

No. 4

McDonnell-Douglas DC-8-62, N1809E, accident near
Paramaribo/Zanderij International Airport, Suriname
on 7 June 1989. Report released by the Commission of Inquiry, Suriname

1. INTRODUCTION

On 7 June 1989 a DC8-62 crashed near Zanderij International, in the Para district. Additional details:

Airline: Surinaamse Luchtvaart Maatschappij NV
(SLM) (Suriname Airways Limited)

Manufacturer: McDonnell Douglas

Model: DC8-62

State of Registry: USA

Registration: N1809E

Serial no.: 46107

Owner: Suriname Airways Holding Company

Place: Near Zanderij Airport, Para District

Date: Wednesday 7 June 1989

Time: About 04:27 local time (07.27 UTC)

2. OVERVIEW

A DC8-62 on a non-stop SLM flight (PY764) from Amsterdam/Schiphol crashed during the approach. There were 187 persons aboard:

3 cockpit crew

6 cabin crew

178 passengers, including an off-duty flight engineer.

A corpse was also being transported.

The aircraft was totally destroyed when it struck the ground. There was a postcrash fire which was extinguished by the fire department.

The Director of the Department of Aviation was notified about the accident in accordance with prescribed procedures. The Department of Aviation notified all involved authorities.

As the aircraft was of American registry, the Federal Aviation Administration (FAA) and the National Transportation Safety Board (NTSB) were notified immediately in accordance with Annex 13 (Accident Investigation) of the Chicago Convention.

The Department of Aviation began its preliminary investigation immediately with the gathering of all relevant data. Following the rescue and recovery activities priority was given to the retrieval of the Cockpit Voice Recorder and the Flight Data Recorder. These devices contain vital information about the operation of the flight; on 8 June 1989 they were shipped to the main office of the NTSB in Washington, D.C., for processing.

The Director of the Department of Aviation requested and obtained assistance from the NTSB and the FAA in accordance with the provision in Annex 13 of the Chicago Convention.

The preliminary investigation focused on the following areas:

- Operational aspects
- Human Factors

- Structures, powerplants, systems and maintenance
- Meteorological aspects

The preliminary investigation also involved work at the accident scene, various hearings and the testing of navigational aids.

The information available at the conclusion of the work at the scene and the necessary hearings led to the preliminary conclusion that the immediate cause of the accident might possibly be pilot error.

The preliminary investigation was concluded on 14 June 1989. All the assembled information was made available to the Commission of Inquiry which, in the meantime, had been established by the Attorney General by Order no. 3441 of 8 June 1989.

The Commission was established in accordance with Articles 42 and 43 of the Regulations for State Control of Aviation (G.B. 1939 no. 33, G.B. 1955 no. 70, as revised by S.B. 1984 no. 115) in order to "provide information and report on the probable cause" of the afore-mentioned accident as prescribed by law.

3. FACTUAL INFORMATION

3.1 History of the Flight

The Captain and his two crew members arrived in Amsterdam on Saturday 3 June 1989. The flight departed Amsterdam/Schiphol on 6 June 1989 at 23.25 local time (2225 UTC) and proceeded non-stop to Paramaribo with an estimated time of arrival of 04.27 local time (0727 UTC).

Preparations for the flight in Amsterdam were normal. According to survivors the flight was rather smooth. About 20 minutes before arrival in Paramaribo the crew received the 0700 UTC weather for Zanderij: "Wind calm", "visibility 900 m in fog", "temperature/dewpoint 22°C/22°C". The tower at Zanderij Airport cleared the flight for a VOR/DME approach to runway 10.

However, this aircraft crashed near the Zanderij Airport at about 04.27 local time on 7 June 1989, during the hours of darkness. The weather at the time of the accident: horizontal visibility 900 m, with fog, and a cloud base of about 400 feet above the ground.

Shortly after the accident the visibility decreased to about 500 m; one hour after the accident it went down to about 200 m. The aircraft struck the ground about 2800 m from the threshold of runway 10. The wreckage came to rest a few meters north of the extended centerline of runway 10.

The aircraft logbook was not recovered. During the examination of the wreckage it was determined that the right wing fuel tank was intact and still contained fuel. Calculations showed that the aircraft's fuel load was between 16000 and 22000 lbs at the time of the accident.

