

**AIR ACCIDENT REPORT NO. 05/95**

**REGISTER OWNER AND OPERATOR : MALAYSIA AIRLINES SDN. BHD**

**AIRCRAFT TYPE : FOKKER 27**

**MODEL : MK 050**

**NATIONALITY : MALAYSIAN**

**REGISTRATION : 9M-MGH**

**PLACE OF ACCIDENT : TAWAU AIRPORT, SABAH,  
MALAYSIA**

**DATE AND TIME : 15 SEPT 1995 AT 0505 HRS  
ALL TIMES IN THIS REPORT  
ARE UTC.**



## **SYNOPSIS**

About 1305hrs on 15 September 1995, a Fokker 27 MK050 bearing registration 9M-MGH, operated by Malaysia Airlines crashed into several squatter houses and a storage yard belonging to a local public work Department in Tawau. The aircraft crashed approximately 517 feet from the threshold runway 35. The aircraft was totally disintegrated on impact, which subsequently caught fire. 2 crew and 32 passengers were fatally injured.

The accident was notified to the Chief Inspector of Air Accident on the same day and investigation began that afternoon. The investigation team comprised of an Inspector In-charge and five members from the Department of Civil Aviation. The Department of Civil Aviation also advised and invited representatives from the following to act either as Accredited Representatives or as Technical Advisors to the accident Investigation.

Holland : Department of Accident Investigation and Fokker BV

Canada : Pratt & Whitney

U.S.A : Federal Aviation Authority (Human Factors)

Malaysia : Malaysia Airlines

The most probable cause of the accident was due to the commander's insistence to continue with an approach despite the fact that the runway available after touchdown was not sufficient enough for the aircraft to stop. The perception regarding economic consideration, which put pressure on him to save fuel and adhere to schedules, was a contributing factor.

## **1.0 FACTUAL INFORMATION**

### **1.1 History of the flight**

Flight MH 2133 A Fokker 27 mark 050 bearing registration 9M-MGH was a scheduled domestic flight from Kota Kinabalu to Tawau, Sabah. The departure from Kota Kinabalu was delayed by approximately 30 minutes due to late arrival of the aircraft operated by a different set of flight crew from Labuan. The flight took off from Kota Kinabalu at 0419 hrs on an Instrument Flight Rules (IFR) flight plan via Airway W 423 direct to Tawau Very Omni Range (VOR) at flight level (FL) 170 with 53 persons on board.

- 1.1.2 The departure out of Kota Kinabalu was uneventful and the weather en-route was insignificant. At 0442 hrs the flight established radio contact with Tawau Tower “MH 2133 we are maintaining FL 170, TMA 40, VTW 0505, presently at 94 DME VTW”. The controller then passed the weather for Tawau which was, “surface wind calm, visibility more than 10 km, rain north to north east, scattered 1600 feet and scattered 2700 feet, broken at 14000 feet, Temperature 30 degree C and QNH 1009mb, Runway 17”.
- 1.1.3 At 0443 hrs another aircraft call sign TSE 809 (a Cessna 206) flying along the same route as MH 2133 but at 9500ft established radio contact with Tawau Tower, TSE 809 then reported that the flight was 65 DME from Tawau VOR. This was immediately followed by Tawau Tower asking MH 2133 to report position from Tawau VOR which MH 2133 replied “57 DME and requested descent”. The controller then cleared MH 2133 to descend to 10500 feet. At this point in time there was also another aircraft MH 2135 (a Boeing 737) heading towards Tawau cruising at FL 230 and cleared by the TOWER to descent to FL 180. MH 2135 was also notified by the TOWER of the Expected Approach Time (EAT) of 0530 hrs.
- 1.1.4 At 0457 hrs TSE 809 reported that the flight was 44 DME from Tawau VOR. On hearing this transmission, MH 2133 requested a lower descend clearance, as it was 30 DME from Tawau VOR. It must be noted that at

this juncture, MH 2133 was ahead of TSE 809 but at a higher altitude. The controller then asked TSE 809 whether there was any objection for MH 2133 to descent through its level and become number One (1). Despite the fact that TSE 809 had no objection for MH 2133 to become number One (1), MH 2133 was asked by the controller to still maintain 10500 feet.

