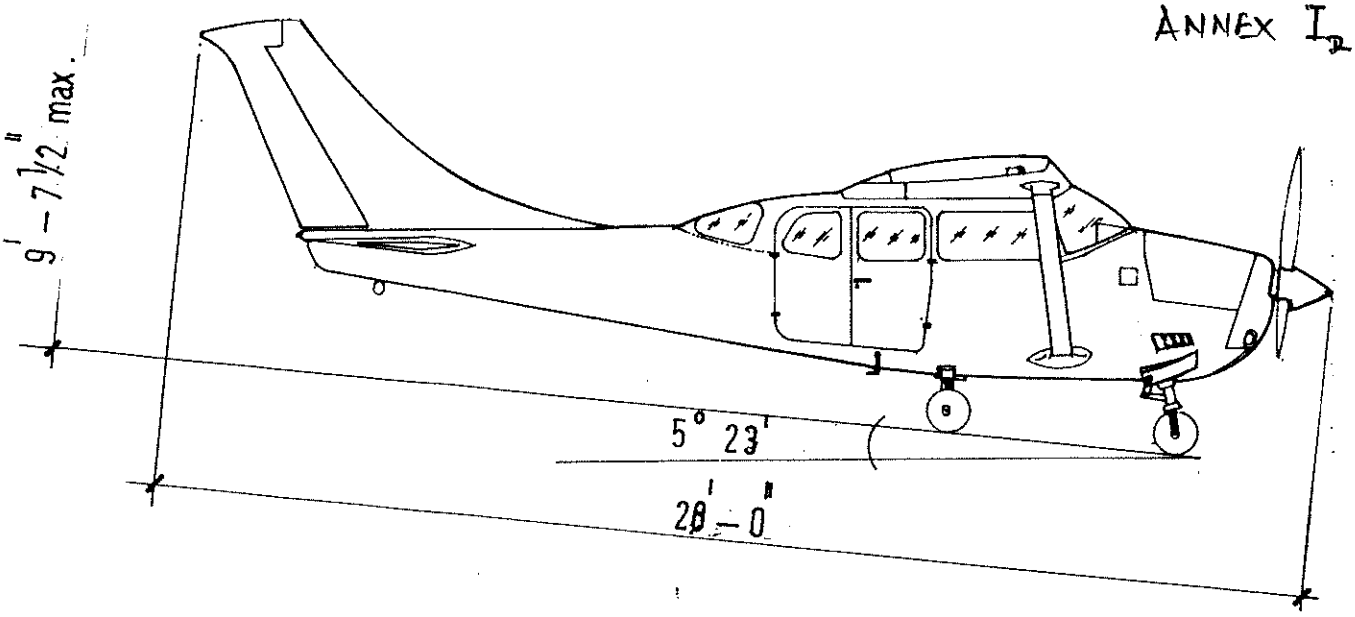


PLAN

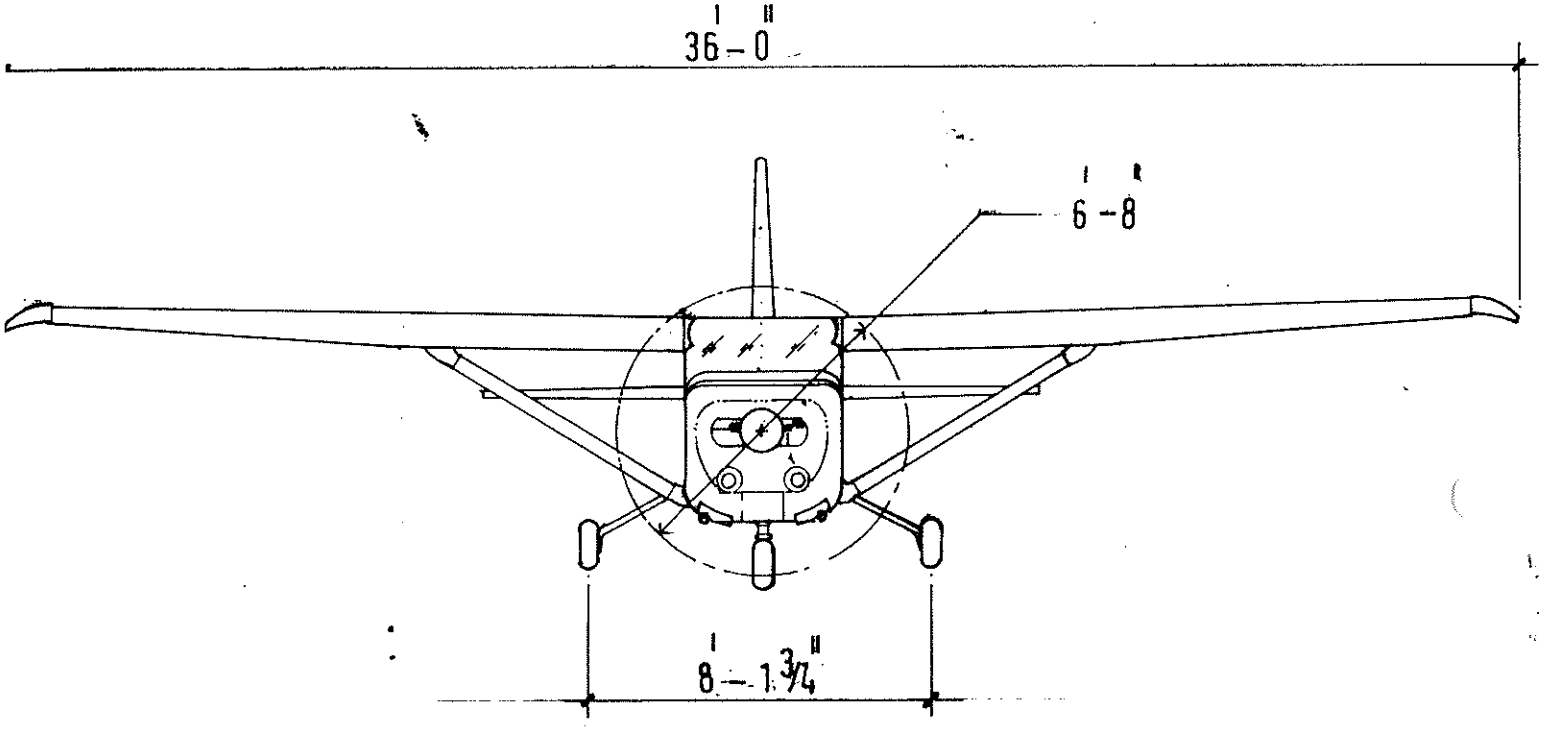
ANNEX 1

JPA.
drawn by
abdullah

ANNEX I