3.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Total</u>
Fatal	9	169	178
Serious	-	7	7
Minor/None	-	2	2
Total	9	178	187

One child was unhurt. Of the 15 persons that were rescued, 7 (seven) died later.

3.3 Damage to Airplane

The on-the-scene investigation revealed that engine no. 2 struck a tree about 25 m above the ground and about 300 m from the runway. The tree had a height of about 32 m

This impact resulted in the separation of a large part of the engine cowling, the fan section, and part of the low pressure compressor. The next impact involved the right wing which struck another tree.

The aircraft rolled around its longitudinal axis, struck the ground inverted, and broke up. The fire that erupted consumed portions of the airplane. The airplane was totally destroyed.

3.4 Other Damage

There were no reports of damage to the property of third parties on the ground.

3.5 Personnel Information

3.5.1 Cockpit Crew

The cockpit crew consisted of a pilot-in-command, a first officer, and a flight engineer.

The crew was hired on the basis of a contract.

with Air Crew International (ACI) in Florida.

The contract stipulated that ACI would furnish SLM with qualified crew members who held FAA certificates and who met the regulatory requirements to fly the DC8. It should be noted that ACI did not provide for proficiency checks but left it to the individual pilots to meet the training and other requirements of their profession. Examination of the captain's qualifications disclosed that he completed his last proficiency check on 16 April 1989 in a small twin-engine airplane (Grumman Cougar GA-7) instead of in a DC8, as required. The captain's age was 66. Additional information about this crew follows:

3.5.1.1. Captain:

Date of birth:	31 January 1923
Place of birth:	Kinderhook, Pennsylvania
Nationality:	USA
Certificate:	Airline Transport Pilot
Last Medical Exam:	11 January 1989, Class I
Ratings:	Multi-engine, Turbojet, DC8, B747
Proficiency Check:	16 April 1989 on a GA-7 belonging to Flying Tigers, Inc.
Logbook:	Not found
Flight time DC8:	About 8800 hrs
Total time:	19450 hrs
Last Route Check:	Miami-Zanderij via

Port au Prince on 4-1-1989

History of Tests

- ATP: Applied for test on 12 October 1970. The flight test was unsatisfactory with regard to the ILS approach procedure and judgement. An FAA inspector was the examiner and failed the applicant. The re-testing on 30 October 1970 was satisfactory.
- DC8: Applied for test on 30 May 1973.
The applicant failed the test on 7 June 1973 because of an unsatisfactory pre-flight inspection and flight test. The examiner: FAA inspector
Applied for a re-test on 14 June 1973.
Failed again on 15 June 1973 due to unsatisfactory results in the following areas: Takeoff, simulated engine failure, holding, instrument approaches, steep turns. Applied for a re-test on 21 June 1973. Type rating issued on 5 July 1973 (FAA inspector).
- Type Rating
B747 Applicant failed the test on 30 December 1985.
Re-tested and failed by FAA inspector due to unsatisfactory results in the following areas: holding, missed approach, and landing.
Again applied for test on 8 January 1986. He passed the test on 8 January 1986 with the same examiner.

Since 1985, the Captain was associated with Air Crew International, Inc.

Medical Factors: The FAA provided details about the medical examinations. He always passed these examinations. His most recent medical certificate is dated 11 January 1989 with the notation: "Holder shall possess correcting glasses for near vision while exercising the privileges of his airman certificate."

3.5.1.2 First Officer

The correct identity and, therefore, the privileges of the first officer could not be clearly established from the information obtained from the American Department of Transportation and the British Civil Aviation Authority.

The following information was obtained from his most recent FAA certificate no. 226500, dated 23 February 1982.

Date of birth:	1 July 1954
Place of birth:	Fort Worth, Texas
Certificate:	ATP
Last Medical Exam.:	12 January 1989
Ratings:	Multi-engine, Turbojet, B737, SD330, Flight instructor.
Proficiency Check:	26 June 1988 on a DC-8
Logbook:	Not found
Flight time DC8:	Unknown

Total time: About 6600 hrs.

Last known route check: Zanderij-Belem via Cayenne on
15 December 1988.