- 1.1.5 At 0458:23 hrs, MH 2133 asked "MH 2133 confirm maintain 10500 feet?". TOWER then replied "Affirm maintain 10500 number 2 in traffic". At 0458:36 hrs MH 2133 again asked "MH 2133, 26 DME confirm we are still number 2?" TOWER then replied- "Station calling.... say again - MH 2133 then repeated "2133 Maam, and are 25 DME maintain 10500, confirm we are number 2?". TOWER – responded "That's affirm 2133, Expected Approach Time 0520 hrs".
- 1.1.6 At 0459:05 hrs MH2133 asked TSE 809 to check position and whether there would be any objection for the aircraft to descend through its level. TSE 809 replied that they had no objection and MH 2133 was subsequently cleared to descend to 7000 feet.
- 1.1.7 The descent into Tawau by MH 2133 from the cruising altitude of 10500 feet was initiated at about 21 DME. The flight crew discussed the descent technique they were going to use and were aware of all their action. At 0501:15 hrs, as the flight reported leaving 9000 feet and passing 16 DME, the flight crew advised the controller that they had the airfield visual. MH 2133 was then cleared for visual approach runway 17.
- 1.1.8 At 0502:48 hrs, MH 2133 reported passing 3500 feet. The aircraft was then configured for landing where landing gears were selected down and flaps set at 25 degrees. The aircraft speed was still fast and since it was also high on the approach, the commander assured the co-pilot "Runway is long so no problem Eh". On passing 2000 feet and on short final, the co-pilot reminded the commander "speed, speed check, speed check Ah". The rate of descent was in excess of 3000 feet per minute and its pitch angle was around minus 13 degrees. The excessive rate of descent

triggered the aircraft Ground Proximity Warning System (GPWS) sink rate and pull up warnings. The commander ignored these warnings and insisted that he should continue with approach for a landing.

1.1.9 The aircraft first touched down on the runway at 0505 hrs. Its first tyre marks (nose wheel) on the runway was at approximately 3400 ft from the threshold. It then bounced and at 4500 ft point, its left main wheel made a light contact with the runway surface. It subsequently bounced up again and its main wheels made a firm contact at 4800 ft point, thus leaving only 800 ft of runway remaining.

1.1.10 The aircraft continued onto the grass verge, momentarily left the ground and hopped over the runway perimeter fence. It subsequently crashed at 571 feet from the end of the runway at almost right angle to the runway. There were a number of explosions followed by a fire. The aircraft was totally destroyed.

## 1.2 Inquiries To Persons

Injuries	Crew	Passengers	Other
Fatal	2	32	0
Nonfatal	2	17	0
None	0	0	0

## 1.3 Damage To Aircraft

Impact forces and post-impact fire destroyed the aircraft.

## 1.4 Other Damages

About 40 squatters homes were either damaged by the impact of the aircraft or by the subsequent fire.

## 1.5 Personnel Information

- 1.5.1 Commander : Male aged 40  
Licence : Malaysia Airlines Transport Pilot's Licence  
No. 1406  
Aircraft Rating : Group 1                      Group 2  
PA 28-181                      B737-200  
DHC – 6                      B737-300/400/500  
Fokker 27 MK 050  
Medical Certificate : Renewed on 12/01/1995 and valid until  
31/01/1996  
Instrument Rating : Conducted on 06/01/1995  
Last Base Check : 04/06/1995  
Last Route Check : 25/06/1995  
Flying Experience : Total on all type : 4892:17 hrs  
Total F27 : 427:15 hrs  
Total last 90 days : 165 hrs  
Total last 28 days : 55 hrs
- 1.5.2 First Officer : Male aged 28 years  
Licence : CPL/IR No. 1805  
Aircraft Rating : Group 1                      Group 2  
Cessna 310/320                      Fokker 27 MK 050  
Medical certificate : Renewed on 11/11/1994 and valid until  
30/11/1995

Instrument Rating	:	Conducted on 25/06/1995
Last Base Check	:	25/06/1995
Last Route Check	:	19/07/1995
Flying Experience	:	Total on all type : 1162:07 hrs
		Total F27 : 962 hrs
		Total last 90 days : 140 hrs
		Total last 28 days : 47 hrs