SIDE ELEVATION



FRONT ELEVATION

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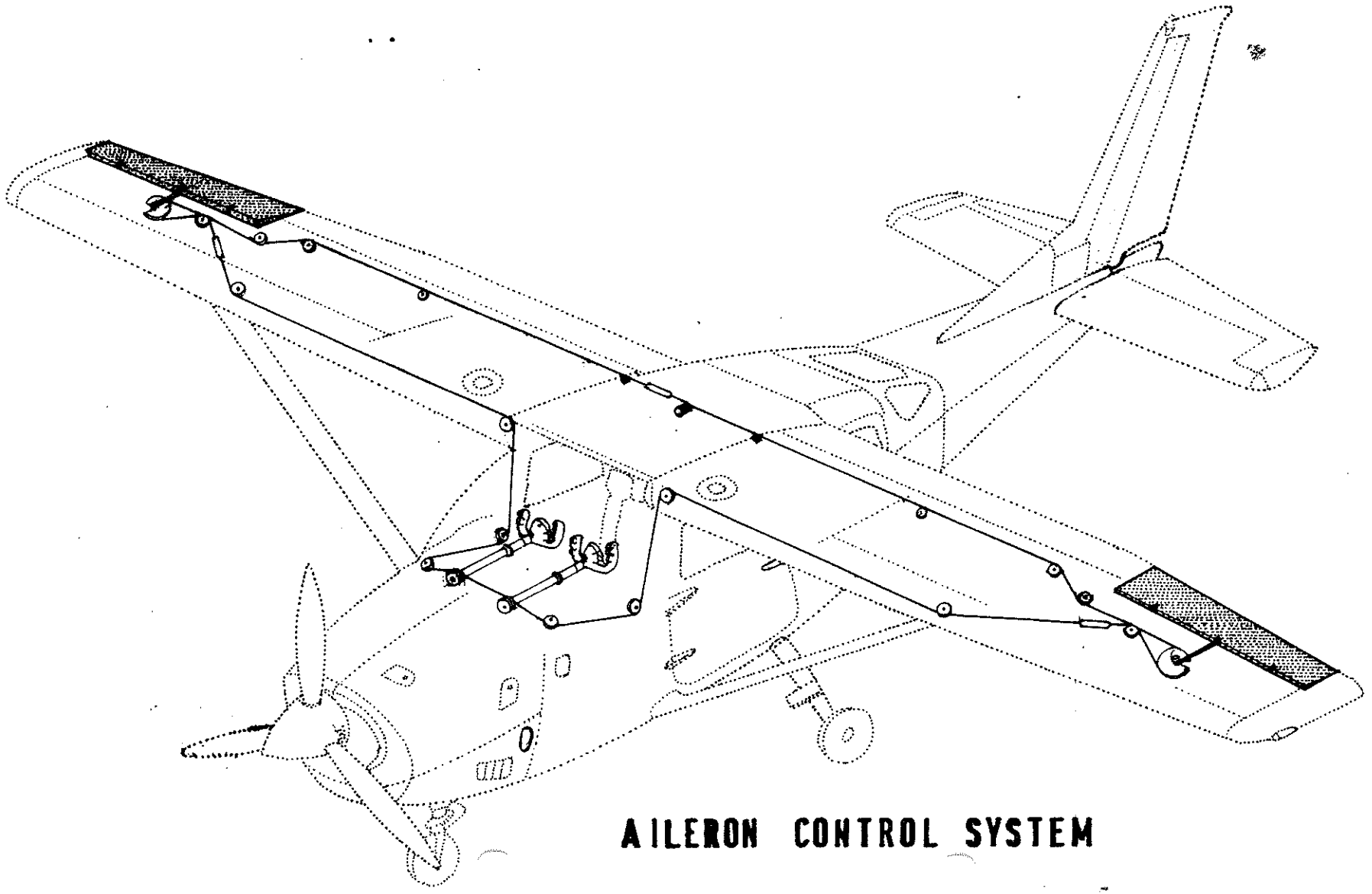