Background

After flying for several companies, the first officer began to work for Air Crew International, Inc., in December 1988.

During the review of his certification it became apparent from the information obtained from England (CAA) and the USA (FAA) that this pilot had several identities and that his first American certificate was issued by the FAA on the basis of "UK license no.84846". Apparently, he was known for some

time as born on 1 July 1945 in Newport, South Wales, England; next as born on 5 September 1946 in Kenilworth, Coventry, England; and finally as born on 1 July 1954 in Texas, USA.

However, the British Civil Aviation Authority stated that said a.k.a. never possessed a British pilot certificate.

The First officer pilot privileges were suspended following an aircraft accident near Wichita Falls, Kansas, USA.

Medical Factors

Medical information from the FAA indicates that the first officer met the medical requirements. His most recent medical certificate was dated 12 January 1989.

3.5.1.3 Flight Engineer

Date and place of birth: 2 April 1924, in Ada, Oklahoma
Certificate: Flight engineer and mechanic
certificate
Medical exam.: 4 May 1989 (USA)
Ratings: DC6; DC10; B727; DC8
Proficiency Check: Unknown
Logbook: Not found
DC8 time: About 720 hrs.
Total time: About 26600 hrs
Route check: Miami-Zanderij via Port au
Prince on 14 January 1989

Medical Factors

The available medical data indicate that the flight engineer met the medical requirements. His most recent medical certificate is dated 4 May 1989.

Cabin Crew

There were 6 cabin crew aboard the aircraft.

3.6 Airplane Information

The airplane was a Douglas DC8-62, fuselage no. 498, serial no. 46107 and American registration N1809E.

The Douglas Aircraft Company delivered the airplane to Braniff International Airways on 17 November 1969. On 17 November 1981 the airplane was returned to Douglas where it was stored until it was sold to the Arrow Air, Inc. on 21 December 1983.

SLM operated the airplane from 23 January 1986 till 15 July 1987, when Tropical Airways, Inc., became the operator, until 2 August 1987. From 2 August 1987, SLM was the only operator of the airplane.

The registration of the airplane, N1809E has never been changed.

The engines were fitted with hush-kits. The airplane had accumulated over 52706 hrs and 20342 cycles. It is interesting to note that the airplane was equipped with a Sundstrand Mark I Ground Proximity Warning computer, P/N965-0376-071, which gave audible warnings that were recorded by the CVR. In addition, this airplane had the following navigational aids:

- dual INS (Inertial Navigation System)
- dual Omega/VLF
- dual VOR/ILS/DME
- dual NDB receivers
- dual Marker receivers
- dual Radio altimeters

The airplane was owned by Surinam Airways Holding Company. It became operational again on 25 May 1989 after undergoing a "C" check; this maintenance was performed by CargoLux in Luxemburg.

The maintenance documents indicated that all Service Bulletins and Airworthiness Directives were complied with and that the airplane was airworthy.

3.7 Meteorological Information

At the time of the accident the horizontal visibility was 900 m in fog, 2/8 cloud cover, fog, with a cloud base of about 400 ft, wind calm, temperature/dewpoint 22°C/22°C and a pressure of 1012 millibars (mb).

This information was provided to PY764 by the Tower. Shortly after the accident the visibility decreased to 500 m and within one hour after the accident the visibility further decreased to 200 m.

The weather at Zanderij Airport between 0300 and 0500 can be summarized as follows:

<u>Time(local)</u>	<u>0300</u>	<u>0400</u>	<u>0410</u>	<u>0430</u>	<u>0440</u>	<u>0500</u>
wind	calm	calm	-	-	-	calm
Hor.Vis.	6000 m	900 m	900 m	500 m	200 m	800 m
Weather	fog	fog	-	-	-	fog
Clouds	1ST 120m	2ST 120m	-	-	-	1St 400f
Rel.Hum.	97%	97%	-	-	-	97%
<u>Temp.</u>	22.8°C	22.3°C	-	-	-	22.0°C
<u>Dew Pt.</u>	22.2°C	21.7°C	-	-	-	21.4°C
Pressure	1012.4	1012.3	-	-	-	1011.9