## 1.6 Aircraft Information

1.6.1	Leading Particulars	:	
	Type	:	Fokker 27 M050
	Constructor's number	:	20174
	Date of Manufacturer	:	1989
	Certificate of Registration	:	M557 dated 20/04/90
	Certificate of Airworthiness	:	M417 dated 24/04/90
	Total airframe hours	:	10,848:44 hrs
	Total Flight cycles	:	17,483
	Engines TSN	:	#1 7,287:87 hrs
			#2 2,326:02 hrs
	Maximum weight authorised for take off	:	20,820 kg
	Actual take off weight	:	20,200 kg
	Estimated weight at time of accident	:	19,220 kg
	Estimated fuel remaining at time of accident	:	1530 kg
	Centre of gravity (CG) at time of accident	:	Within limits
	Maximum operating speed	:	224 kts

## 1.6.2 Maintenance details

Last A check : 13/09/1995  
Last C check : 27/06/1995

## 1.7 Meteorological Information

At the time and place of the accident, the weather conditions were clear with a visibility of more than 10 km.

The 0500 UTC/1300 hrs weather report at Tawau Airport was as follow:-

Surface Wind : Light and variable  
Surface Visibility : 10 km or more  
Weather : Nil  
Cloud : Scattered at one thousand six hundred  
QNH : 1008  
Temp. : 30 centigrade

Note: The wind direction indicator was unserviceable and wind direction was given based on tower observation on the windsock.

## 1.8 Aids to Navigation

Navigation aids Tawau Airport and along the route of the aircraft were operating normally except for the TWU Locator.

## 1.9 Communications

All relevant communications between the aircraft and Air Traffic Control service units were on very frequency (VHF) radio. A transcript of the

communications between the aircraft and ATC from the time when the aircraft departed Kota Kinabalu until the aircraft crashed were available.

## **1.10 Aerodrome Information**

Tawau Airport is operated by Malaysia Airport Berhad. The airport was serviceable, and there was no evidence of any equipment malfunction except for 'TWU' locator and wind direction indicator at the time of the accident. These facts had been promulgated in NOTAM. The landing by MH 2133 was made using runway 17 which is 5600 feet long and 10ft wide with an asphalt surface. The elevation of the airfield is 74 feet above mean sea level. The aerodrome and ground facilities were not factors in this accident.

## **1.11 Flight data recorder**

- 1.11.1 The aircraft fitted with both the Digital Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR). These items were recovered at the tail end of the wreckage partly submerged in a drain and found to be partially burnt.

Both the recorders were processed at the facilities of the Aircraft Accident Investigation Branch (AAIB) at Farnborough, United Kingdom on the 19<sup>th</sup> and 20<sup>th</sup> September 1995. A transcript of the CVR was produced by the AAIB for the last 15 Minutes of the recording. The GMT timings shown is approximate and are based on GMT recorded by the FDR.

### **1.11.2 The Universal Flight Data Recorder (UFDR)**

The unit model was Sunstrand Data Control, Part Number 980-4100-Dxun which recorded in digital form a total of 15 parameters. The serial number was 10986.

The UFDR readout of the subject flight did not appear to suggest that the aircraft behaved abnormally. There were no indications of technical defect or malfunction of the aircraft and its systems. A steep descent into the airfield was recorded in the UFDR. The data showed an estimated average rate of descent of 3000 feet per minute at the final phase of the approach.

The high rate of descent resulted in repeated ground proximity warning below 1000 ft. The aircraft landed at 0505:27 at an airspeed of 104.02 knots. The impact was recorded at 0505:30 hrs by the UFDR.

#### 1.11.3 The Cockpit Voice Recorder (CVR)

The unit model was Fairchild Industrial products Part Number: A100 and serial Number 6698. It recorded cockpit conversations and sounds in 3 channels namely P1 channel (Captain), P2 channel (First Officer) and P3 channel (Area Microphone).

The Voice Recorder was undamaged and a transcription was made of the recordings starting with the radio contact with Kinabalu control until the recorder was stopped by impact which was about 30 minutes of recording. This recording is included as an appendix to this report.

### 1.12 **Wreckage**

- 1.12.1 The aircraft first contacted several saplings at a distance of approximately 280 ft from the threshold of runway 35 at an elevation of approximately 74 ft above mean sea level. Initial ground contact was made against the sloping terrain approximately 396 ft from the runway end and about 16 ft below the runway elevation. It was determined that the aircraft had a slightly nose high attitude and a left bank angle of about 25 degrees on impact with the concrete blocks. The aircraft came to rest approximately 571 ft from the threshold runway 35. The swath path from the runway to

the wreckage was oriented on an approximate heading of 162 degrees.

