Republic of the Philippines
Department of Transportation and Communications
CIVIL AERONAUTICS BOARD
OLD MIA ROAD, PASAY CITY,
METRO MANILA

A Century of bringing the Filipinos closer together through better transportation and communications

IN RE : Aircraft Investigation Report on the Accident of Philippine Airlines' Flight PR137 on the Manila-Bacolod-Manila route Last March 22, 1998

RESOLUTION NO. 94 (2000)

The Board resolved, as it hereby resolves to Take Note of the Aircraft Investigation Report on the accident which befell RP-C3222, an Airbus A320 type of aircraft operated by Philippine Airlines, Inc. as Flight PR137 for its Manila-Bacolod-Manila route last March 22, 1998.

The Board resolved further to make public said report pursuant to R.A. 776.

23 August 2000,
Mandaluyong City, Philippines.

x----------x

ORIGINAL SIGNED

SEC. VICENTE C. RIVERA, JR.
Chairman

ASST. SEC. JACINTO F. ORTEGA, JR.
Vice Chairman

USEC. FRANKLIN M. EBDALIN
Member

MR. EDUARDO C. GALANG
Member

ATTY. LITO A. MONDRAGON
Member

Attested by:

CARMELO L. ARCILLA
Deputy Executive Director
(Acting Board Secretary)

COPY RECEIVED
BY: FERDINAND AQUINO
DATE: 7 Oct 2000

Republic of the Philippines
Department of Transportation and Communications
CIVIL AERONAUTICS BOARD
OLD MIA ROAD, PASAY CITY,
METRO MANILA

A Century of bringing the Filipinos closer together through better transportation and communications

2nd Indorsement
13 June 2000

Respectfully forwarded to the Honorable Board the attached ATO Aircraft Accident Report on the accident which befell RP-C 3222, an aircraft operated by Philippine Airlines on the route Manila-Bacolod-Manila last March 22, 1998, at 1941 H, for the Board's information and consideration.

EMMANUEL NOEL A. CRUZ
Executive Director

Republic of the Philippines
Department of Transportation and Communication
AIR TRANSPORTATION OFFICE
1300 MIA Road, Pasay City, Metro Manila

AIRCRAFT ACCIDENT REPORT
(30 MAY 2000)

I. BASIC INFORMATION

Registration Mark	:	RP-C 3222
Aircraft Type/Model	:	Airbus A320-214
Operator/Address	:	Philippine Air Lines Post Office Box 1955 Manila, Philippines
Pilot-In-Command	:	Capt. Theodore P. Facun
Date/Time of Accident	:	22 March 1998/1941H
Place of Accident	:	Some 200 meters from the end of Bacolod Airport Runway 04 Lat. 10° 38' 42" N Long. 122° 55' 21" E
Type of Operation	:	Domestic Scheduled Passenger
Phase of Operation	:	Landing
Type of Accident	:	Overshoot

1.1 History of Flight

Flight PR 137 was a regular scheduled passenger flight of Philippine Airlines utilizing an Airbus A-320 type of aircraft which departed Manila for Bacolod at 1840H last March 22, 1998. The flight was piloted by Capt. T. P. Facun and assisted by First Officer J. J. Hernandez. The flight time from Manila to Bacolod was normally flown for a period of one hour and the said flight was uneventful from take-off up to top of descent.

At 1920H, PR 137 called up Bacolod Approach Control and reported passing Flight Level (FL) 260 and 55 DME to Bacolod. Then requested for landing instructions and was instructed to descend to FL 90 after passing Iloilo and descend to 3,000 ft. for a VOR Runway 04 approach. Wind at 030°/08 kts., altimeter setting at 1014 mbs, transition level at FL 60 and temperature at 28° C.

The flight acknowledged the ATC instructions and repeated to descend to 3,000 ft .after passing Iloilo. At 1928H, the flight requested to intercept the final approach to Runway 04 and the Approach Control replied "PR 137 visual approach on final". At 1937H, Bacolod Tower cleared the flight to land at Runway 04 and the clearance was acknowledged by the pilot.

PR 137 approached and landed without declaring any emergency at 1941H, The Bacolod Tower controller-on-duty saw the aircraft landed on Runway 04. However, investigation revealed that the touch down point was abeam the Distance To Go Marker No. 3 and continued to roll until it overshoot the runway. The aircraft hit the airport perimeter fence and then jumped over the river. It continued to slice through a hallow block fence where it went through several clusters of shanties and trees. It rested finally on a heading of north 70° east amidst a Karaoke Disco Pub House some 200 meters away from the Runway 04 end.