3.8 Aids to Navigation

According to ICAO's "Regional Air Navigation Plan" the Zanderij Airport should be equipped with the following navigational aids:

- a) one VOR
- b) one NDB
- c) one ILS Categoror 1

There are three published instrument approach procedures for runway 10 at Zanderij. The limits for the ILS-DME procedure are: a minimum descent altitude (MDA) of 260 ft above sea level and a minimum visibility of 800 meters. The VOR/DME and the NDB have identical limits: an MDA of 560 ft and minimum visibility of 2300 m. A Notam published on 29 December 1988 announced that the ILS-DME was not available for operational use; the crew was aware of this. A test of the navigational aids by a specially equipped airplane on 13 June 1989 confirmed that the VOR, DME and NDB were functioning in accordance with the prescribed criteria. The middle marker was inoperative. The angle of the glidescope was within limits while the localizer alignment was unreliable. NDB "PZP" (336 KHz) was operational.

3.9 Communications

The traffic control communications equipment (123.9 MHz) and 118.1 MHz) was in good condition. However, the equipment that recorded the communications between traffic control and airplanes was not functioning.

3.10 Aerodrome Information

Zanderij International Airport (lat 05°27'21"N, long 55°11'11" W) is located about 45 km south of Paramaribo; its elevation is 54 ft. The runway is 3480 m long and 45 m wide. Runway 10 has high intensity runway and approach lights; runway 10 as well as runway 28 have a functioning Precision Approach Path Indicator (PAPI).

3.11 Flight Data-Recorder (FDR) and Cockpit Voice Recorder (CVR)

3.11.1 Flight Data Recorder

This model Lockheed 109C serial no. 1355 records the following parameters: altitude, airspeed, heading, acceleration and the keying of the transmitter microphone.

The last 10 minutes and 12 seconds of data have been transcribed. However, the altitude was not registered during this flight, due to the non-functioning of the related part of the recorder.

According to the FDR information, the runway heading was maintained during the final 5 1/2 minutes of the flight.

During the final 22 seconds of the flight the airspeed decreased gradually from 139 to 132 knots.

3.11.2 Cockpit Voice Recorder

The Cockpit Voice Recorder was a Fairchild A-100 model, serial no. 2388. The last 24 minutes of the flight as recorded by the CVR were transcribed verbatim by the NTSB Laboratory and verified by the Commission of Inquiry.

The CVR tape was not damaged. This tape continuously records information during the last 30 minutes of flight; it has 4 separate audio channels. Three of these are connected to the audio selector panel of the captain, the first officer and the flight engineer. The recording of information on these three channels is controlled by the keying of the microphone of the respective crew members. The fourth channel is connected to the open cockpit area microphone, which records all conversation in the cockpit.

3.12 Wreckage and Impact Information

The wreckage trail was "V" shaped and had a length of about 335 m with a width varying between 10 and 50 m. Parts of the cockpit equipment were found halfway down the wreckage trail. The fuselage was broken into pieces the longest of which were the empennage with the horizontal and vertical tail surfaces, and the wing center section. The center section with the main landing gear in the down-and-locked position was intact and had come to rest inverted. The cabin portion was totally destroyed.

3.13 Search of Hotel Rooms in Paramaribo

The search of the hotel rooms (Torarica) of the captain, the first officer and the flight engineer yielded nothing remarkable.

3.14 Fire Fighting

There was a postcrash fire. During the fire fighting activities of the airport fire department it became apparent that there was a shortage of adequate fire fighting equipment and no effective fire fighting plan as part of an all-inclusive disaster plan.

3.15 Survival Aspects

The rescue activities began at about 0453 local time, in darkness, following the fire extinguishing activities.

Despite the fire and the total destruction of the passenger cabin, 15 survivors were pulled from the wreckage of whom 7 (seven) died later. One child was found outside the wreckage.

3.16 Tests and Research

A delegation from the Commission visited the NTSB and FAA in Washington, D.C., between 19 and 29 July 1989, in order to verify the CVR Transcript and the data obtained from the FDR. There was also a discussion of the further course of action and additional information was obtained, especially with regard to the cockpit crew's professional and medical records. Moreover,

the NTSB was requested to do everything possible to get a statement under oath from the Director of Air Crew International, Inc.