- 1.12.2 The major airframe structure and flight control surfaces were found in the wreckage area. No evidence of any malfunctions or failures of the aircraft structure or component prior to impact was found. Evidence revealed that the elevator trim was 6 division nose up, and that the landing gear was down and locked and flaps extended to 25 degrees.
- 1.12.3 Both power plants were still attached to the aircraft and were recovered in the main wreckage area. The left engine was extensively damaged by ground fire but ground fire damage on the right engine was localised in the vicinity of the top aft cowlings.
- 1.12.4 All propellers blades found, had broken off from the root. Visual inspection of both hub assemblies indicated that this respective blades were in the flight fine position. Examination of both engines and propellers revealed no evidence or operational distress prior to impact. The hydraulic, electrical and other aircraft systems were examined and no evidence was found that would indicate any pre-impact failure or malfunction.

### **1.13 Medical and Pathological Information**

A review of the medical records of the flight crew, the toxicological examinations and the autopsy reports did not reveal any evidence of the flight crew incapacitation. The crew member were all performing their duties and conversing in normal tones until just before the accident occurred.

#### **1.14 Fire**

Evidence revealed that on the final impact with the concrete blocks both wings started to disintegrate and the internal tanks to rupture. As a result approximately 1530 kg of fuel escaped and caught fire. The main wreckage as well as a ground area 405,000 sq ft including about 40 squatter houses were subject to an intense fire for a considerable time.

#### **1.15 Survival Aspects**

The aircraft crashed about 571 ft from the threshold runway 35 and airport rescues arrived at the scene by 0506 hrs. All the fire engines that were rushed to the scene had to stop 500 feet short of the wreckage due to perimeter fence, the steep slope and the squatter houses. At 0650 hrs the aircraft fire was brought under control, however the fire to the squatter houses was contained only at time 0815 hrs.

According to the Airport Fire Rescue Services, all the 19 survivors survived mainly owing to their own effort. The spray from the fire engine could only be provided for the first five minutes owing to the obstacles.

#### **1.16 Test and Research**

Subsequent to the accident, the Investigation Board conducted a flight test in a Fokker 27 MK 050 aircraft for the purpose of carrying out trial on the MH 2133 approach profile. Actual aircraft, speed rate of descent and configuration derived from the tower tape transcript were used. All the approaches were made from 6500ft and 11 DME Tawau VOR. A total of three runs were conducted and the trials concluded that it was impossible for the Fokker 27 MK 050 to make a landing from a straight in approach. It was found out that the aircraft heights crossing the threshold runway 35 were all above 800 feet.

The abovementioned trial was also carried out on a Fokker 27 MK 050 simulator in MAS Subang. A comparison between high speed descent (210kts) versus slow speed descent (130 kts) were made. It was concluded that the slow speed descent resulted in more height loss over a given distance as compared to high speed descent. There was also a possibility that, if this technique was adopted by MH 2133, a normal landing would have been possible.

## **1.17 Other Information**

### **1.17.1 Flight Crew activities before the accident**

The flight crew's activities were reconstructed from interviews and available documents which are as follows:-

The aircraft commander was on standby on the morning of 13 September 1995, 3 days before the accident. He was off duty the following afternoon. He went outing with some friend to Pulau Manukan at 1300 hrs and come back by 17300 hrs. on 14 September 1995, he flew a morning schedule, going on – duty at 0530 hrs and off duty at about 1200 hrs. this was around trip flights from Kota Kinabalu (BKI) stopping at Labuan (LAB), BKI, LAB, Brunei (BWN), LAB and back to BKI.

At 2145 hrs that evening, he went out for a dinner at Daily Restaurant. By 2230 hrs he proceeded with some friends to 'KRASH DISCO' for a drink. The group ordered about 10 jugs of beer of which he consumed about 3-5 glasses of beer. According to his friends, he was a little bit quiet that particular night. He want back home between 0130 hrs (15 September 1995).

He woke up at 1000 hrs the following morning (15 September 1995) and had a van picked up at 1035 hrs to BKI office.