No fire ensued after the crash on account of the timely arrival of the ATO Crash Fire Rescue Team under the close supervision of the Bacolod Airport Manager, with the assistance support of the Bacolod City Fire Brigade. Rescue evacuation of the injured passengers and other persons on the ground was supervised by the USEC of the DOTC who happened to be present in the airport at the time of accident. The accident happened after sunset.

1.2 Injuries to Person(s)

Injuries	Crew	Passengers	Others
Fatal	0	0	3
Serious	2	42	25
Minor/None	0/4	0/82	0
Total	6	124	28

1.3 Damage to Aircraft

The aircraft RP-C 3222 was damaged beyond economical repair as the integrity of the main aircraft structure has been compromised by impact with the concrete fence structures erected after the end of Runway 04.

1.4 Other Damage

The left hand inner PAPI light s of Runway 22, together with some parts of the airport perimeter fence, several houses and trees along the opposite bank of the river where the Airbus aircraft came to a full stop were destroyed.

1.5 Crew Information

Pilot-In-Command: Capt. THEODORE P. FACUN, age 33, is a holder of a current and valid Airline Transport Pilot License No. 2AT97000125 with rating on Airbus 320 type of aircraft. He has flown a total flying time of 5,048 hrs.of which 74 + 00hrs. were flown in Airbus A 320 type of aircraft.(as of Feb. 1998) The ATO Civil Air Surgeon issued him a First Class Medical Certificate without waiver last November 19. 1998.

Capt. Facun completed his Airbus A-320 Equipment Qualification Course last November 13, 1997 at Airbus Training Center in Toulouse, France and earned his Airbus 320 aircraft type rating last December 15, 1997. His original flight training was undertaken with PAL Aviation School at Nichols Field, Pasay, Metro Manila where he earned his basic pilot training. He completed his commercial pilot training also in PAL Aviation School last January 27, 1988.

First Officer: F/O JOHANSEN C. HERNANDEZ, age 31, is a holder of a Commercial Pilot License No. 2AC9700082, with rating on Airbus A-320 type of aircraft with Instrument Rating . He has a total flight time of 2,886 + 55 hrs. of which 147 + 57 hrs. are flown in Airbus A-320 type of aircraft. The ATO Civil Air Surgeon issued him a second class medical certificate last April 8, 1997 without limitation

He completed his Airbus A-320 Equipment Qualification Course at Airbus Training Center in Toulouse, France. and got his aircraft type rating last October 6,1997. His basic flight training was undertaken in the Philippine Airlines Aviation School, at Nichols, Pasay City and completed his commercial pilot training also in PAL Aviation School last April 30, 1990.

1.6 Aircraft Information

The accident aircraft was an Airbus A-320-214 type of aircraft built by Airbus Industrie, Inc. in Toulouse, France under body serial number MSN 708. It was acquired by Prime Aircraft Leasing Company and leased to PAL last July 25, 1997. It was registered in the Air Transportation Office as RP-C 3222 under Certificate of Registration No. 48-97 last August 11, 1997, valid up to August 10, 1998. It was given a Certificate of Airworthiness No. 37-97 last August 16, 1997, valid up to August 15, 1998.

Aircraft Status as of March 22, 1998

Aircraft Registration	RP - C 3222
Aircraft Serial No.	MSN 708
A/C Total Time/Cycles	1224 : 16 Flying Hours cycles
Last "A" Check	1085 : 36 Flying Hours (960)
Last "B" Check	_____Flying hours ( )
Last "C" Check	_____Flying Hours ( )

	LH Engine	RH Engine
Type	CFM56-5-B4	CFM56-5-B4
Serial Number	779-285	779-286
Date Installed	June 1997	June 1997
TSN/CSN	1224:16hrs/ 958Cyc	1224:16hrs/ 1058Cyc
TBO	Modular New	Modular New
TSO/CSO	New hrs/ New hrs	New hrs/ New hrs
THSI	New hrs	New hrs
TSL/His	New hrs/ New Cyc	New hrs NewCyc

1.7 Meteorological Information

The observed prevailing weather condition at Bacolod Airport according to the Controller on Duty at the time of accident is as follows:

Wind	030° at 08 knots
Altimeter Setting	l014 mbs
Temperature	28°C
Ceiling	Unlimited
Visibility	Unlimited

1.8 Aids To Navigation

No malfunction or outage of any aids to navigation was reported in the Bacolod Airport area of responsibility.

1.9 Communications

No communication difficulty or malfunction of the communication equipment was ever reported by the Bacolod Approach/Tower Control.