The FAA legal section was approached for a more detailed explanation of the interpretation of Federal Air Regulations Part 121, Part 129 and the Age-60 Rule. The Director of Air Crew International made a statement on 1 November 1989, in Miami, Florida.

In March 1990, the Douglas Aircraft Company in Long Beach, California, performed a simulation of the flight based on CVR and FDR data.

4. ANALYSIS

4.1 Analysis of CVR Transcript

The times listed in this section correspond with the times listed in the CVR Transcript.

It appears that the 0700 UTC weather report

caught the crew by surprise, as evidenced by the captain's repeated question at 08.59 and 09.06: "What happened with the 6 kilometers (visibility)?"

This was followed by an intracockpit discussion (from 10.17 till 10.42) of published visibility minima. The fuel situation was also discussed (at 11.26). At 10.57 and again at 10.59 the copilot said: "We don't legally have an ILS". At 11.05 he stated: "We have to use it", to which the captain responded affirmatively at 11.10. The copilot's remarks at 11.21 "You can see the town over there" and at 13.05 "It must be very localized", as well as the captain's reaction at 13.07 "We'll take a shot at it" are

indications that the crew believed that the fog reported at 08.26 was a localized phenomenon with discontinuities and that they could try to land.

This assumption finds additional support in the copilot's remark at 13.11 "We'll get in okay", followed by the captain's "Yeah" and the copilot's observation at 17.38 "You can see the airport down there no problem".

At 17.57 the first officer says "that's right here visibility won't be any problem". The captain responds with "Make a pass and ah we'll land that's all".

Following the controller's transmission that they could expect a clearance for a VOR/DME approach, the captain gives the instruction (at 21.00) "Put the ILS on my side". At 21.48 the tower at Zanderij issued to PY764 a clearance to conduct a VOR/DME approach to runway 10 and reported that the airplane was in sight.

At 22.02 the captain asked the first officer "Got the VOR on your side?" and instructed him to set the final approach course for the published VOR/DME approach on his (the first officer's) side. This cockpit configuration indicates that the captain may have planned to use the VOR/DME approach as a back-up for the ILS/DME approach.

At 23.07 the first officer told the captain "We're at nine DME" and at 23.12 he says "Yeah ah suppose to turn at seven". This is an indication that the DME of the VOR/DME was received on the first officer's side. With regard to the handling of the airplane it appears that the captain reacted slowly since the first officer repeatedly gave advisories to the captain, for example at 25.29 "Just keep on comin around on the

thirty degree bank there you'll be all right" and at 25.38 "Get it on up to thirty degrees". Furthermore, the flight engineer states at 25.50 "Two thousand feet". The captain's reaction at 25.51 was "Huh?" followed by the first officer's call-out "Two thousand two thousand" to which the captain responded "Okay" and then "you mean I went through it so we'll come back..."

At 26.00 the first officer gave the captain additional advisories: "It's a level out it's about ten degrees to the right level out now you'll be all right".

That the first officer repeatedly switched back and forth from VOR to ILS is indicated by the discussion between the first officer and the flight engineer (from 26.11 to 26.15) about the inbound course for the approach and by the conversation between captain and first officer at 26.43 when the captain asked "How far out are we?". to which the first officer responded with "Let me get back on the DME".

At 27.41 the first officer reported that he could see the airport: "Runway's at twelve o'clock". At 28.32 he comments "A little bit of low fog comin' up I reckon just a little bit", and next he says "OKay it's down right right there ah close to the runway " apparently referring to a fog bank in the vicinity of the runway. At 28.28 he gave an affirmative answer to the tower's question whether he had the runway lights in sight. Apparently the airplane was in stratus clouds since the captain told the first officer at 30.56 "Tell him to turn the runway lights up" and again at 31.05 "Tell him to put the runway lights bright".

At 28.51 the first officer states "Glide slope alive"; at 30.09 the captain says "If I get a capture here I'll be happy"; and again

at 30.24 "I didn't get no capture yet", which indicates that the glideslope for the ILS/DME approach had not been intercepted.

The captain's comment at 27.26 "I'm right on the localizer now" indicates that the localizer signals, which identify the extended center line of the runway, were received.