To co-pilot activities were routine and nothing abnormal was reported.  
(Note: all time in this paragraph are local times)

## **2. ANALYSIS**

### **2.1 Analysis**

There was no evidence that any malfunction of the aircraft, aircraft systems, power plant or the flight control system, contributed to the cause of the accident. The aircraft had been maintained in accordance with the DCA approved procedures and was certificated properly.

The flight crew and the involved Air Traffic Controller (ATC) were also qualified to perform their assigned duties. Their flight and duty times were in accordance with the current Flight Time Limitation Scheme requirements. Intoxication was also ruled out, not only on the basis of post mortem examination, but also because of the routine nature of the cockpit conversation. In addition, all persons who came in contact with the crew prior to the flight stated that both pilots appeared alert and normal.

Evidence indicated that the flight was operationally routine until the aircraft established radio contact with Tawau Air Traffic Control. Approaching the Tawau area, MH 2133 was sequenced number 2 although the flight was ahead of the number 1 aircraft which was maintaining a lower cruising altitude. The number 3 aircraft on the approach into Tawau was Boeing 737 MH 2135 which was behind these aircraft but would arrive at Tawau VOR first. This was the scenario of the traffic situation at that period in time which led MH 2133 to encounter difficulties in obtaining descent clearance below 10500 ft.

The activities of the flight crew reflected in their recorded conversation indicated that during the greater part of the descent, the commander and

the co-pilot were involved in assessing traffic situation and also attempting to obtain descent clearance. The contents of the CVR disclosed that the descent from FL 170 to 10500 feet was as planned. However the flight crew was denied of their request for further descent from 10500 feet. The commander had to negotiate with the Number 1 aircraft to descend through its level and become Number 1 for an approach into Tawau, The descent into Tawau from a cruising altitude of 10500 ft was initiated closer to the destination than normal. It required the flight crew to conduct the descent with the higher than normal rate towards the runway. According to the Aircraft Operating Manual, calculation for top of descent point would be 3 nautical miles for every 1000 feet height loss. Assuming this was the case, the aircraft should leave 10500 feet altitude by 31.5 DME instead of about 21 DME on the day of the accident. This resulted in the approach being high.

Based on ATC communications and intra cockpit conversation between the flight crew members, it was obvious that the commander was flying the aircraft. The descent from 10500 ft to 7000 ft was initiated at 0459:50 hrs, ATC then asked MH 2133 to report passing 6000 ft. A level which MH 2133 would never attained as the flight was only cleared to 7000 ft. This error was spotted by the commander and corrected by co-pilot later. At 16 DME and when MH 2133 was visual with the airfield, ATC cleared the flight to below 7000 ft for a visual approach. Throughout the descent, the co-pilot called out the appropriate warning to the commander as the aircraft approached assigned altitudes and apparently performed all his assigned duties without being prompted by the commander. Immediately after the approach checks were carried out by the flight crew, the commander made a remark that he would maintain high speed. At 11 DME, MH 2133 reported that the flight was passing 6000 ft and based on a normal approach profile the aircraft should be passing 2000 ft. At this instance, not only the flight profile of the aircraft was still high, the speed too was well above normal.

At 0502:50 hrs, the co-pilot informed the commander to slow down. Immediately the commander disengaged the auto pilot and maintained level for a while. The co-pilot then added 'Okay otherwise cannot make it already'. At 0503:00 hrs, the flight passed 3500 ft and the flight crew performed the pre landing checks where the gears were selected down and flaps set to 25 degree. The commander then said to the co-pilot that the approach would be okay as long as the speed of the aircraft was not more than 160 kts. At 0504:40 hrs knowing that the approach profile was still high, the commander told the co-pilot that the runway was long and there would be no problem even if the aircraft were to land way in. Subsequently, the co-pilot advised the commander "Speed, Speed check, Speed check" and then informed the tower that they were on short final.

The manoeuvre taken by the commander to regain the normal descent profile were insufficient to remedy the situation. The aircraft finally made a firm landing on the runway at the 4800 ft point, leaving only 800 feet of runway remaining which was not enough for the aircraft to stop. It subsequently crashed at 571 feet from the end of the opposite runway.

