JABATAN PENERBANGAN AWAM
MALAYSIA

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Aircraft Type and Registration	:	Piper Dakota PA28- 9M-GBS.
Engine	:	Piston Awco Lycoming O-540-J3A5D 235 HP, Constant speed propeller.
Registered Owner	:	Royal Selangor Flying Club.
Crew	:	Captain - Not injured.
	:	Safety Pilot - Not injured.
Passengers	:	One - not injured.
Place of Accident	:	Johore Baharu Polo Ground airstrip 10ft AMSL.
Date and time	:	13th. September, 1979 at about 1315 hrs G.H.

Summary.

The aircraft, with 3 persons on board, was lined up for a short take-off from the JB polo ground airstrip for departure to Malacca. The strip was covered with grass and the ground was moderately soggy due to rain during the previous days. Cutting right across the airstrip, about 1100ft from the line-up point, was a recently a dug out drain measuring 4ft wide. Beyond the drain and running parrallel to it was a 3ft high earth bund being earth excavated from the digging of the drain. During the take-off roll acceleration was reported to be normal for that configuration and strip condition. The captain rotated at 55 KIAS and reported that the aircraft got airborne. Though airborne, the safety pilot who was sitting in the right hand seat was apprehensive when he saw the earth bund fast coming up, and fearing that the aircraft might not clear it, pulled the control Yoke back hoping to generate more lift and clear it. Unfortunately the aircraft instead, was observed to have lost some altitude, and the main undercarriage struck the bund.

Having felt the strike and fearing for the worse the captain put the aircraft down almost immediately. The aircraft flopped onto its belly and slidded on the ground for about 250 yds before coming to a complete rest cocked 90° right of take-off direction.

INVESTIGATION

1. History of the flight

The captain of the aircraft, being a member of the Royal Selangor Flying Club (RSFC) planned to fly from Sempang to Kuantan, Johore Bahru and Malacca. Departure from Sempang was fixed for 121300 hrs (Sept). As normally practiced by the club, a qualified club , pilot was arranged to assist in the preparation of the flight and to act as the safety pilot for him. Following the standard club practice, the safety pilot prepared the flight plan, filled in the details in the relevant documents and 'pre-flight' the aircraft.

The flight to Kuantan was uneventful with all phases of flight being personally flown by the Captain. From Kuantan the aircraft was flown to Johore Bahru, landing Senai Airport at 121725 hrs. A night stop at JB was arranged with the aircraft left parked at Senai Airport. Before retiring to his private lodging at JB the aircraft captain briefed the safety pilot that if conditions permit, he (the safety pilot) was to position the aircraft at the JB polo ground on the next day - 13th. September, 1979.

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1.2 Injuries to Persons - Nil.

1.3 Damage to Aircraft -

The aircraft was noted to be lying on its belly cocked 90° to the right of the intendended take-off path. The main undercarriage were ripped off from its attachment points at the wings. The nose gear completely collapsed backward underneath the aircraft. The propeller blades were bent from about 1.5 ft measured from the tips. Top wing skin were rippled in certain areas and punctured around the areas where the main gears were attached to the wings. Both the flaps were distorted. Plus numerous of minor damages normally expected from a belly landing onto a soft surface.

1.4 Other Damages - Nil

1,5 Crew Information -

Pilot	:	Age 57 years.
Licence	:	PPL group A valid until 28th. February, 1980.
RT Rating	:	Valid until 27th. February, 1980.
Aircraft Rating	:	Group A PPL.
Medical Certificate	:	Valid until 28th. February, 1980 with endorsement to wear spectacles to correct for near vision.
Last Competency Check	:	10th. August, 1979.
Total Flying Hours	:	776:50.
Total hrs on type	:	10:50

1.6 Aircraft Information:

The Piper Dakota is a low wing, single engined, 4 seater aircraft. It is powered by a Lycoming 235 HP piston engine driving a two bladed propeller via a constant speed unit. It has a fixed undercarriage with a nose wheel and standard tricycle layout. It has a dual flight control and possible to fly the aircraft from either of the two side-by side front row seats.

Manufacturer	:	Piper Aircraft Corporation U.S.A.
Date of build	:	1979.
Certificate of Registration	:	Royal Selangor Flying Club.
Certificate of Airworthiness	:	o.k.
Aircraft total hrs	:	± 50 hrs.
Engine Hours.	:	± 50 hrs.