The conversation in the cockpit and the advisories given by the first officer lead to the conclusion that the captain was flying.

During the approach (between 30.48 and 31.02) the warning of the Ground Proximity Warning System sounded several times.

The "glideslope" warnings are no longer heard after 31.02. This suggests that a crew member probably deactivated the warning system while the airplane was still within the zone where a warning should have been triggered. According to the first officer's call at 31.33 ("Two hundred feet") the captain was flying the aircraft below the minimum altitude for the ILS/DME approach procedure (260 ft above sea level as well as below the minimum descent altitude for the VOR/DME approach procedure (560 ft). The first collision with the tree occurred at 31.46.

It should also be noted that the warning signals of "glide slope" indicated that the airplane was flying under (below) the glidepath transmitted by the ILS and that the deviation kept increasing.

It is noteworthy that the airplane would have been at an altitude of at least 600 ft at the accident site if the pilot had flown the VOR/DME approach procedure for which he had been cleared, or if he had properly executed the ILS/DME approach procedure - although it was not operational.

4.2 Flight Path Reconstruction

With cooperation from McDonnell Douglas an attempt was made to reconstruct the final 10 minutes of flight PY764. CVR and FDR data were used for that purpose. However, the reconstruction was hampered by the fact that the FDR did not record altitude. That portion of the FDR was inoperative.

The following data points were used to reconstruct an approximation of the flight path:

- level terrain around the airport; elevation 54 ft
- altitude alert at 2000 ft (time index 21.14)
- altitude calls referred to height above sea level)
- distance calls were based on the VOR/DME
- standard pressure gradient
- wind from the surface till 8000 ft - calm
- the FDR ceased recording at time index 31.46

The airplane made its landing approach after completing a procedure turn.

The landing limits for this approach are an altitude of 560 ft and 2300 m visibility. It has already been mentioned that the reported visibility was 900 m. Examination of the radios showed that the crew had initiated an ILS/DME approach. The CVR confirms that this was indeed the case. The limits for an ILS/DME approach are an altitude of 260 ft above sea level and 800 m visibility.

However, a Notam had been issued for the ILS, giving notice of its unreliability; the CVR indicates that the pilot was aware of this.

It is also apparent from the cockpit conversation that the flight progressed for a considerable time below the indicated glideslope of the ILS and that the crew was aware of this. No corrective action was taken.

The pilot had decided to descent to 200 ft. The CVR indicates that, at 200 ft, the pilot started to arrest the descent of the airplane. The airplane kept descending for a few more seconds, during which time a tree was struck.

The altimeter settings corresponded with the barometric pressure of 1012mb reported to the flight. The radar altimeter indicated 180 ft.

The reconstruction of the actual approach and landing procedure revealed that:

1. The cockpit crew knew that the use of the ILS was not authorized.
2. The crew received a clearance for the VOR/DME approach. Although they acknowledged this clearance, they proceeded to use the ILS.
3. During the approach procedure the crew descended deliberately below the minimum descent altitude of the VOR (560 ft) and that of the ILS (260 ft).
4. The first officer suggests that the airplane is too high despite the "glide slope" alarm, which warns that the airplane is below the glide slope.

4.3 Aircraft Performance

The Commission based its study of aircraft performance on data from the FDR, the CVR and the flight plan obtained from SLM

operations. The weight and balance for this flight was calculated as follows:

Total Traffic Load	41.816	pounds
Dry Operating Weight	149.362	"
Zero Fuel Weight	191.177	"
Take-off fuel (actual)	139.311	"
Take-off gross weight	330.488	"
Estimated fuel burn	120.250	"
Estimated Landing Weight	210.237	"
Taxi fuel (not included above)	1.000	"

The take-off load limit was 26.0% MAC and for the landing with extended landing gear 18.2, while the aftmost limit at more than 195.000 lbs was 31.4.

The fuel requirements for the flight (actual take-off fuel) was calculated as follows:

Fuel for ETE plus 2% for high consumption	120.250	pounds
3% reserve for no alternate within 500 miles	3.610	"
10 minutes company imposed reserve	1.820	"
Alternate Cayenne plus 30 minutes	13.630	"
	<hr/>	
	139.310	pounds

The approach speeds (in knots) for an estimated landing weight of 210.237 lbs are as follows:

<u>Full Flap landing</u>		<u>35° Flap landing</u> ("quiet approach")
Vref	127	132
FAS	132	137
12 bug	152	157
Obug	177	182

The crew probably used the quiet approach procedure with 35° flaps max.