It was obvious that the commander had demonstrated a performance well below the skill, airmanship and judgement capabilities expected out of any aircraft captain. As the result of traffic restriction in Tawau, not only the descent profile was high, his speed control was totally neglected. The commander had also ignored several suggestions made by the co-pilot whom he felt uncomfortable with the approach. Nevertheless evidences indicated that the co-pilot fell short of taking any positive actions to arrest the eroding situation. The commander chose to set aside these hints but unstead made assurances that landing was possible due to long runway and speed below 160 knots.

The excessive rate of descent on the final approach resulted in repeated GPWS warnings. There were no indication that the flight crew reacted to these warnings. The FDR and witnesses statements also revealed that the aircraft was never stabilised on the final approach. In accordance with the

requirements reflected in the operators Operation Manual, any activation of the GPWS or failure to stabilise the aircraft by 500 ft necessitated a mandatory go around. These requirements were totally disregarded by the flight crew. The CVR also disclosed that the flight crew did not even mention an alternative action for an approach or contemplated to go around although there were clear indications that the safety of the aircraft was in jeopardy.

An analysis of the above indicated that the commander had his mind set to land the aircraft. This was a typical operational problem involving decision making. The investigation was further extended to focus on trying to find the reason or reasons for the commander's radical departure from exercising good judgement and decision making. The following are factors that had bearings or influenced his decision making.

## **2.2 Human Factors/Frustration**

- i. On 19 Mei 1995, the commander was involved in an incident event at Bintulu airport. Fleet manager F27-50 Kuching claimed that the commander had displayed poor airmanship.
- ii. The commander felt that the fleet manager Kuching had unfairly accused him of poor airmanship and not being cooperative with ATC in spite of his co-pilot's statements supporting the commander's version of disputed events. The commander stated that he was disappointed that his own fleet manager not only did not support him but agreed to let the complaining manager to carry out his next line check.
- iii. On 9 September 1995, the commander's flight voyage were reviewed by his management. The commander felt that the Director of Flight Operations and his fleet manager were questioning the times reported on his voyage reports without giving him a chance to explain the

extenuating circumstances which resulted in longer than normal sector times. He stated that the fleet manager was “chasing after his back”.

- iv. The commander also expressed fear that the Kuching fleet manager giving him his line check was in some way setting him up to be fired. (The commander passed the flight check).
- v. The commander gave the impression to his colleagues that he felt someone in the company was “out to get him”.

While there was no way to objectively quantify the effect that the commander’s perceptions might have had on his decision making abilities, it had been established that emotional considerations might play a role and distort the decision making process. On 15 September 1995, the commander had been counseled by his fleet manager just prior to the accident flight on the company’s policy regarding cost cutting. Some of the procedures, discussed by the manager included avoidance of circling procedures, avoidance of instrument approaches, use of straight in approaches and delaying top of descent where possible. Commercial considerations were also considered to play a role in the commander’s decision making process and judgement.

## **2.3 Illusions**

When flying a visual approach to a runway, runway down sloping (away from the pilot) would result a visual illusions where one would have the impression of being lower than the actual glideslope angle. For example, if one were flying a 6 degrees glideslope to a runway with 3 degrees down slope away from the pilot, the visual illusion would be the same as a normal 3 degrees glideslope. On the day of the accident, the approach attempted by the commander was calculated to be about 6 degrees. The slope of runway 17 Tawau is about 1 degree, based on the difference

between the two runway end elevations. This visual illusion could potentially be greater than the above depending on perspective, because the Tawau runway has significant dip in.

## **2.4 Past experience**

At earlier points in the commander's career, he operated short take off and land (STOL) aircraft to very short airstrips in the country's interior jungles. A significant portion of his total flying time involved operations utilizing steep approach paths. This certainly made the commander comfortable with steep approaches. Most likely, this was the reason why the commander pressed on with his approach into Tawau.

## **2.5 Flight Delay**

The departure from Kota Kinabalu was delayed by approximately 30 minutes due to late arrival of the aircraft. The delay was further aggravated by the traffic situation when approaching Tawau. The commander encountered difficulties in obtaining the descent clearance and he himself negotiated with the number one aircraft in order to descend through its level. On several occasions, the commander had expressed concern over the delay in arrival into Tawau. In one of the remarks made by the commander he mentioned that he might be called up by his superior again. This certainly had an impact on his decision making and judgment particularly after being granted clearance to be number one on the approach, where he could not afford to upset traffic sequence.