1.6.1. Aircraft Loading;

The load sheet calculation as done by the pilot after the accident was 2584.4 lb with the C of G 87.3 inches. aft of datum. The gross weight and C of G position were well within the limits approved for this aircraft. And as they did not play the significant factor in the accident it is not included in the analysis.

1.7 Meteorology Conditions.

Weather 20 N.M. around the site of accident was reported to be fine with about 1/8 cloud cover at about 5000ft. Prevailing wind above

1.8 Aid to Navigation.

N/A.

1.9 Communications.

Since the site of the accident was some distance fromthe nearest ATC, i.e. Senai, the aircraft captain was unable to communicate with them by means of radio. However departure clearance was arranged by means of telephone from the Mados hanger.

1.10 Flight Recorder - Nil.

1.11 Fire - There was no evident of fire.

1.12 Survival Aspects - The crew survived without injuries.

1.13 Test and Research - No test was carried out.

2. CONCLUSION AND ANALYSIS.

2.1 Analysis.

Take-off and landings from short, semi prepared strips at its best is demanding both to machine and human . In many instances the aircraft captain is faced with many unknown variables like temparature, surface conditions, slope of the strip and wind directions and strength. More so when the strip is unattended and lack the aids and maintainence normally expected from a proper airfield or runway. A pilot will need to call on his experience, training and wise judgement to assess the condition and decide on whether to operate from such strip or not. The manual, as any manual for a light general aviation aircraft, does not factorise runway surface type, slope and surface condition. It is then left to the pilot to include and take those unfactorised variables into consideration when assessing the safe operation of his aircraft from such strip.

In the case of this accident, what are the possible reasons that the aircraft struck the bund? The strip where the accident occured had a medium length grass normally expected from a football pitch in this country. Its width was more than enough and had a useful 1130ft in length. For a Northerly direction take-off, one is faced with slight initial up slope, which at half way along the strip flatten off. At the end of the Northerly take-off path was an earth mound, being earth dumping from a newly dug out drain. From the point where the accident aircraft started the roll to the earth mound was about 1100ft. The aircraft was observed by ground observers and felt by the pilot and passengers to be airborne. And from evidence, there was enough time after being airborne for the captain to discuss something with the front passanger for about 1.75 sec. before the main undercarriage struck the mound. This was calculated to give about 162.5 ft, being the distance where the aircraft got airborne to where it struck the mound.

From the performance chart given by the manufacturer, if properly flown, and no external untowards happening, the aircraft should have climbed at $7.348^{\circ}4$ and should clear the mound by 17.95 ft. As the evidence pointed that the aircraft was airborne after a roll of 937.5 ft, then its not being able to clear the mound as expected is the area for probe and analysis.

a. The aircraft was rotated at the correct speed of 55kt and clearly got airborne. The pilot held the

to the obstacle clearance speed. The front passanger, being an assistant instructor pilot was apprehensive of the mound looming ahead pulled back on the control. Thus inducing the already high angle of attack of the wing to deepen further and made it pass the critical angle. This resulted in a reduction in lift and a sharp increase in drag. The wings having passed the critical angle of attack was announced by the stall warning horn heard by all occupants in the aircraft. The front passenger admitted to having pulled back on the control yoke was comfirmed during the questioning.
The aircraft having gained height and then sank was confirmed by ground observers.

2.1.1. Flying Technique.

The Technique for short take-off obstacle clearance climb, appeared to have been properly followed. The aircraft was properly configured and the engine was confirmed to be operating well before the pilot released brakes to roll. Directional control for such take-off was maintained using the standard rudder inputs. Elevator was allowed to trail in the neutral position so as to reduce drag. Rotation occured at the correct speed and there was no evidence that the pilot over-rotated or was too rapid with his rotation, thus inducing a mush. After airborne the attitude was held and aircraft allowed to accelerate to the obstacle climb speed.
Therefore there is no indication that the aircraft lost height due to flying technique.

2.1.2. Prediction of air currents.

As reported, that though during the line up there was some head wind, it backed over to end up as tail wind by the time the aircraft came to a rest on its belly. The tail wind component, however could not have been more than 3 kts. The 3 kt tail component was taken into factorising the net ground roll and flight path during calculation. It was not considered as the main cause of the accident and therefore can be left to that.

2.1.3 Maximum take-off weight.

From calculation the aircraft was operated well within its weight limits.

2.2. Conclusions.

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

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 attributable 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 accessively 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.

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