The CVR and FDR do not give any indication that there were problems with the performance of the airplane or that one or more of the crew members were unable to discharge their duties.

4.4 The Role of Ground-based NavAids

Tests were made to determine to what extent the operation of the navigational and visual landing aids may have contributed to the accident. These aids were tested on 13 June 1989 by a specially equipped FAA airplane.

It was found that the NDB and VOR/DME functioned well while it was confirmed that some parameters of the ILS - as per previous notification - were unreliable. However, this FAA flight check team arrived at the conclusion that a safe landing could have been made if the pilot had adhered to the published ILS procedure.

4.5 Operational Control

The discovery during the investigation that the captain was not qualified to conduct this flight prompted the Commission

to find an explanation for the presence of an unqualified pilot-in-command.

When the crew of this aircraft was recruited from ACI by SLM it was assumed that they were fully qualified and properly certificated to fly the DC8.

The investigation revealed that this background of the cockpit crew had not been examined, that no proficiency or route checks had been conducted and that the Aviation Department had not received information about the crew. ACI stated that the pilots themselves were responsible for arranging the required flight checks.

Documentation obtained from the FAA and NTSB shows that the captain and the flight engineer were licensed to fly DC8 - type airplanes. However, as the flight involved was a commercial, international flight, the captain was not authorized to act as pilot-in-command of this flight based on the current regulations of the USA and Suriname as well as the relevant international (ICAO) procedures which stem from the Chicago Convention.

According to Suriname Law - Art. 8 of the Decree of 27 November 1985 (S.B. 1985 no. 69) - the holder of a pilot certificate is not authorized to act as pilot during commercial flights when he/she has reached age 60.

Statements from SLM indicate that the company assumed that the Operating Permit issued by the FAA under FAR Part 129 included permission to conduct international flights without applying the age 60 limit to the pilots. However, said Part 129

is applicable only in the USA and, furthermore, this does not affect the applicability of Suriname aviation regulations in the operation of Suriname airlines, even if it involves flights to the USA or flights in aircraft registered in the USA.

Since the aircraft had American registration, the certification and qualification of the pilots were also governed by American regulations. In that regard American regulations stipulate that pilots-in-command of commercial flights conducted under FAR Part 129 may not be older than 60, in accordance with international regulations stemming from the Chicago Convention.

The information obtained also showed that the pilots had not completed the required periodic proficiency check on the type airplane (DC-8) within the prescribed period; as a result, they were not qualified to act as flight crew members.

According to statements from SLM personnel some incidents had occurred during SLM flights under the command of

- At Miami Airport he allowed the aircraft engines to develop full RPM in the vicinity of the terminal, contrary to existing directives; he ignored the admonition of airport officials.
- At Belem Airport the airplane left the runway and became stuck in the soil when too sharp a turn was made.
- At Lisbon Airport he made a hard landing with N1809E during a thunderstorm resulting in deflated tires and runway damage. This happened about four months before the PY 764 accident.

Following SLM's investigation of those incidents, ACI executives were forbidden to use the Captain in future SLM assignments; this directive took effect. Nevertheless, flight logs indicated that, since 24 May 1989, said captain again acted as a crew member (co-pilot) and on 4 June 1989 as pilot-in-command of a flight to Amsterdam. An employer of SLM's Logistics Department noted this and reported it to the directors of the Departments of Operations and Logistics; no action was taken.

The manager of Flight Operations was also aware that the Captain was again flying for SLM. However, there is no evidence that further action was taken against him.

The investigation also indicated that the appropriate and responsible SLM officials (Manager Flight Operations, Director of Operations) often had no direct or indirect knowledge of the identity of the American flight crews who conducted the SLM DC-8 flights and of their qualifications and certification. The following procedure was used to muster flight crews:

The Manager of Flight Operations notified the Logistics Department of the requirement; this Department, in turn, would send a telex message to SLM-Miami and the latter would relay the requirements to ACI. ACI would then assign 3 persons (a pilot-in-command, a first officer and a flight engineer) to conduct SLM flights.