In summary, the above had influenced the commander in making good judgment and decision making. However, these factors did not excuse him from the unsound captaincy qualities displayed when attempting the approach into Tawau.

## **3.0 CONCLUSIONS**

### **3.1 Findings**

- a) The aircraft was properly certificated and maintained in accordance with appropriate DCA requirements.
- b) The flight crew members were properly certificated and qualified for the flight.
- c) The weather conditions did not contribute to the accident.
- d) There was no aircraft system malfunction or aircraft structural failure prior to the accident.
- e) On short final the aircraft airspeed was 155 knots instead of a normal 113 knots. The rate of descent was in excess of 3000 feet per minute and its pitch angle was around minus 13 degrees. The excessive rate of descent triggered the aircraft Ground Proximity Warning System (GPWS) sink rate and pull up warnings. The commander ignored the warnings, insisted that he should continue with the approach for a landing and remarked to the co-pilot, "Runway is so long so no problem, eh..."
- f) During the approach into Tawau, the commander had disregarded the company's procedures and requirements concerning activation of GPWS and failure to stabilise by 500 feet, which called for a mandatory, go around.
- g) The aircraft first touched down on the runway at 0505:27 hrs. Its first tyre marks (nose wheel) on the runway was at approximately

3400 feet from the threshold. It then bounced and at 4500 feet point, its left main wheel made a light contact with the runway surface. It subsequently bounce up again and its main wheels made a firm contact at 4800 feet point, thus leaving 800 feet of runway remaining.

- h) The aircraft continued onto the grass verge, momentarily left the ground and hopped over the runway perimeter fence. It subsequently crashed at 571 feet from the end of the runway of explosions and followed by a fire. The aircraft was destroyed.
- i) The commander had on several occasions expressed concern over the delay in arrival into Tawau. In one of the remarks made by the commander, he mentioned that he might be called up his superior again.
- j) On the 09 September 1995 the commander's flight voyage reports were reviewed by MAS management. The management noted that in one of the voyage report the commander had flown more than the normal schedule time allotted. Subsequently the management made an arrangement for an appointment with the commander but cancelled it later.
- k) On 15 September 1995 prior to the accident the commander met the Fleet Manager Fokker 27-50 to inquire about the above-mentioned appointment. The commander was told to strictly adhere to company policies regarding schedule time allotted and suggested visual and straight in approaches should be attempted to save fuel and time.

- l) The flight departure out of Kota Kinabalu was 30 minutes late due to delay caused by the previous flight.
  
- m) Though the flight was about 15 DME ahead and higher than Transmile 809, it was given number two for arrival into Tawau by Air Traffic Control. The commander had to negotiate to become number one for arrival and by the time clearance given for the flight to descend, it had passed the normal top of descent point. This resulted in the approach being high.
  
- n) The commander was aware that the landing point would be way in. He configured the aircraft for landing early and decided to go for high speed with power at flight idle in order to recapture its normal descent profile.
  
- o) The commander's maneuvers to regain normal descent profile were insufficient to remedy the situation. The aircraft landed firmly on the runway at about 800 feet from the end of the opposite runway.
  
- p) Basing on actual aircraft weight, wind and temperature, the aircraft required 1500 feet of landing roll to stop.
  
- q) The commander's 48 hours activities prior to the accident, were very active. However, there was no indication of intoxication that could impair his judgment or performance during the flight.

### **3.2 Cause**

The most probable cause of the accident was due to the commander's insistence to continue with an approach despite the fact that the runway available after touchdown was not sufficient enough for the aircraft to stop. The perception regarding economic consideration which put pressure on him to save fuel and adhere to schedules was a contributing factor.

## **4. RECOMMENDATIONS**

### **4.1** It is recommended that:-

- a) Pilots, operators and regulatory agencies should renew emphasis on, and improve wherever possible, crew discipline and flight management.
- b) The operator and regulatory agencies should review policies, procedures, practices and training concerning visual approaches toward increasing crew efficiency.
- c) The regulatory agencies should make cockpit resource management course mandatory to all airline operators. Meanwhile, the operator should commence the said course with immediate effect.
- d) The operator should devise a practical approach to overcome flight crew hesitancy or resistance to change when instilling flying discipline in order to meet corporate and business goals.  
(When this investigation was in progress, the operator had attempted this recommendation in order to clarify issues and narrow the gap between management and flight crew).