1.10 Aerodrome Information

Bacolod Airport located at Bacolod City, Negros Occidental has the following airport particulars:

Coordinates	Lat. 10° 38' 42" N Long. 122° 55' 21" E
Elevation	6.10 m AMSL
Runway QFU	04/22
Runway Dimension	1,956m x 30m
Runway Stopway	50m/0
Runway Clearway	60m/0
Runway Gradient	Uphill to the Northeast
Runway Surface	Concrete
Runway Strength	PCN 28.6R/C/W/T
Ground Services	Aviation fuel and oil available on case to case basis
Operating Hours	H24
Remarks	**Threshold markings on runway 22 is displaced by 54 m. due to presence of building and antennae in the approach zone of runway 22**
Restrictions	**Closed to aircraft without functioning two-way radio. All aircraft maneuvering on runway 22 make 280° turn to the right to avoid jet/prop blast to aircraft at the Aero Club Parking Ramp located on the left side of Runway 22.**

Facilities	Tower, Approach, FOBS. TVOR and CFR services, Hospitals, Telegraph and Telephone stations in the city.			
Visual Ground Aids	Windcone (lighted), AVASI (Runway 04/22), Markers (Runway, Threshold, Designation, Centerline, Touchdown zone, Stopway and Distance To Go)			
Apron	260m x 60m (Concrete)			
Declared Distances	TORA	TODA	ASDA	LDA
Runway 04	1958m	2018m	2008m	1958m
Runway 22	1958m	2008m	1958m	1904m
Turn Around Pad				
N-end	65m x 60m (Elliptical)			
S-end	65m x 60m (Elliptical)			
Classification	Trunkline			

1.11 Flight/Voice Recorders and GPWS

.1 Flight Data Recorder

The Flight Data Recorder of RP-C 3222 was manufactured by Allied Signal under PN-980-4700-003/Serial No. 2001 and installed in the aircraft at the time of its manufacture. It was recovered at the crash site on the same date of the accident and sent to the read out facility of the French DGCA at Paris, France last March 26, 1998 for read out correlation with the cockpit voice recorder.

.2 Cockpit Voice Recorder

The Cockpit Voice Recorder of the aircraft was a Fairchild of USA manufactured under PN-S200=0012-00/Serial No. 01147 and installed in the aircraft during the time of its manufacture. It was also recovered at the scene of the accident on the same day and sent together with the FDR in the French DGCA facility for transcription and correlation with the FDR read out.

.3 Ground Proximity Warning System

The GPWS was not relevant in this particular accident as the landing gear systems of the aircraft are fully extended during the landing roll rendering the system inoperative.

1.12 Impact and Wreckage Information

Investigation revealed that RP-C 322 landed on Bacolod Airport runway 04 as seen by the matching tire prints left on the surface of the runway. Traces of its landing gear tire marks indicated that the aircraft veered to the right shoulder of the runway scouring intermittent braking scars on the ground surface.

The aircraft continued to roll as it left the runway shoulder and went back to the concrete portion of the runway end. It sliced through the overrun hitting the inner left light of runway 22 PAPI lights and crashing into the airport perimeter fence. The aircraft traversed the river at the end of runway 04 and landed with detached landing gears and engines on the opposite bank of the river. Due to its momentum, the aircraft hit in the process cluster of trees and shanties until it came to a full stop on a North 055 degrees East heading.

1.13 Medical and Pathological Information

Still awaiting for the medical examination results.

1.14 Fire Information

There was no pre-impact fire that ensued before landing. The post impact fire that ensued after the crash was put out by the timely response of the ATO Crash Fire/Rescue Team with the full cooperative assistance of the Bacolod City Fire Brigade.

1.15 Survival Aspects

Passenger survival was not remote because the integrity of the main aircraft structure was not fully compromised, although it was battered beyond economical repair.

1.16 Tests and Research

No test and research was ever conducted.

II. ANALYSIS

The Autothrust system was engaged at SPEED mode as confirmed by both Pilots when the item "AUTOTHRUST" was called in the landing checklist and the Captain responded "SPEED" under this set-up, the FADEC commands the engine to maintain the computed $V_{APPROACH}$, or in conditions with wind the "GROUND SPEED MINI" (FCOM 1.22.30).

Selecting one thrust lever (TL) to idle, limits the thrust range of the No. 2 engine. Consequently, since the TLA-1 was not retarded to idle but was left in the CLIMB DETENT, engine No. 1 therefore, remained being controlled by the A/THR SPEED MODE.