According to statements from ACI, , the competency and certification of those involved were generally not checked. This

practice is contrary to the aviation regulations and the Operations Manual approved by the Aviation Department.

It is noted that within SLM there was no agreement about the scheduling of the captain. The company had insufficient insight in the qualifications of the flight crew while their operation of the flight was considered an "American operation". This could lead to the erroneous belief within SLM that the hired crew did not fall within the jurisdiction of SLM's Operations Department.

5. FINDINGS

5.1 Summary

- a. The analysis of the CVR transcript, the FDR data and all other available information indicates that the aircraft was in a normally functioning, airworthy condition during the flight until the moment it struck the tree.
- b. Investigation of the wreckage did not produce any evidence of a terrorist act or sabotage.
- c. The flight crew was aware that:
 1. Air traffic control had cleared them for a VOR-DME approach.
 2. The reported weather was below the prescribed minima for a VOR-DME approach.
 3. The ILS was not to be used for operational purposes, which meant that the weather minima associated with the ILS were not applicable.

d. The captain decided to execute an approach procedure. However, that procedure did not follow the prescribed approach procedure for runway 10; one of the deviations involved not starting the procedure turn at the designated point. In addition, there was no adherence to the prescribed minimum altitudes, including the "Minimum Descend Altitude" as evidenced by the crash location. The CVR analysis indicates that the pilot used information from the ILS in that process, although he knew that the ILS was not available for operational use. Especially noteworthy in that regard is the observation that various warning signals in the cockpit were either ignored or turned off.

e. The CVR information also indicates that the pilot was actually in the process of making a visual landing as shown by his confirmation that he had the field in sight and also his repeated request to increase the intensity of the runway lights.

The refraction of light through the fog could have created a false impression of the real distance to the runway. As a result of the concentration on a visual landing during the final phases of the approach, little or no use was made of the information available in the cockpit which depicted the true position of the aircraft with regard to the runway.

f. The captain was aware of the fact that he was proceeding below the "normal" glide slope angle since the appropriate warning signals were audible in the cockpit.

- g. It is noted that during the descent and approach, coordination in the cockpit was very poor; at the same time, the captain was slow in the performance of certain tasks or failed to make proper use of the information displayed on the instruments.
- h. According to binding regulations the captain was not qualified to act as pilot-in-command of flight PY764 due to his age (beyond 60) and his most recent proficiency check flight on an aircraft other than a DC8.
- i. ACI failed to furnish SLM with a qualified and properly licensed pilot-in-command in accordance with the contract.
- j. The company failed to verify that ACI assigned qualified and properly licensed flight crew members to conduct the company's flights.
- k. It was not clear who was directly responsible for the American crew and the exercise of control over training, competency, route checks, etc.
- l. SLM did not inform the Suriname Aviation Department about its contract with ACI. Furthermore, no information about the qualifications and licensing of the American pilots was ever forwarded to the Aviation Department.

5.2 CAUSE

The Commission determines:

- a. That as a result of the captain's glaring carelessness and recklessness the aircraft was flown below the

published minimum altitudes during the approach and consequently collided with a tree.

- b. An underlying factor in the accident was the failure of SLM's operational management to observe the pertinent regulations as well as the procedures prescribed in the SLM Operational Manual concerning qualification and certification during the recruitment and employment of the crew members furnished by ACI.

RECOMMENDATIONS

The Commission of Inquiry wishes to make the following air safety recommendations:

1. The Commission's finding with regard to the lack of standardization in flight operations calls for improvements in the functioning of the company's organizational elements.
Government surveillance of SLM must be strengthened.
2. All airline companies operating in Suriname should have a properly staffed and functioning Flight Operations Department that is familiar with the relevant regulations.
3. The Aviation Department has to strengthen its surveillance, especially with regard to the operational performance of air carriers.
4. It is recommended that more meteorological information be made available to airspace users by augmenting the existing ground equipment.

5. A comprehensive disaster plan, including adequate equipment for the agencies involved and an appropriate legal framework, are essential for efficient and vigorous search, rescue and investigation activities in connection with various types of disasters.