AILERON CONTROL SYSTEM

ANNEX I 3

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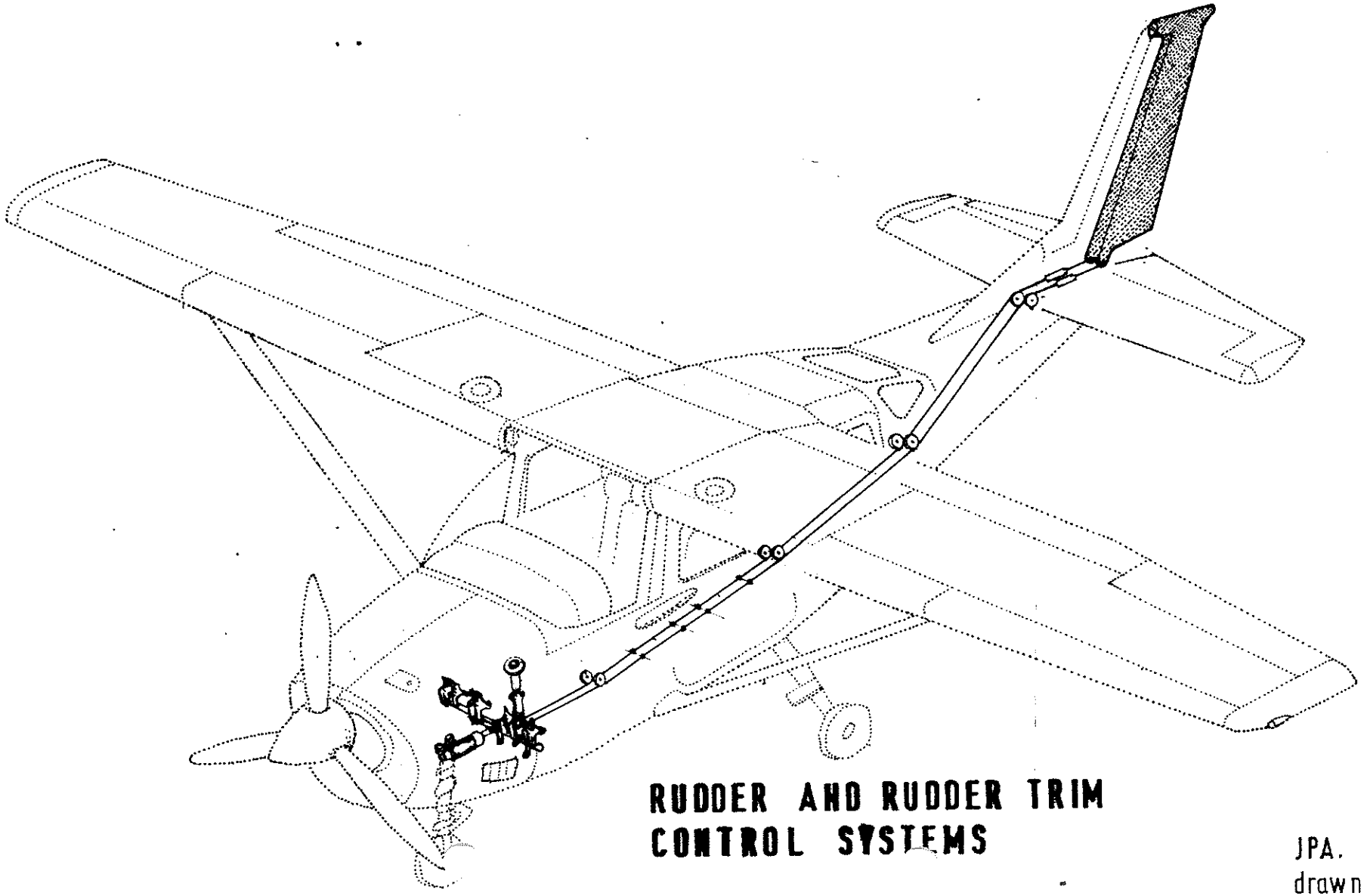
drawn by:
abdullah