In the context of the accident, approach in manual mode and A/THR engaged , and at least one thrust lever is above idle detent, the "retard" call out is emitted at 20 feet R. A. and continuously below this height until the aircraft speed reaches below 80 kts on ground.

- 2 thrust levers in idle detent, or
- at least one thrust lever is in the reverse range detent (this was the condition that stopped the "retard"callout on the accident aircraft (Annex B)

Upon touchdown, F/O Hernadez calls out "no spoilers, no reverse, no decel" the actuation logic to satisfy the deployment of the spoilers demands the following:

- compression of the landing gears, sensed by the LGCIU
- the BSCU
- thrust lever angle, in the context of the accident when TLA 1 was in climb detent spoilers did not deploy (FCOM 1.27.10 p. 12 & 13)

Engine No. 2 was set to full reverse thrust after touchdown, Engine No. 1 thrust lever was not retarded to idle and remained in the climb power position (Annex C).

At this point autothrust was disengaged (Annex B) this is the normal disengagement logic on the ATS at least one lever set to reverse detent.

ATS disengaged TLA 1 was in climb detent, actual N_1 of engine No. 1 now increases to climb thrust.

This significant difference in thrust caused the runway excursion abeam the Bacolod Terminal. With this speed, no amount of rudder and steering could correct the situation (as mentioned by Capt. Facum). The NWS angle is limited to + 6° ordered from rudder pedals and at speeds greater than 70 kts ground speed, the orders from the hand wheels are ineffective (FCOM 1.32.20 p. 1)

Engine No. 2 was moved out of reverse up to more than 70 percent N_1 (Annex C).

Aircraft swerves back to the runway. Exited the end of the runway with both engines in forward thrust. Engine 1 at climb power, Engine 2 N_1 more than 70 percent.

Aircraft hits an embankment entered a housing area and it is reported that three people on ground were killed and several passengers were injured (Annex D).

The last data recorded on the CVR was retard on the Cockpit Mechanical Voice (CMV).

The DFDR records the last speed at 90 kts.

III. CONCLUSIONS

3.1 Findings

.1 Flight Crew

a) Records indicate that both pilots were holder of appropriate current and valid pilot licenses issued by ATO;

b) Records also indicate that both pilots were type rated to fly the Airbus A-320 type of aircraft;

c) The same records also showed that both pilots were issued with an appropriate current and valid medical certificate by the ATO Civil Air Surgeon ;

d) Records revealed that both pilots were route qualified for the Manila/Bacolod flight and there was nothing to indicate that any of the two pilots either suffered incapacitation during the flight as evidence by the playback of the Cockpit Voice Recorder;

.2 Flight Operations Officer

a) Records showed that the Flight Operations Officer who dispatched Flight 137 is duly licensed by the ATO;

b) Records also indicated that the same Flight Operations Officer is issued an appropriate medical certificate by the ATO Civil Air Surgeon;

.3 The Aircraft RP-C 3222

a) Records showed that the Airbus A-320 aircraft with Serial No. MSN 708 was registered with ATO as RP:-C 3222 and issued a Certificate of Airworthiness No. 37-97 valid up to August 15, 1998;

b) RP-C 3222 has flown from Manila to Cebu uneventful and then took-off from Cebu to Manila without any untoward incident the day before it met an accident at Bacolod.

3.2 Probable Cause(s)

The probable cause of this accident was the inability of the pilot flying to assess properly the situational condition of the aircraft immediately upon touch down with No. 1 engine reverse inoperative, thereby causing an adverse flight condition of extreme differential power application during the landing roll resulting in runway excursion and finally an overshoot.

Contributory to this accident is the apparent lack of technical systems knowledge and lack of appreciation of the disastrous effects of misinterpreting provisions and requirements of a Minimum Equipment List (MEL).

IV. RECOMMENDATION

To prevent recurrence of similar or the same accident, the following are recommended:

1) In todays world of sophisticated automation, human interface with this kind of machine can only be safe and efficient if the technical knowledge in close coordination with Crew Resource Management (CRM) is applied correctly all the time. The operator therefore needs to augment its initial and recurrent training to ensure safe and efficient operations;

2) Airline Operators must develop a comprehensive monitoring coupled by a correcting and enhancing system preferably thru its Flight Safety Division to ensure that technical system knowledge are well understood and correctly applied.

3) Review the Airbus A320 flight technique for landing with one engine reverse inoperative, amend/revise as necessary;

J. C. ROBLES, JR.
Chairman, SAAIB

ROLANDO LUNA
Member

CRISPIN L. CRUZ
Member

CESAR A. DARIO
Member

ARIEL CONCEPCION
Member