RUDDER AND RUDDER TRIM CONTROL SYSTEMS

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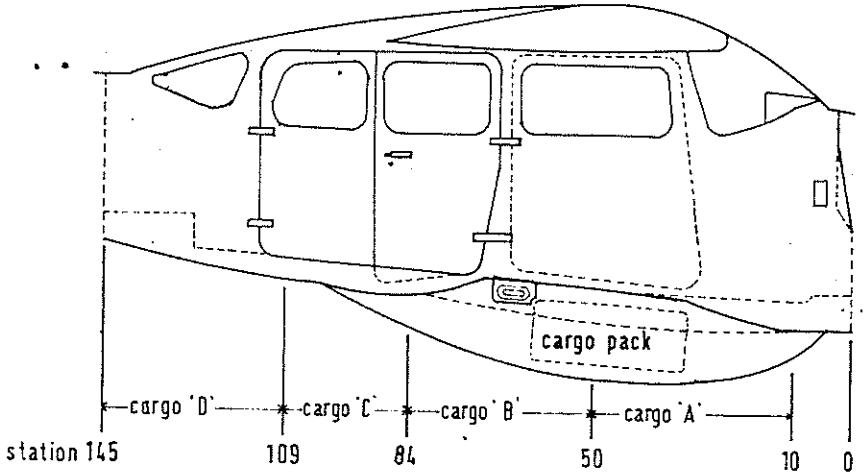
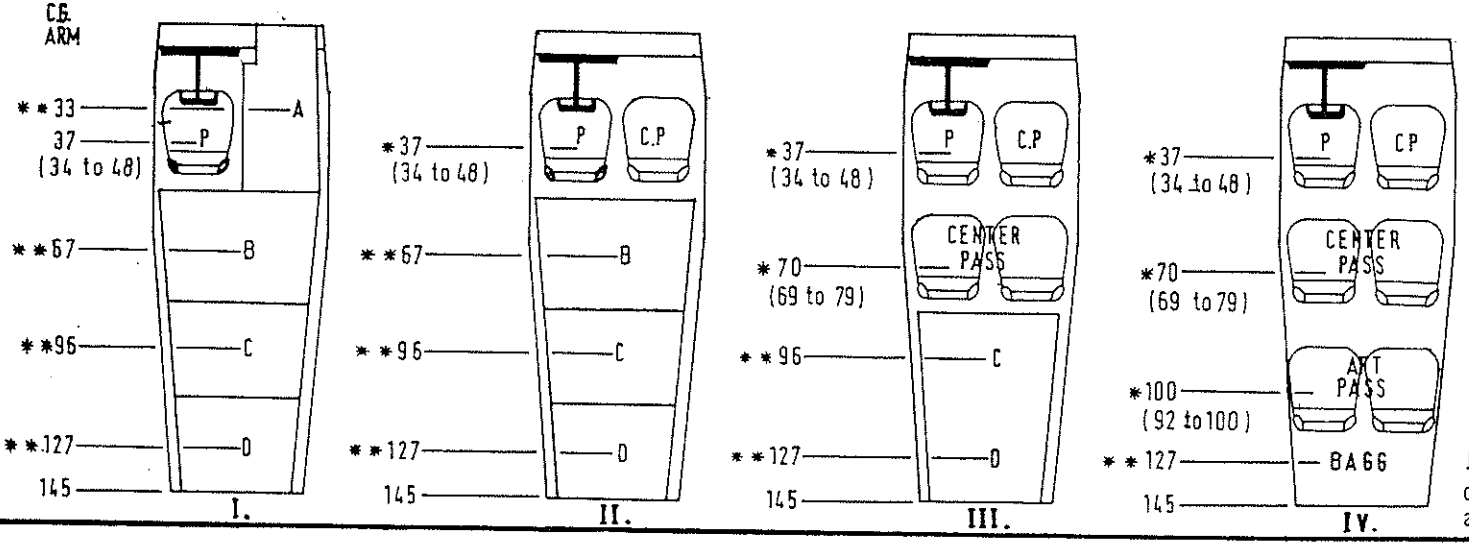
ANNEX I 4

LOADING ARRANGEMENT

CESSNA MODEL U 206 G





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drawn by: abdullah

ANNEX 15